

LAS PALMAS

Masters Report by Aaron Liggett

An approach towards sustainable tourism development in
BAJA CALIFORNIA SUR, Mexico



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A Master's Report submitted to the Faculty of the
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ABSTRACT

AS MASS TOURISM IS SPREADING THROUGHOUT LATIN AMERICA, HAPHAZARD GROWTH IS THREATENING THE ENVIRONMENT AND LOCAL COMMUNITIES. IN AN EFFORT TO MITIGATE SOCIAL AND ENVIRONMENTAL IMPACTS AN ALTERNATIVE APPROACH TOWARDS TOURISM DEVELOPMENT UTILIZES PRINCIPLES OF ECOTOURISM AND SMART GROWTH TO BALANCE TOURISM, COMMUNITY, AND ENVIRONMENTAL GOALS IN ORDER TO MAINTAIN A HEALTHY ENVIRONMENT AND CONTRIBUTE TO THE LOCAL COMMUNITY.

LOCATED SEVERAL MILES SOUTH OF THE TOWN OF TODOS SANTOS IN BAJA CALIFORNIA SUR, MEXICO, LAS PALMAS IS A 490 ACRE SITE WITH A MIXED USE DEVELOPMENT FOCUSED ON ECOLOGICAL PRESERVATION AND THE INTEGRATION OF TOURISM WITH THE LOCAL COMMUNITY.

ENTIRELY PEDESTRIAN ORIENTED, THE DEVELOPMENT INCLUDES A 46 UNIT ECOLODGE THAT IS CONNECTED TO A TOWN CENTER COMPOSED OF A VARIETY OF HOUSING TYPES, AND FEATURES COMMERCIAL SERVICES, SELECTED RETAIL, AND FITNESS AND COMMUNITY CENTERS. A 14 ACRE ORGANIC FARM WEAVES THROUGH THE DEVELOPMENT PROVIDING FRESH VEGETABLES TO THE LOCAL MARKET AND RESTAURANTS. 95% OF THE SITE IS SET ASIDE AS PERMANENT NATURAL OPEN SPACE RUN BY RESEARCH FACILITIES THAT RESPONSIBLY GUIDE VISITORS THROUGH ITS NATURAL BEAUTIES.

SUSTAINABLE PRACTICES AND RESEARCH AT LAS PALMAS INCLUDE AN ONSITE CONSTRUCTED WETLAND TO TREAT AND REUSE WASTEWATER, ENERGY-EFFICIENT DESIGN STRATEGIES, A SOLAR HARVESTING FARM, AN ONSITE AGRICULTURAL CENTER, AND ECOLOGICAL REGENERATION.

“LOS PAISAJES SON LAS MÁS LINDAS HERMOSAS PINTURAS QUE NOS REGALA LA NATURLEZA, SIN PELEIGRO DE QUE ALGIEN LAS ROBE, PERO SÍ DE QUE LAS MEJORE O LAS DESTRUYA.”

“LANDSCAPES ARE THE MOST BEAUTIFUL PICTURES WHICH NATURE GIVES US AND ALTHOUGH NOT IN DANGER OF BEING STOLEN, ARE SUSCEPTIBLE TO BEING IMPROVED OR DESTROYED.”

NÉSTOR AGÚNDEZ MARTÍNEZ
POET AND PROFESSOR FROM TODOS SANTOS
1926-2009

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Ronald Stoltz
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INTRODUCTION

THE INTRODUCTORY CHAPTER CONTAINS A BRIEF DESCRIPTION OF THE PROJECT SIGNIFICANCE AND GOALS IN RESPONSE TO CURRENT DEVELOPMENT TRENDS OBSERVED IN BAJA CALIFORNIA SUR, MEXICO. IT IS FOLLOWED WITH AN OVERVIEW OF THE APPROACH AND PRINCIPLES USED IN THE DESIGN PROCESS AND A BRIEF SYNOPSIS THE REGION'S GEOGRAPHY, HISTORY, AND CULTURE.

SIGNIFICANCE

In a boom of heavy tourism growth in Mexico's Southern Baja region, many beachfront properties are developing into high rise resorts, golf courses and private gated communities. Carelessly building on fragile coastal ecosystems, using an abundance of water, and alienating the local community, these developments are leaving behind a degraded environment, displaced locals, and a diminished cultural identity. The very assets that have attracted tourists in the first place are being replaced with deteriorated ecological and social conditions.



2) This example of a massive beach front resort in BCS has leveled the fragile sand dunes to get as close to the ocean as possible, making it prone to storm surges and disrupting the nearby wetlands.

1) Rapid population growth, a response to an increase of tourism activities, in Cabo San Lucas BCS has resulted in poor housing conditions. This grid is in a flood plain and is pushed to the outskirts of town surrounding the Cabo San Lucas airport.



3) A golf course along a pristine beach in BCS uses an abundance of water to maintain its greens and fairways in a region where water is scarce.

PROJECT DESCRIPTION

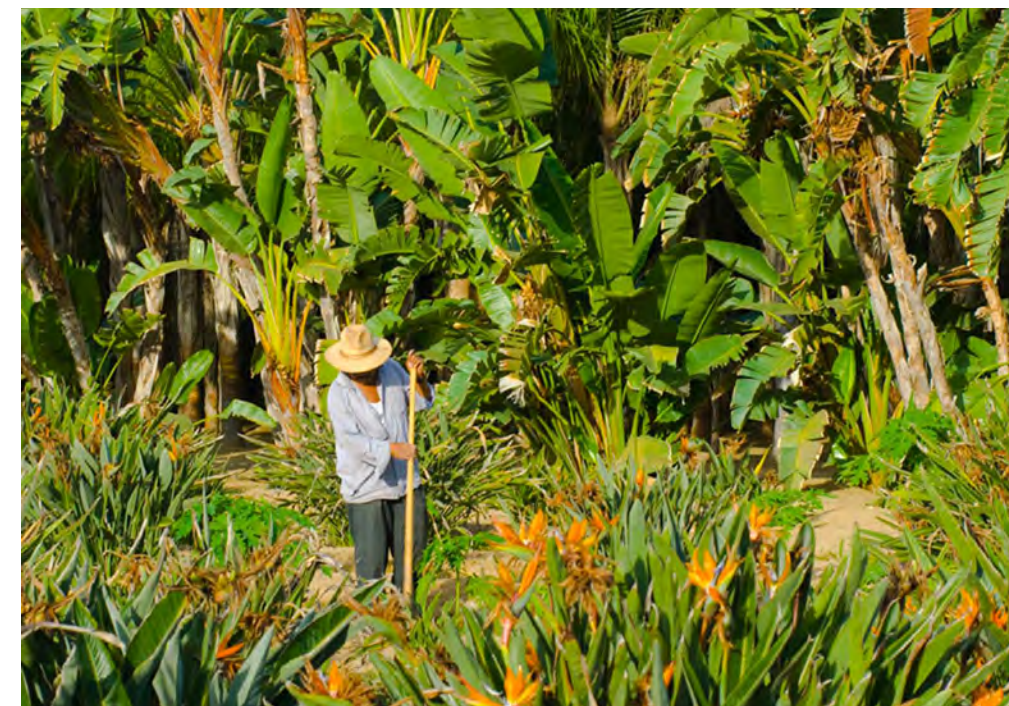
This project explores alternatives to the region's current development trend, with the design of a sustainable beachfront community in Baja California Sur, Mexico. The design addresses the ecological and social impacts, with principles of eco-tourism and smart-growth, to create an environment that attracts tourists while contributing to the local community. Balancing environmental, community and tourism goals, an appropriately scaled development maintains a healthy environment and preserves a cultural identity.

4) A girl in traditional dress captures the rapidly fading colonial culture of BCS.



PROJECT GOALS

To integrate tourism development in Baja California Sur, Mexico with existing ecological and cultural characteristics to provide an authentic tourism scenario that minimizes the impact on the environment and encourages cultural exchanges.

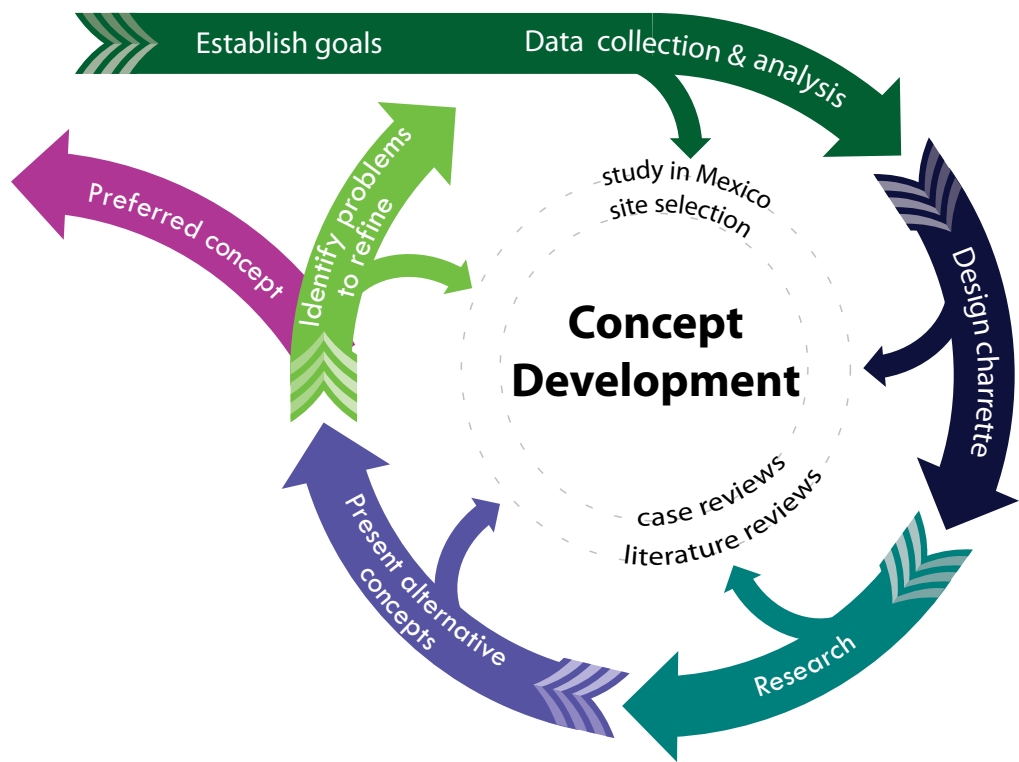


5) Farming, a strong part of the identity of BCS, was essential to sustaining the colonial Spanish Missions.

DESIGN PROCESS

In an iterative process involving site analysis, design charettes, and focused research, alternative concepts are generated and critiqued by my client, faculty and peers. In a feedback loop that heavily relies on constructive criticism and the evaluation of alternative design concepts, the concepts are re-worked and synthesized until a preferred alternative is proposed.

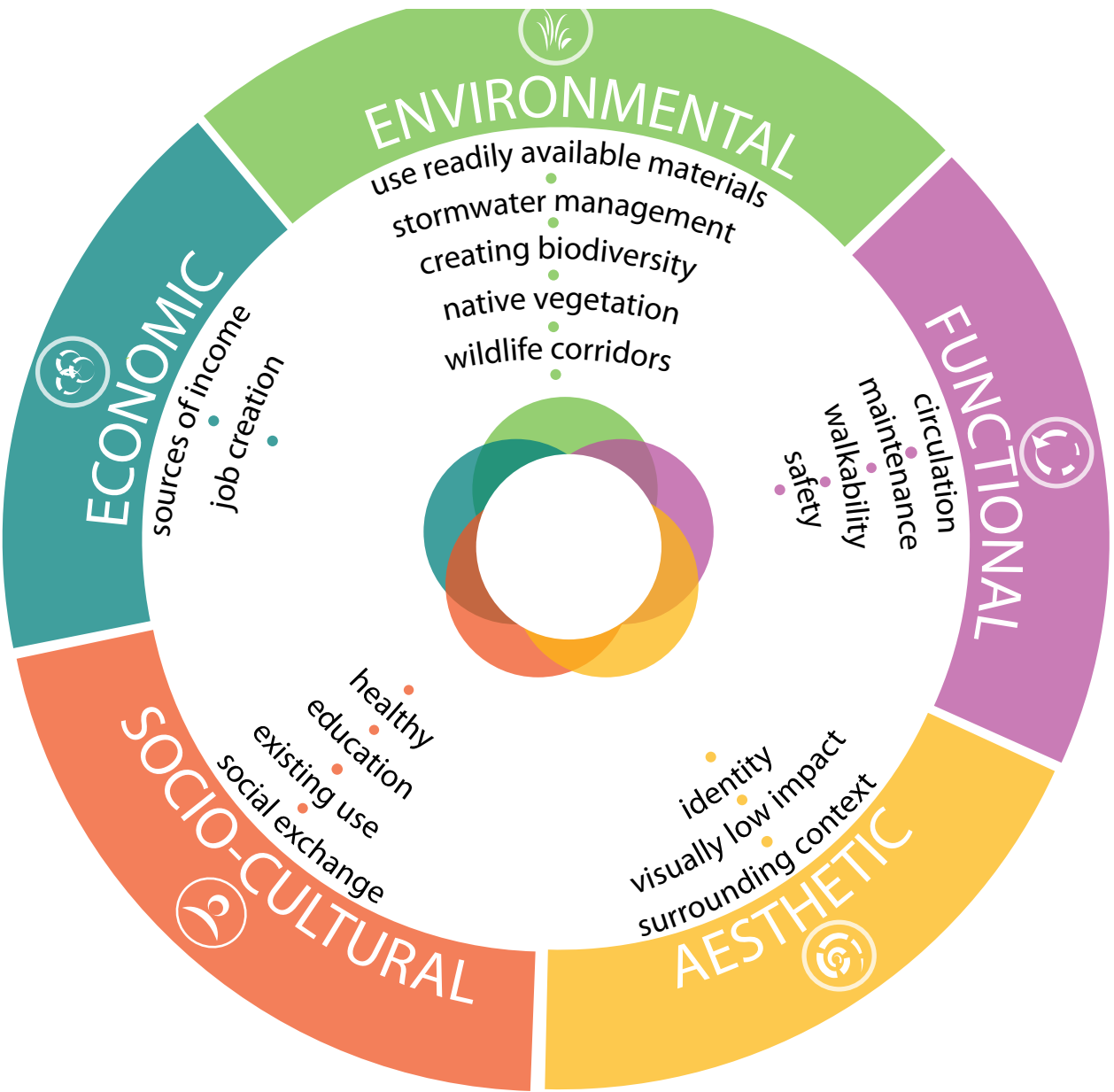
With the objective of presenting alternative solutions to the current tourism trends in Latin America, an overarching goal was established to design a sustainable tourism development in the southern Baja California Peninsula of Mexico. This was followed up with a 5 week long study of observations and research in Baja California Sur, Mexico. Cities of various scales and level of development were observed in order to identify problems and potential solutions to the rapid tourism growth. After meeting with local architects and developers, the opportunity arose to design a tourism development at Las Palmas. Once the site was chosen, further research into the contextual surroundings and a detailed analysis of the site were performed.



6) This small cabina immersed in a working orchard home during the study in Baja. Lucky enough to see it while it still stood, it is unfortunately being torn down along with the orchard as it is planned to be converted into a private gated community.

ORDERING SYSTEMS

The evaluations of the study in Mexico, of literature and case reviews, and ultimately the final design are defined across an array of dimensions that are used to evaluate the success of the design; Economic, Socio-cultural, Environmental, Functional, and Aesthetic. These dimensions act as guiding principles throughout the design process to measure the effectiveness and sustainability of the tourism design. Understanding that sustainability is a difficult task to measure, by satisfying and balancing each dimension, it is believed that a more thoughtful and responsible design can be achieved.



SITE DESCRIPTION

Along the Mexican coastline of the Pacific Ocean, the secluded beach of San Pedro is nestled between the small towns of Todos Santos and El Pescadero. In a geographically unique setting where the ocean, desert, and mountains converge at an oasis, lush palm groves and fertile farm lands offer a pleasant contrast to the surrounding rugged desert of Baja California Sur (BCS). San Pedro beach, locally known as Las Palmas, originated as a sugar cane ranch in the 1800's. Now, having been abandoned for nearly 70 years, what remains are the brick ruins of ranch dwellings surrounded by dense palm groves and a freshwater lagoon that cuts through sand dunes into the sea.



8) This freshwater spring invites a wealth of wildlife and is an attraction for the local residences.



9) A ruin of an old ranch dwelling perched on the central hill surrounded by the palm groves. The building materials date the age of the building and are similar to the archetype found in nearby colonial town of Todos Santos.



10) An access path through the dense palm groves leads to the beach.

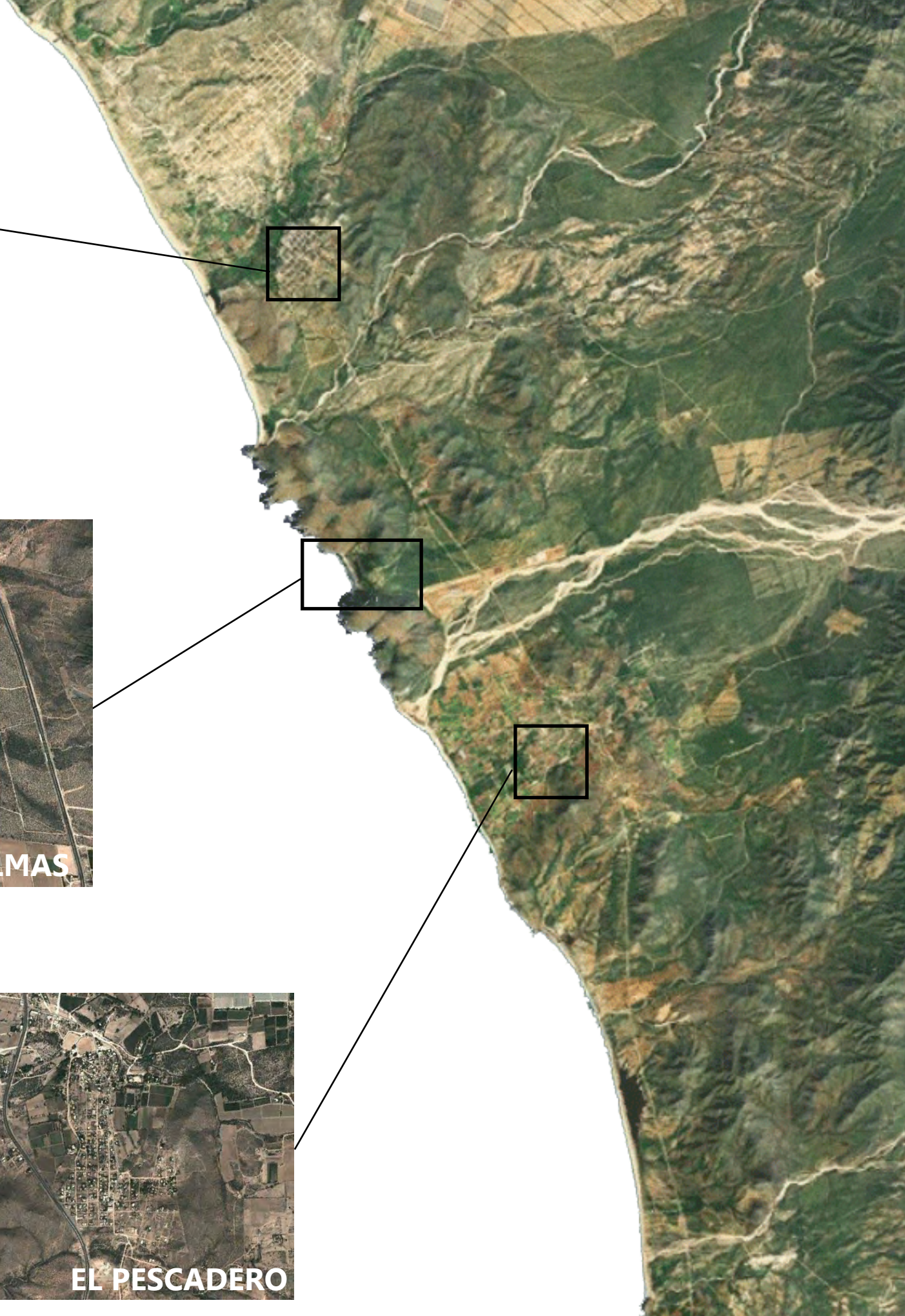
7) A view from a hill looking north over the site shows the contrast of the lush oasis immersed in an arid dessert.



GEOGRAPHIC LOCATION

Las Palmas is located on the southwestern tip of the state of BCS, Mexico in the municipality of La Paz. It lies along the Pacific Ocean just off the Mex 19 highway, 50 miles (80 kilometers) south of the state capital of La Paz and 50 miles (80 kilometers) north of the popular tourist destination Cabo San Lucas.

Two small towns are situated on either side of the beach. Todos Santos, 3 miles (5 kilometers) to the north, has a population of approximately 6,000 residents. An old colonial town that is home to one of the original Spanish missions, its cobble stone streets and red brick buildings has gained it the prestigious title of a Pueblo Magico. This honorary distinction, given to well-preserved towns across Mexico is a pledge to preserve its charm, unique traditions, and natural beauty. El Pescadero, 3 miles (5 kilometers) to the south, is about half the size of Todos Santos. A more laid back town of rural farmlands, the town flourishes with its commercial farming.



PHYSICAL ENVIRONMENT

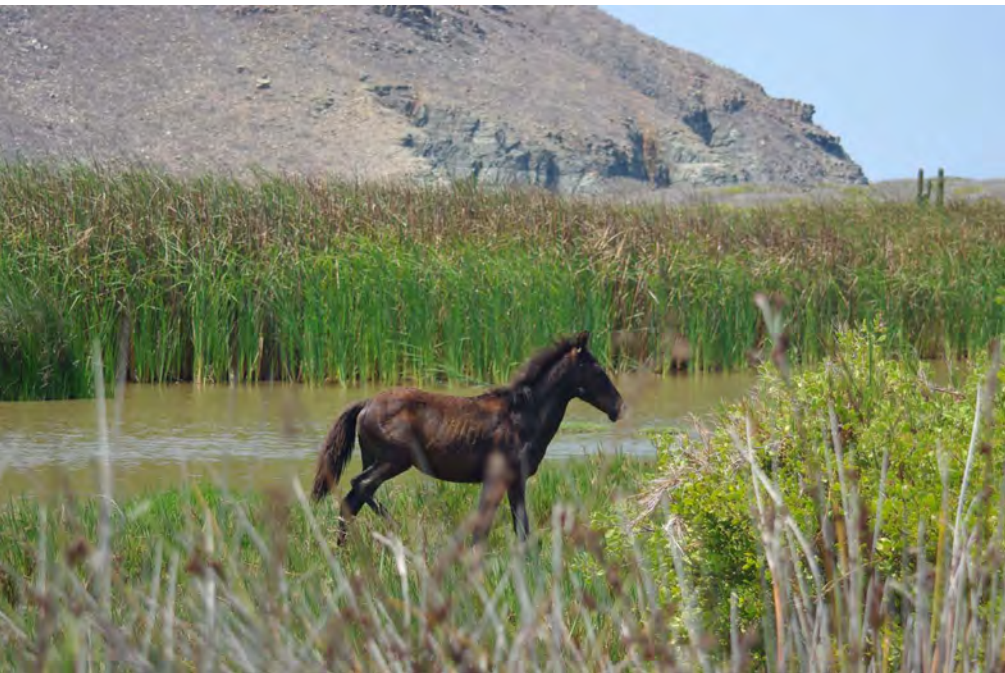
Las Palmas is in the cape lowlands of the tropical dry region that occupies the southern tip of the Baja California Peninsula. Just several miles below the Tropic of Cancer, most of the precipitation is derived from tropical cyclones in late summer and fall that provide an average of 22 inches (56 cm) of annual rainfall. Las Palmas is a part of the coastal alluvial plane of the Sierra de la Laguna mountain range that, just 10 miles (16 kilometers) inland from the Pacific coast, runs boldly down the southern spine of the peninsula. The steep granite mountain range, peaking at 7,200 feet (2,200 m), is composed of evergreen oak woodlands and pine-oak oak forests, attracting hikers, climbers, and mountain bikers to explore it slopes. The mountains receive significantly more rain than the coastal plains bellow with an average of 40 inches (1 m) per year (Rebman 2012). Water is distributed to the coastal region through washes and underground rivers, filling aquifers that nourish coastal oases of palm groves and marshlands. The health of the Sierra de la Laguna Mountains are essential to the unique physical environment found in the southern tropical dry region of the Baja Peninsula and has been designated by UNESCO as a protected global biosphere reserve.

The coastline is made of sandy beaches of sand dunes that are enclosed by steep rocky bluffs. The Pacific Ocean provides a biologically diverse ecosystem that is great for fishing and diving. Strong ocean swells provide waves year around and make for a world class surf destination. The cool California Current maintains moderate seasonal variations that provide a comfortable climate a good portion of the year. August through October, the most hot and humid months, are considered the low season. However, it is almost always a comfortable 10 degrees (5.5° C) cooler at Las Palmas, along the Pacific Coast, than in La Paz or Cabo San Lucas on the Gulf side.

Region:	Tropical Region
Sub-region:	Cape Lowlands
Ecoregion:	Coastal alluvial plains
Biotic Community:	Desert scrub
Rainfall:	22 in/yr.
Temperature:	Average high in August is 77 F High of 91 F Average low in February is 52 F Low of 46 F



11) Located among lush thornscrub desert, Las Palmas receives little rainfall yet is surrounded by a rich mix of desert plants that include towering cardón cactus and white-barked palo blanco, in part due to hot and humid summers.



12) A wetland surfaces at the coast providing rich habitats and attract wildlife from across the desert.



14) A waterfall in the nearby Sierra de La Laguna Mountain range provides a perennial source of water that feeds the coastal wetlands through underground rivers.

13) A tropical cyclone strikes down off the coast of Las Palmas. These summer storms are the main contributor of rainfall to the otherwise dry coastal region.



HISTORY AND CULTURE

The region of the southern Baja Peninsula was originally home to the Pericu Indians, nomadic fisherman who lived almost entirely off of the sea. Since the first Spanish contact in the 1530's, their population was in rapid decline due to disease and Spanish conflict. Today the Pericu are linguistically and culturally extinct.

The town of Todos Santos was initially founded by Jesuit Father Jaime Bravo in 1723 as an outstation to help support the Mission de Nuestra Senor de Pilar in La Paz. The climate, fertile soil, and plentiful water supply were well-suited for growing crops to help sustain the mission. Ten years later Todos Santos built a mission of their own, which still stands today.

During the 19th century Todos Santos thrived as the Baja sugarcane capital, which is evident by the ruins of sugarcane ranches, such as the one at Las Palmas. Now the rich farmlands prosper from an abundance of vegetable & chili farming, avocado & mango orchards, and fishing & ranching.

Due to Southern Baja California's remote location and rough climate and terrain, the peninsula

remained virtually isolated for many years. It wasn't until the trans-peninsular highway was completed in 1973 that the southern region became readily accessible. Todos Santos wasn't then re-discovered by tourists until 1984 when the road from Todos Santos to Cabo San Lucas was paved. The tranquil lifestyle of this authentic Mexican village attracted artists and writers from countries around the world. Today, Todos Santos remains an interesting mix of Mexican farmers and expatriates, and has become an artist's haven, home to annual art, music, and cinema festivals.

16) Art studios in old refurbished buildings help enhance the unique character of Todos Santos, one of the only traditional towns in the region that been able to maintain a strong cultural identity.

15) Todos Santos made up of traditional colonial architecture is engulfed by orchards and farmlands, which historically helped sustained its existence.



17) Fishing is a large economic driver for the region though few facilities cater to their needs.



19) Though sugarcane ranches have been abandoned in the region, fruit orchards and vegetable farms are prevalent.

18) The Misión Santa Rosa de las Palmas surrounds a plaza in the heart of Todos Santos.



20) Traditional folklore dance is being performed at one of Todos Santos' many festivals.





RESEARCH

LITERATURE REVIEW & PRECEDENT STUDIES

LITERATURE REVIEWS ARE PRESENTED ON FOCUSED RESEARCH IN ORDER TO ESTABLISH A KNOWLEDGE BASE FOR CONCEPTS, GUIDELINES, AND POTENTIAL PITFALLS THAT ARE FACED WITH COASTAL TOURISM DEVELOPMENT. WITHIN THE RESEARCH A NUMBER OF PRECEDENT STUDIES DEMONSTRATE GOOD AND BAD PRACTICES ON SUSTAINABLE DEVELOPMENT. THESE STUDIES ACT AS INSPIRATIONS AND PROVIDE ALTERNATIVE DESIGN IMPLICATIONS FOR THE FINAL PROPOSED PLAN.

FOR ORGANIZATIONAL PURPOSES THE RESEARCH IS SEPARATED INTO THREE MAIN CATEGORIES; **TOURISM, COASTAL DEVELOPMENT,** AND **GREEN BUILDING DESIGN.** WITHIN EACH CATEGORY, SUB-CATEGORIES NARROW IN ON MORE SPECIFIC SUBJECTS.

DESIGN PRINCIPLES ARE EXTRACTED FROM THIS RESEARCH, AND ARE PRESENTED AT THE END OF THIS SECTION, WHICH DIRECT THE DEVELOPMENT OF THE DESIGN STRATEGIES.

TOURISM

TOURISM TRENDS IN BAJA CALIFORNIA SUR

Tourism is one of Mexico's main economic activities with BCS being a main destination for foreigners and for Mexican nationals. Mexico is the eighth largest international tourist destination in the world and the 2nd largest in the Americas, after the US (Porter, 2008). The top industry in BCS is tourism with Los Cabos at the tip of the Baja Peninsula being the region's most popular destination.

The Beginning

Since the time of the Pericu Indians, human population in the Baja Peninsula was low and settlers had a challenging time colonizing the region. Spanish conquistador Hernan Cortés

first established the settlement of Santa Cruz at the present day site of La Paz, but the colony was soon abandoned after finding the living conditions difficult in the arid region. A hundred years later Jesuit missionaries began navigating the peninsula establishing missions, many of which were abandoned as well. Drought, lack of food, and resistant Native Americans made it difficult for the missions and colonies to survive (Niemann 2002). Eventually, as the Spanish set up trade routes connecting Acapulco and the Philippines, sailors and pirates began to dock in the clam waters of the Sea of Cortez, developing several small commerce centers along the coast. The Spanish influence began to grow on the peninsula and by the 19th century most of the present-day communities had been established (Krutch 1986). Today, the region is still sparsely populated and is the least densely populated of the 32 Mexican states. Most of the development occurs in clusters around the original ports at La Paz and Los Cabos.

Like European colonization, tourism was late to hit BCS due to its remote location and challenging conditions. Separated by 100 miles (160 kilometers) across the Sea of Cortez to the Mexican mainland, and 950 miles (1,530 kilometers) of desert to California in the north,

BCS remained one of the world's least traveled regions for years. It wasn't exposed as a tourist destination until after World War II, when a handful of sportsmen-pilots discovered large fish in the Sea of Cortez bringing attention to the area and gave rise to the first tourism developments (Niemann 2002). Several small lodges arose to cater to the tourists that would fly down to hunt and fish. A few of them built their own airstrips, to facilitate access to those remote areas.

In 1948, the first organized tourism emerged when the region's first resort of Las Cruces was built near La Paz. Over the coming years several more resorts popped up around the Southern Cape of Los Cabos primarily hosting wealthy American actors (Niemann 2002). Still, except for the few brave explorers that would traverse the 1000 mile long peninsula of dirt or absent roads, the region was only accessible by small planes.

The area remained obscure and inaccessible until the Trans-Peninsular-Highway was built in 1973, opening the door to tourist access and a large boom in development. The highway was the first paved road that extended over the entire Baja California Peninsula and was built by

the Mexican government to enhance tourism and economy in the region (Delgado 2011). The highway, starting at San Diego, California provided easier access to the peninsula for Southern California's campers and surfers. Word eventually got out that celebrities hid out down at the Cape, attracting even more yachts and fishing boats (Porter 2008).

In 1976 Fondo Nacional de Fomento al Turismo (FONATUR), the Ministry of Tourism's development branch, pushed for the development of what is today's third largest tourist destination in Mexico, at Los Cabos. It laid out a master plan for the Southern Cape including San Jose del Cabo and Cabo San Lucas. Each piece of land in this area, called the Cabo Corridor, was planned for and to be used as marinas, hotels, golf courses, and shopping centers. Streets were paved and desert sand dunes were converted into green fairways. With 10 luxury hotels of 544 rooms, Los Cabos immediately became a hot spot for high class tourism. In 1986, the international airport in San Jose del Cabo expanded to accommodate more flights. With that came a wave of more development of restaurants, hotels and over 3,000 private residences for foreign vacationers and retirees (Porter, 2008). With the close



22) Today the beach at Cabo San Lucas is lined with large all-inclusive resorts with thousands of rooms.

proximity to the United States, Los Cabos developed close social and economic ties with US visitors.

Tourism development along the Pacific Coast remained scarce, with the exception of Todos Santos. In 1984, after the road from Los Cabos to La Paz was paved, Todos Santos emerged as a beautiful colonial town tucked behind an oasis of palm groves. The cooler climate along the magnificent Pacific coast caught the attention of foreign tourists. Still, development remained slow.

Tourism Today

The Ministry of Tourism has actively pursued a 5-star tourism development at Los Cabos (Porter 2008). Today, there are four international airports in BCS, two in Los Cabos with the others in La Paz and Loreto. Development has continued to grow, though mostly clustered around these areas. Todos Santos, relative to Los Cabos and La Paz remains less developed, but as the highway is improved, allowing for quicker and easier access, tourism development is rapidly advancing. Generally, the scale of development has been smaller along the Pacific due to its distance from major airports and overall smaller community size, but some large resorts and gated communities are currently under construction.

21) Rancho Las Cruces, opening in 1948, was the first resort in Southern Baja. It was started by Abelardo L. Rodriguez Montijo, who started several other resorts in Cabo San Lucas and purchased the property at Las Palmas. Las Palmas, still in his family today, is currently owned by his grandson Kamal Rodriguez.



23) Before the Trans-Peninsular-Highway opened in 1973, the only way to arrive to Southern Baja was by small planes and boats. Now, a highway down the 1000 mile peninsula connects California to the tip of Baja.



Problems Associated with Tourism

Tourism has been and remains the largest economic driver for development in BCS. Though it has brought in a lot of money and created many job opportunities, a number of problems have arisen as well.

Some of the most damaging are the ecological impacts resulting from large scale development. Natural wetlands have been dredged to form marinas and coastal sand dunes leveled to build beach front resorts. These fragile coastal ecosystems, that are essential to the health of the environment, are continually being destroyed (Berger 2006). Wetlands are sources of fresh water and are the most biodiverse ecosystems in the region. Sand dunes replenish beaches after large storm surges and buffer inland areas from flooding. Without protecting theses ecosystems, the most precious resources the region has to offer, the beach and clean water, are being destroyed.

24) Authentic Mexican cultural identity is being replaced by large corporate run business catering to wealthy Americans. Tourists visiting for reasons such as partying, increase the amount of drugs, crime, and prostitution contributing to social problems for the local residents.



Another major environmental concern is water use. Golf courses and large resorts are using an immense amount of water, in region where water is scarce. The increase of tourism has raised the demand for potable water and in certain months many neighborhoods are left without water for extended periods of time (Rains 2007). A local saying in BSC “El agua vale mas que el oro” (“Water is worth more than gold”) found on T-shirts and stickers on street signs is an indicator that there is a local movement of people recognizing the significance of water and inspiration to change how it’s being used.

Sociocultural impacts are equally as damaging with the scale tourism development is now occurring in the region. Large gated communities and high rise resorts are pushing locals away from their homes and cutting off access to public beaches. Separating tourism development with the physical barrier of a wall further alienates the local community from

25) Poor waste management cannot handle the overpopulation of tourists, leaving many beaches littered with trash.



economic prosperity and forms a divide of noticeably different social and living conditions. This contributes to the degradation of the local community pride and strength, which may lead to crime and security issues (Rains 2007). In recent years the majority of the tourism in BCS has been marketed towards a specific social class of wealthy Americans, which discourages the average Mexican tourists from participating (Porter 2008).

26) Local efforts are observed to conserve water, a resource rapidly diminishing with poor water-use management.



The Planning Commission of Todos Santos has recognized the following problems that the region is currently facing today.

Environmental Impacts

- Destroying sand dunes
- Threatened oasis
- Constructing on steep slopes
- Constructing in flood plains
- Absence of facilities for fisherman
- Lack of sewage coverage
- Burning garbage

Socio-cultural Impacts

- Human settlements in high risk areas
- Booming construction causing haphazard growth
- Lack of subsurface wastewater treatment
- Conflict of land uses threatening agricultural lands
- Poor conditions for agricultural laborers
- Poor coverage of drinking and drainage infrastructure water

Economic Impacts

- Tourism aimed at foreign market and high costs
- Lack of promoting tourism to Mexican market
- Lack of support for small farmers
- Lack of marketing agricultural products
- Lack of investment in infrastructure
- Lack of marketing fishery products



27) Even though local efforts encourage people not to build on the fragile sand dunes, they are continuously being leveled for homes and resorts.

28) An aerial view of the Cabo San Lucas Marina demonstrates the scale of the tourism developments. The rapid loss of vast stretches of desert and marine habitat has made the development of Cabo San Lucas controversial.



PRECEDENT STUDY



29) The concentration of hotels can be seen in the map and aerial photograph to the left. Exceeding the carrying capacity on the narrow sandbar has irreversibly damaged the ecosystem and left poor living conditions for local residents.



30) A pristine beach not far from Cancún shows what Cancún used to look like before mass tourism development. Today, trees have been replaced with tall buildings and clear skies with smog.

CANCÚN, MEXICO

Cancún, once one of the most remote tropical areas in Latin America, is today one of the most visited tourist destinations in Mexico. It is located on the northeast coast of the Yucatán Peninsula along the Caribbean Sea, and is comprised of beautiful white sandy beaches, turquoise waters, an abundance of coral, and a lagoon that is home to a wide variety of indigenous species. Recognizing its beauty and economic potential, The Ministry of Tourism pushed for tourism development during the 1970's building 120 hotels in a span of 20 years. Today there are some 140 hotels, 2 million visitors per

year, and approximately 600,000 permanent residents in a once desolate area. The resulting tourist industry placed unimaginable pressures on the local culture and ecosystems. The lagoons have been contaminated due to poor wastewater management and the sand dunes and rainforests leveled to build hotels. This mass tourism development has led to difficult social conditions and many native people now live in slums on the outskirts of the city.

In 1993, in attempts to prevent further damage the government pushed for conservation zones restricting further development, but most of the damage is irreversible.

Design Implications:

- **Limit the number of people and development to the carrying capacity of the land**
- **Implement conservation zones to protect fragile and unique ecosystems**
- **Integrate affordable housing within the community**
- **Develop strategies for wastewater management**

PRECEDENT STUDY



31) A new resort currently being built atop virgin sand dunes will be in danger of flooding during storm surges.



32) Sand dunes were leveled to build a series of beach front cabins. The flooding that has occurred in result is apparent in the flat, eroded desert.



33) The Cerritos Master Plan show lots zoned without consideration of the existing roads and washes.

CERRITOS, MEXICO

Cerritos is a surfing beach 8 k (5 miles) south of Las Palmas in Baja California Sur. A master plan of lots have been zoned and sold in a configuration that does not respect existing conditions. They do not respect the existing roads and streams nor take into account topography and slopes in the area. Over the last ten years a series of

hotels have developed with little respect to the ecological conditions. They have built on the fragile sand dunes and steep slopes causing severe erosion and yearly flooding. Not having learned from previous developments a new 8 story resort is currently under construction atop oceanfront sand dunes. This type of zoning and construction is typical for this region where there is rapid tourism growth.

Design Implications:

- **Avoid building on sand dunes**
- **Anticipate storm surges and sea level rise**
- **Consider topography and existing conditions before zoning**

ECOTOURISM

Defining ecotourism

Ecotourism is a form of responsible tourism that actively contributes to the conservation of natural resources and cultural heritage. An alternative to standard commercial tourism, ecotourism is typically small scale low-impact travel to fragile, relatively undisturbed natural areas that attempt to mitigate the negative environmental and social effects that is commonly associated with tourism (Martha, 2008). A key component in ecotourism is an element of education that is incorporated into the experience.

Ecotourism can be defined as “taking place in unspoiled natural areas and is a form of tourism that strives to conserve the environment, enhance the lives of local communities and educate the visitor” (Smith, 2010).

In 1983, Mexican architect and environmentalist, Hector Ceballos-Lascurain coined the term ‘ecotourism’ and has set up National Ecotourism Strategies for Mexico, and a number other countries in Latin America. In developing countries ecotourism can be used as a tool

for conservation and community development (Lumson 2001). Ecotourism remains a prominent focus in Mexico and continues to grow with popularity and success.

Among the fastest growing sectors in the tourism industry, ecotourism demands a more holistic approach to travel, in which tourists strive to respect, learn about, and benefit the environment and local communities. It focuses on socially responsible travel and personal growth, and the tourist must be an active participant in the experience for its success. The growing popularity in ecotourism represents a shift in tourist attention towards environmental awareness and the desire to explore more natural environments (Honey, 2008).

The term ecotourism is often over used, and unfortunately is used to advertise certain businesses that do not truly have an ecotourism approach. This greenwashing can mislead tourists and diminishes the prestige of genuine ecotourism operations. Ecotourism should be steered by a set of principles that guide ecotourism practices and what it truly stands for.

Accreditation Programs

In order to acknowledge the legitimate ecotourism operations, several accreditation programs and awards are given to those that have demonstrated commitment to practicing ecotourism principles. The awards not only give recognition to those enterprises that are sincerely following ecotourism principles, but also increase the awareness to the tourist who are searching for an authentic ecotourism experience.

In Mexico, The Ministry of Environment and Natural Resources (SEMARNAT) has their own eco-tourism certificate, that is awarded to tourism business that are environmentally and socially responsible. With an ultimate goal towards sustainable development, SEMARNAT strives to improve the social, economic and environmental conditions for local communities by encouraging education and community participation in the conservation of ecosystems and natural resources. SEMARNAT recognizes the power of ecotourism to introduce values and behaviors that will help with their efforts. They offer an ecotourism certificate with a seal of approval, along with governmental tax incentives, to encourage conservation practices and help give true ecotourism operations a competitive advantage.

The term ecotourism is often over used, and unfortunately is used to advertise certain businesses that do not truly have an ecotourism approach. This greenwashing can mislead tourists and diminishes the prestige of genuine ecotourism operations. Ecotourism should be steered by a set of principles that guide ecotourism practices and what it truly stands for.

Martha Honey, the director of the Center on Ecotourism and Sustainable Development, describes real ecotourism of having the following seven characteristics:

- 1)** Involves travel to natural destinations: usually under some form of environmental protection, whether on the national, international, communal or private level.
- 2)** Minimizes impact: use recycled or local building materials, renewable energy, and is environmentally and cultural sensitive in architectural design to minimize negative effects.
- 3)** Builds environmental awareness: educates the tourists and local residents by using well trained guides and demonstrating good practices.
- 4)** Provides direct financial benefits for conservation: helps raise funds for environmental protection, research, and education.
- 5)** Provides financial benefits and empowerment for local people: keeps local people involved and happy by creating jobs and public amenities, and keeping money in local hands. Shares socio-economic benefits with local community by having their consent and participation in ecotourism operations.
- 6)** Respects local culture: encourages meaningful cross cultural interaction between visitors and hosts and respects cultural customs.
- 7)** Supports human rights and democratic movement: following the words of the World Trade Organization, tourism should contribute to: “international understanding, peace, prosperity, and universal respect and observance of human rights and fundamental freedoms for all.”



PRECEDENT STUDY

LAPA RIOS, OSO PENINSULA, COSTA RICA

Lapa Rios Ecolodge is a privately owned luxury ecotourism lodge located on an 1100 acre Forest Reserve in the southwestern tip of the Oso Peninsula, Costa Rica. The ecolodge has been operating for nearly 20 years and is one of the most authentic ecolodges in the world. Designed in conjunction with sub-consultants and stakeholders, an overall master plan contains 16 bungalows, a research facility, a swimming pool, luxury rental-pool villas, nature interpretation center, conference center, beach club-house, organic garden, and an extensive system of walking trails through their own reserve.

Committed to the idea that a “rain forest left standing is more profitable than one cut down,” the owners strove to prove that lands can be both ecologically and economically sustainable. The result was creating nature reserve for bird watching and hiking, that offers full service amenities. Interlocking walking paths connect the bungalows with the ocean and the rest of the reserve. Not one native tree was cut down during construction, as all the structures and paths were designed into the existing forest. The project goals were to **(a)** minimize environmental impact and have a small ecological footprint, **(b)** contribute to conservation through direct efforts and through financial benefits, and **(c)** promote local livelihoods through political empowerment and a combination of culturally appropriate social and economic benefits to local people.



34) Not one native tree was cut down during the construction of the 16 bungalow ecolodge.

Negative Impacts

Negative Impacts of tourism usually involve degradation of local dignity, erosion of traditional cultural practices, inflation of real-estate, and increase in drug use and prostitution. Many eco-tourism projects are guilty of greenwashing, misleading customers about being green. Lapa Rios does a good job to mitigate these impacts but several of them still present an issue.

- **Drugs and Prostitution:** the increase of drugs and prostitution is typical in areas of tourist development and the Lapa Ecolodge is no exception. Though there is not a problem directly in or around the ecolodge, the nearby city of Puerto Jimenez has witnessed an increase in drugs and prostitution due to the overall increase of all tourists in the area.
- **Land Value:** Land value has largely increased over the years. The increase is due to the demand of foreigners coming in and wanting to buy cheap beach front land in an economically and politically stable Costa Rica. The land is still relatively cheap to many Europeans and Americans but is too expensive for a local to purchase. It is good to bring in tourists for vacation purposes, but not ones who end up buying land and contribute to the increase of land value.

Design Implications:

- **The passive cooling of the open air bungalows takes away the need for air-conditioning**
- **Building a modest size lodge and limiting the number of guests at one time, limits the negative impacts on the land**
- **Buying local material keeps money in local hands and reduces the carbon footprint**
- **Employing and training local employees puts money back into the local economy and introduces them to methods of conservation which they can adapt in their own life and introduce to their neighbors**
- **Building and operating of a local elementary school promotes community education on concepts of sustainable development and conservation**
- **Constructing around existing vegetation will better integrate the development into the natural surroundings**

PRECEDENT STUDY



35) The ecolodge is built adjacent to a small village encouraging cross-cultural interactions.



36) Native building techniques were used to visually blend the lodge in with the neighboring village.

KASBAH DU TOUBKAL IMLIL, MOROCCO

Located in the High Atlas Mountains in the heart of the Toubkal National Park, Kasbah Du Toubkal provides a genuine taste of a Moroccan village life. The lodge is located within the tiny village of Achein in a restored building, was once the residence of an ancient feudal caid (local baron). The restoration was applied using ancient building techniques, without power tools, and followed a comprehensive architecture recycle and reuse program. The lodge's proximity to the local village encourages cultural interactions with the local people and culture. The lodge visually blends into the landscape and the surrounding village and

maintains the traditional architectural elements, including solar underfloor water heating. A variety of rooms range from 40 to 340 euro per night, and a conference center holds retreats and study groups for the local schools. The owners of the lodge have set up the Imlil Village Association which raises money to contribute to the local community. So far, the association has built the regions first community steam bath, constructed a school, and provided the regions first ambulance driver.

Design Implications:

- **The location within the local community encourages cross cultural interactions and an appreciation for the local culture**
- **Providing a variety of room prices allows for diverse range of tourist types to participate and interact**
- **Including a conference center in the program will not only facilitate large business retreats but can also be a venue for local classes and town meetings**

AGRITOURISM

Defining agritourism

Agritourism is agriculturally based tourism that brings visitors to a farm or ranch and engages them in the observation or participation of agricultural production (Przezborska ed al. 2008). A form of rural tourism, which focuses on the participation in a rural lifestyle, there are many opportunities and advantages of emphasizing the agriculture landscape and culture in tourism development of rural farming communities.

Current problems in farming communities

Many rural villages, particularly in developing countries, rely heavily on the agriculture industry for jobs and self-subsistence. As agriculture is becoming highly mechanized, less manual labor is required on the farms. With seasonal unpredictability, many farms do not make enough money strictly from food production to sustain. The dependence of these communities on the volatile agriculture market is leading to a migration of young people to urban areas

in search for jobs (Przezborska ed al. 2008). Uncontrolled migration to urban areas result in the formation of slums around big cities which, ironically, have much harsher living conditions than where they left on the farm.

Agritourism as a solution

Agritourism is particularly relevant in developing nations where farmland and its surrounding communities have become fragmented due to rapid population growth and development (Przezborska ed al., 2008). There is a segment of urban population that is interested to visit rural areas to understand the farming perspective and experience the rural countryside (Przezborska ed al. 2008). Rustic farm towns and idyllic views, sounds, and even smells of the country provide a romantic setting, appealing to certain tourists. These types of visitors may be interested in where food comes from and how it is grown harvested and processed. They are even seeking to acquire new practical skills and experiences. Agritourism can satisfy the demands for this unique tourists experience while significantly benefiting the farmer and community. The added income that tourism provides to households can revitalize communities and spur economic development.

Functions of agritourism

The concept of agritourism takes a multifunctional development approach that seeks to activate the rural community in multiple dimensions, not only in agriculture sector. According to Przezborska et al., there are three primary functions of agritourism that help benefit rural communities: socio-psychological, economic, and spatial and environmental.

Socio-psychological functions include the increased respect for the rural community and interactions between of rural and urban cultures. The opportunity for tourists to participate in and learn about aspects of the traditional lifestyle in the rural community can gain them new skills, experiences, and possibly learn a new language. Meeting new people, and the exchange of new

experiences and outlooks, can lead to increased tolerance to different attitudes, behavior, and opinions, broadening their knowledge of the world. These functions go both ways and can benefit the local community members as it does the tourist.

Economic functions stimulate development of agricultural farms and generate additional sources of income for both rural households and the local communities. This results in the creation of employment opportunities and diversification of the local economy. Agritourism can be used as a revitalization tool, offering possibilities of social and economic advancement.

Spatial and environmental functions involve the consequences of the development of agritourism on the natural and human environments. Centered on preserving rural countryside, there is an enhanced care for the natural environment and ecological protection. An increase of tourism brings more income to the community which can go towards better developing local infrastructure and improving the standard of living for rural populations. With nature protection and improved infrastructure there is an increased aesthetic value added to communities and a preservation of cultural heritage, all which help counter the mass migration from rural areas.



37) All produce grown at the farm is consumed locally in their onsite restaurant and grocery store.



38) Cottages within the farm allow residents to live with the changing harvest seasons.

FLORA FARM, SAN JOSE DEL CABO, MEXICO

A ten-acre farm in the foothills of the Sierra de la Laguna Mountains in San Jose del Cabo, Mexico, Flora Farm is a working organic farm with a restaurant, bar, grocery, cooking school, art gallery, microbrewery and variety of homes on-site. The founders are dedicated to build a community around the source of food, in which the seasons guide activities and what is grown and eaten. They grow over 100 types of fruits, vegetables, and herbs, strategically using the shade under trellised crops to protect light sensitive crops. All of their production is consumed locally and used in their onsite restaurant and grocery store. They strive to realize efficiencies between the farm, ranch, restaurant and market, using compost and food scraps to fertilize soils and feed chickens and

pigs. At Flora Farm's cooking school, participants walk the fields, harvest ingredients, cook and then eat, providing a sense of how traditional farmers in the area lived their day-to-day.

A number of cottages on site frame picturesque views, offering residents a simple rustic lifestyle that revolves around the harvest seasons. They also offer a number of live/work sheds that provide an opportunity for people and their businesses to connect with the farm. The sheds, using sustainable design strategies, are handcrafted straw bale buildings passively lit and cooled with glass doors and transom windows. They are arranged amidst the farm to give the visitors a dynamic mix of experiences with a strong sense of place.

Design Implications:

- **Support local businesses by offering live/work studios**
- **Use traditional farm architecture/materials to passively heat/cool and light buildings**
- **Plant a variety of crops to be sold at an onsite restaurant and grocery store**
- **Offer cooking classes to introduce the visitors to the traditional lifestyle and foods**

COASTAL DEVELOPMENT

Coastal regions are disproportionately populated. In the US, coastal cities cover less than 17% of the land but are home to 52% of the population. Worldwide, two-thirds of all cities are located on the coast (Beatley 2009). The concentration of communities and tourism along the natural resources of the coastline cause many problems both environmentally and socially.

Ecologically, coastlines are some of the most biodiverse regions in the world. The interface between marine and terrestrial environments is extremely unique, but equally as fragile, susceptible to negative impacts from intense uses of neighboring lands. Agriculture runoff, oil pollution, and the exploitation of living and mineral resources contaminate water, threatening biodiversity and coastal degradation (Barnabe 2000).

The demand to be near the coast encourages development to sprawl linearly along shorelines significantly altering the landscape through the loss of rural farm lands, the paving of open natural lands, and the destruction of wetlands. These impacts affect social welfare by decreasing recreation and aesthetic values, land and housing prices, job opportunities, and sense of community (Barnabe 2000).

As coastal populations grow haphazardly in the development of low density, poorly planned, automobile dependent communities without respect of its natural surroundings, detrimental impacts will continue accrue. In order to sustainably approach development there needs to be a balance of the built and natural environments, between ecosystems and socio-cultural capital (Gonec and Wolflin 2005).



39) Beaches eventually fade away if natural sand dunes are destroyed and cannot replenish sand to the beach after large storms.



40) Proper coastal zone management can increase the coastal resilience by not building in hazardous areas that will be heavily impacted by storm surges.

COASTAL ZONE MANAGEMENT

A way to balance the intensity of land development is through zoning. A zoning system can evaluate and classify all land within a particular area according to the most suitable use. It indicates the development suitability for different areas with efforts to minimize impacts on natural and cultural environments (Barnabe 2000). By organizing a site by zones, representing varying intensities of land use, there is more control over where development occurs and the different management objectives and regulations within each zone (Mehta 2002). Each zone should be planned for a specific density, ensuring compatibility with adjacent land uses. There also should be zones indicating where land cannot be developed and set aside for recreation or preservation. Proper coast zone management will weigh the ecological assets within the site and thoughtfully place zones of and varying levels of conservation, recreation and development around them as to minimally disrupt those resources (Mehta 2002).

COASTAL RESILIENCE

Planning for coastal resilience is essential to a sustainable waterfront development. To be resilient is to be flexible, adaptable, or durable. A resilient community is one that lives in harmony with nature's varying cycles and process and is able to bounce back from adversity. It has the capacity to withstand change and disturbances and still retain its basic structure and function, and maintain its cultural identity (Beatley 2009).

There is a growing consensus among climate scientists that global climate change will result in stronger and more frequent hurricanes, heat waves, droughts, and a rise in sea level (Beatley 2009). Communities need to be able to withstand natural disasters and prepare for future change in order to maintain functional ecological, social and economic conditions. Ecological resilience, social resilience, and economic resilience are interconnected systems that must be considered and understood.

Ecologically, coastal ecosystems should be protected and restored. Healthy sand dunes act as a buffer in the event of hurricanes and large storm surges. Coastal wetlands act as natural sponges, retaining large amount of floodwaters, controlling erosion, and protecting quality of drinking water supplies (Gonec and Wolflin 2005). Consciously protecting these ecosystems, and building on appropriate lands to avoid hazards and natural disasters will increase the community's resilience.

Strong social networks and community values will help a town function and bounce back after adversity. Encouraging community involvement and giving back to the community will gain support leading to a safer more successful recovery. Finding innovative and creative ways to make resilience more visible and tangible will help build a sense of community and preserve a sense of place (Beatley 2009).



SMART GROWTH

Coastal communities, bounded by the ocean, are challenged to make the efficient use of limited land, while protecting natural resources from effects of growth (Barnabe 2000). Smart growth is an urban planning and transportation theory that addresses these challenges by concentrating growth in compact walkable urban centers to avoid sprawl. It is guided by principles to help communities expand economic opportunities and protect public health and the environment while upholding the community's sense of place (Swaback 2007). Smart growth concepts can be particularly useful with costal development, where the ocean is a precious amenity and resource that typically encourages sprawl linearly along its shoreline. The EPA has produced some smart growth principles specifically for coastal and waterfront communities that seek to balance the strong demands for development, recreational uses and protection of the environment. Two of those principles are discussed here:

Provide a balanced mix of land use and variety of transportation options.

It is important to provide a balanced mix of land use and transportation options that are both water and non-water based. Many coastal developments tend to experience surges in seasonal visitors and part-year residents. The influx in numbers can stress the local transportation infrastructure causing heavy traffic congestion. Offering a number of transportation options can lessen the stress in the local infrastructure and provide a unique tourism experience.

A balanced mix of land use of water and non-water based residential, commercial and civic uses will strengthen the local economy to meet the daily needs of the community, even if water based activities slow down in a low season. Providing a broad range of housing options for different income levels and age will allow people to stay in the same neighborhood as needs and income level changes, and provide easy access to jobs, schools, shops, and recreation.

Create compact walkable community with physical and visual access to the waterfront for public use.

Well designed, appropriately scaled compact development can accommodate more land uses and encourage the use of alternative transportation, increasing levels of social interaction, opportunities for physical activity, and reduction of automobile emissions. By making it easier to walk and bike to daily destinations, more people are in the streets creating more vibrant environments.

Another way to draw people to the streets is to take advantage of the physical assets that the ocean has to offer. Incorporating areas of distinctive visual, historical, and natural features into the daily lives of residents and visitors will reinforce a strong sense of place. The emphasis of the sights, sounds and activities of the ocean by visually and physically connecting streets, buildings, and public spaces with it will further reinforce the relationship with the water. Using the "wedding cake" approach where building size gradually decreases as it approached the water front will create more views, strengthening the connection to the ocean. Increasing the public access to the waterfront with shared access and communal boardwalks rather than private can reduce visual and habitat impacts and can become attractive community spaces.

PRECEDENT STUDY



41) Compact walkable streets and rooftop patios create a dense development footprint and allows for more preserved open space.

THE VILLAGES AT LORETO BAY LORETO, BAJA CALIFORNIA SUR, MEXICO

Designed by DPZ

Situated on the Sea of Cortez, seven miles south of Loreto, the Villages at Loreto Bay is an 8,000 acre coastal resort community that follows smart growth principles and is centered around long-term sustainability. The community is planned for a series of nine compact car free villages where residence get around by walking, biking or electric carts. 6,000 homes are planned, intermixed with mixed use commercial services, while preserving 5,000 acres of natural open space.

Sustainable design features include the construction of a desalination plant for water harvesting and an offsite wind farm to generate more electricity than the community needs. Other efforts include an onsite agriculture center that produces organic fruit and vegetables, a regional affordable housing project, a full-service medical facility, and a donation of one percent of gross proceeds to assist with local social and community issues.

Principles driving the community design:

- Providing independence of movement for everyone by bringing most of the activities of daily living within walking distance
- Minimizing congestion, the expenses of road construction, and air pollution by reducing the number and length of automobile trips required in a community
- Bringing neighbors together by providing streets and squares of comfortable scale where people can gather
- Forming authentic communities and integrating age and economic classes by providing a full range of housing types and work places
- Facilitating democracy and a balanced society by providing suitable civic and public buildings and spaces

Design Implications:

- **Using local building materials reduces a community's carbon footprint.**
- **Creating an economic development fund for surrounding low-income communities can help boost an area's economy and improve social interactions between communities.**
- **Preservation of natural open space increases property value**
- **Generating alternative energy and harvesting potable water can facilitate the community to be completely off the grid**
- **Rooftop terraces and gardens contribute to a more compact development**

TRAILS AND OPEN SPACE CORRIDORS

Coastal wetlands, sand dunes, and riparian systems provide valuable functions that are essential to the resilience and health of the overall community. Wetlands provide critical habitat, mitigate flooding, and capture and retain sediments, helping to keep pollutants from reaching the ocean. Sand dunes protect wetlands and shorelines against the natural hazards of erosion, storms, and sea-level rise (Gonec and Wolflin 2005). Riparian systems act as corridors facilitating movement of plants and animals and deliver water across the arid desert. These ecosystems have symbiotic relationships that need to be protected and creating linkages between these sensitive areas will support more plant and animal diversity, benefiting the entire community. Connections can be made through open space corridors in the form of protected natural areas, parks, plazas or pedestrian paths. If managed properly, this open space of the protected ecosystems can provide a great opportunity for education, recreation, and tourism.

Nature Boardwalks

Elevated boardwalks are a good way to allow the public, scientists, and students to explore the beauties of protected dunes and wetlands while minimally disturbing their ecosystems. If properly designed and suitably managed they can educate the public in wildlife beauty and function, and build support for further protection. Providing a safe and less intrusive way to experience these fragile ecosystems can deter people from disrupting them while better facilitating bird watching, ecotourism, and science education and research (Kusler 1993).

Jon Kusler’s “Wetland Interpretation and Ecotourism” points out some key elements of successfully designed boardwalks and trails. The boardwalks should bring users into contact with key features of the ecosystems while avoiding impacts of the more sensitive plants and animals. The trail systems should create loops to avoid visitors from having to back track, doubling the traffic on the trail. To minimize the impact on the

environment, the trails should utilize existing paths and navigate around existing vegetation and landforms.

The boardwalks should be architecturally interesting, curving through varied land cover, setting up views and anticipation. They should be designed to withstand deterioration and flooding and use local materials and colors to blend into the natural scenery. Providing education and way finding signage, and incorporating observation deck and towers, can enhance the visitors experience with minimal disturbance to the ecosystem. The towers can also set up panoramic views and facilitate bird and other nature watching.

PRECEDENT STUDY



42) A restored wetland remediates stormwater runoff and acts as a natural amenity on UC Santa Barbara campus.



43) Elevated boardwalks through the wetlands provide exceptional educational opportunities allow students to get a firsthand look at the unique ecosystem.

LAGOON PARK UNIVERSITY OF CALIFORNIA AT SANTA BARBARA, USA Designed by Van Atta Associates

A restored wetland habitat on the UC Santa Barbara campus seeks to balance aesthetics, function and environment to create an inviting spot for students. The planned open space creates a wilderness interface to the campus and surrounding student housing. There are no fences around the park and trails, ocean overlooks, and study areas attract students to enjoy the natural amenity. A restored vernal pool and wetlands are buffered with larger

swaths of vegetation to help protect the sensitive areas. An elevated boardwalk through the middle of the lagoon provides opportunities for a firsthand look at the ecosystem and how it functions. The park is designed to filter runoff from the campus and remove pollutants before entering the lagoon.

- Design Implications:**
- **Elevated boardwalks through sensitive ecosystems can offer educational opportunities**
 - **Wetlands can be used to clean storm water runoff from adjacent lands**

GREEN BUILDING DESIGN

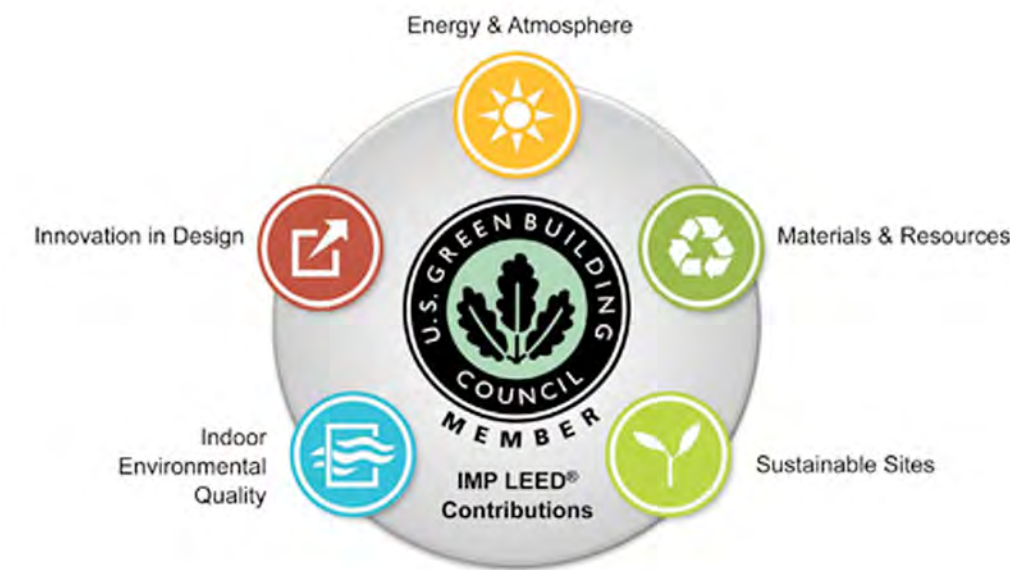
The built environment has enormous impacts on the environment and human health. The resources used to build and operate buildings destroy wildlife habitat, pollute the atmosphere, and require large amounts of energy and water. The inefficiencies of buildings and communities are depleting the Earth's natural resources while emitting gases that contribute to the greenhouse effect. These practices are continuing at an unsustainable rate and the impacts are noticeably affecting the ecosystem and our quality of life.

The U.S. Green Building Council (USGBC) is an organization that recognizes these concerns and addresses solutions to minimize those impacts. Their mission is "to transform the way buildings and communities are designed, built and operated, to enable an environmentally and socially responsible, healthy, and prosperous environment that improves the quality of life." This green building movement pursues solutions for a healthy balance between environmental, social and economic benefits and strives to shift the design, planning, construction, and operation practices to ultimately move toward developing lower-impact and more sustainable built environments.

LEED

The USGBC has developed the Leadership in Energy and Environmental Design (LEED) guidelines to suggest approaches for green building design and set benchmarks on water and energy consumption. The LEED guidelines can help create more dynamic communities, more healthful indoor and outdoor spaces, and stronger connections to nature. LEED takes an integrated approach, looking at whole systems, and understanding the relationships and interactions among the different components of a project when developing and implementing a design. The triple bottom line is referred to when addressing the sustainability of the LEED design approach, which seeks to balance economic prosperity, environmental stewardship, and social responsibility. The goal of the triple bottom line is to ensure that buildings and communities create value for all stakeholders, not just a select few.

In an organizational framework to address all the components of a project, LEED addresses sustainability among six different categories; Sustainable Sites and Location, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, and Innovation.



Sustainable Sites and Location

The connection and linkage to the local bioregion, watershed, and community will determine how a project can contribute to a sustainable environment. The project should meet the needs of the local community, support an active street life, promote healthy lifestyles, and help create a sense of place. A project that is connected to the community by pedestrian paths and bicycle lanes encourage people to walk or bike instead of drive, not only reducing air pollution, but promoting physical activity as well. Buildings that protect the history and character of a place also promote sustainability. Taking advantage of a community's past by reusing materials with historic value will help link the present with the past, reinforcing a sense of place. Dense and diverse configurations, that are built close to existing infrastructure and to where people live and work, will reduce construction costs and the need for excessive automobile use. Building on a previously developed site, or an infill project, will conserve the amount of natural open space available. Development is discouraged on farmlands, wetlands, floodplains, steep slopes, and endangered species habitat, as these lands are important for maintaining a healthy ecosystem and typically are not suitable for construction. To minimize environmental impacts on any project site, it is important to manage storm water, minimize impervious pavement, prevent light pollution, and preserve open space.

Indoor Environmental Quality

Controlling the conditions of the indoor environment in a building can reduce the energy consumption and enhance the lives of its occupants. Providing satisfying thermal comfort, lighting, views and acoustics lead to healthy, happy and more productive users. Appropriately sized and placed windows can dramatically increase the amount of daylight introduced to a space while providing views and options for ventilation. Increasing the daylight will also minimize the amount of energy needed for artificial light and ventilation, reducing the need for air conditioning.

Materials and Resources

Selecting appropriate materials can make a big impact on the amount of waste that is thrown away, amount of energy that is consumed, and amount of resources extracted from the Earth. Evaluating the cost of the entire lifecycle of a material, from its extraction to its disposal, can help determine its level of sustainability. One must not only consider the economic cost, but the environmental cost (its detriment to the ecosystem), and the social cost (work conditions of the people who manufacture it) of the material as well. In general, using materials that are harvested and manufactured locally, and those that are rapidly renewable, are more sustainable. Materials that contain recycled content, are long lasting, durable, and reusable are preferable.

Water Efficiency

The U.S. Geological Survey estimates that buildings, and their accompanied landscapes, in the United States use approximately 47 billion gallons of water per day. As development expands, so does the demand for water and it is putting stress on the potable water supply. Responsible new developments should strive to reduce the use of potable water, by reducing the water use demand, finding alternative sources of water, and re-using water on site. Storm water and treated grey water are excellent sources that can be used for toilet flushing, irrigation, and cooling towers. In some cases, with the right plant pallet and storm water management, irrigation can be eliminated altogether.

Innovation

LEED encourages projects to engage in new technologies and develop programs that promote the advancement of the local community's knowledge of green design. Setting up and implementing recycle programs or education outreach programs are a good way to influence the people who use the site and those beyond. This category helps keep the guidelines current, as new innovative techniques are being tested and developed in the ever evolving field of green design.

Energy and Atmosphere

Projects with an efficient design can reduce energy use, thus saving money and decreasing the consumption of fossil fuels. The energy demand can be reduced by capturing natural energy, such as sunlight, wind, and geothermal potential. These passive design strategies minimize energy needed for lighting, cooling and heating buildings. Finding sources of renewable energy, including solar, wind, wave, biomass, geothermal, and certain forms of hydropower also lessen the stress on fossil fuels. Monitoring and demonstrating energy consumption is an effective way to educate people and help them reduce their energy use.

WASTEWATER MANAGEMENT

Good wastewater management is a problem facing Southern Baja is and has been specifically addressed as a major concern by the Todos Santos Planning Commission. As developments haphazardly arise, the lack in infrastructure leaves them without sewage treatment and access to potable water. With the increase demand for potable water and the amount of wastewater being produced, the effective treatment and responsible use of wastewater is vital. Poor wastewater management can lead to a depleted ecosystem and an eventual decline of tourism.

Water scarcity is another major challenge facing Southern Baja as population and tourism grow. The largest consumers of potable water are resorts and agriculture. Finding alternative sources for water and reducing the demand for potable use is essential if developments continue to grow.

Wastewater reuse

Historically, the reuse of wastewater for domestic and agriculture purposes has occurred all over the world. The planned reuse, however, has only been a topic of discussion in recent decades as the natural water cycle is being stressed in many parts of the world. The treatment and reuse of wastewater for certain needs such as irrigation, toilets, and cool towers, can lower the demand of the precious potable water. Remediated wastewater can also be used for agriculture, aquifer recharge, aquaculture, and habitat creation in wetlands.

Many parts of the world, including Mexico and the US use remediated wastewater to irrigate edible agriculture. 60 percent of agriculture in California is irrigated with treated wastewater (Vigneswaran 2004). This combination of waste disposal and water supply is “closing the loop,” of what is traditionally a linear use of water. The reuse proves cost effective and has benefits



44) A decentralized wastewater treatment system can be used onsite to clean grey and black water for non-potable and irrigation reuse.

for crops through the recycling of nitrogen and other nutrients. Other advantages include an increase in crop yields, a decrease reliance on chemical fertilizers and increase protection against frost damage (Vigneswaran 2004).

There are a number of possible constraints, many which evolve around the negative public perception of using wastewater for edible crops. This can affect the marketability and public acceptance of the food produced and, if not managed properly, can contribute to surface and groundwater pollution.

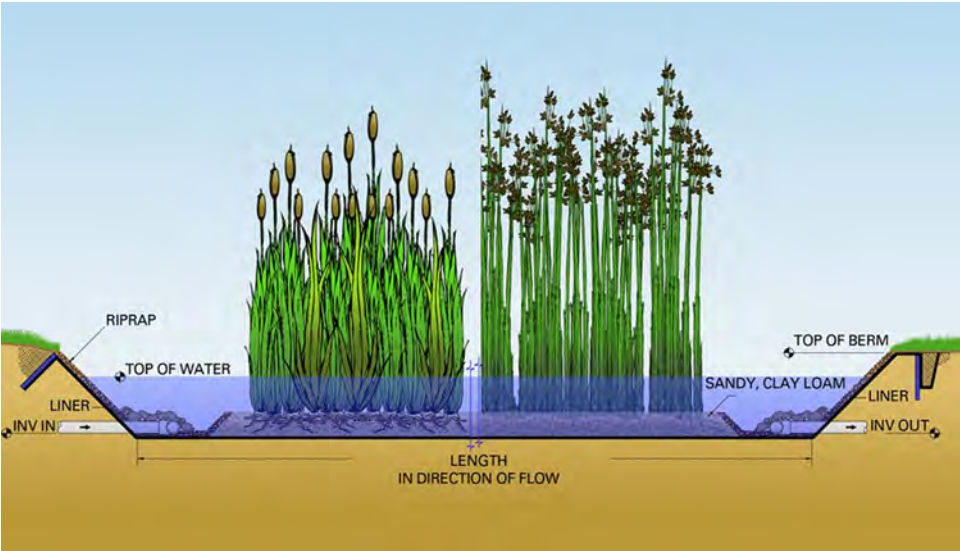
Constructed Wetlands

Constructed wetlands are an environmentally sound method of controlling waste water which is particularly relevant in coastal areas to prevent contamination of the sea. Constructed wetlands are artificial wastewater treatment systems consisting of shallow ponds planted with aquatic plants that rely upon natural biological, physical

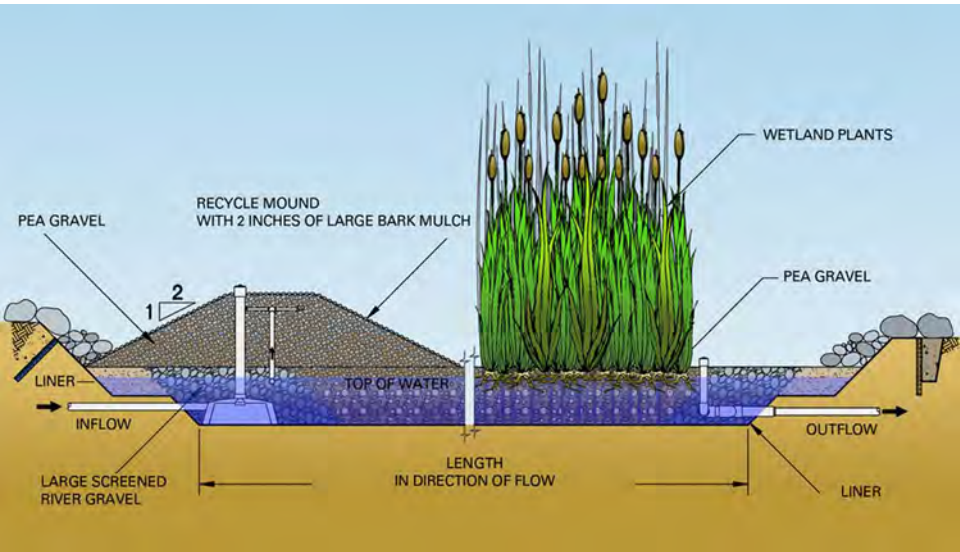
and chemical processes to treat wastewater. Mimicking the processes occurring in a nature to filter and remove sediments and pollutants from water, constructed wetlands can provide tertiary treatment of water that can be acceptable for most non-potable uses, including agriculture irrigation.

The components of the constructed wetlands system include vegetation, substrate, water column, and communities of microorganisms; all which control the water treatment. Substrates used to construct wetlands include soil, sand, gravel, rock, and organic materials such as compost. Constructed wetlands are capable of treating primary wastewater though often are used after primary treatment in a septic or sludge plant, to allow for safer human and animal exposure to the wetland.

Wetlands can be surface or subsurface flow moving water vertically or horizontally. Surface



45) Surface flow constructed wetland

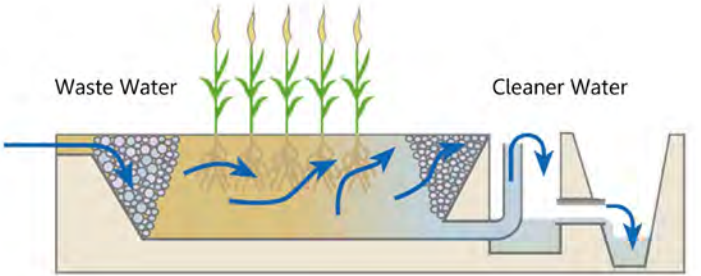


46) Subsurface flow constructed wetland

flow wetlands move effluent above the soil in a planted marsh consisting of a shallow basin, soil and vegetation. They closely resemble a natural wetland serving as great wildlife habitat and aesthetic enhancements to open space. Subsurface flow wetlands move effluent in a sealed basin underground through a porous substrate of rock. Subsurface flows require less land, are less odorous, and reduce the chances of mosquitoes, but typically have more construction and maintenance costs than surface flow wetlands.

Tidal flow wetlands are the latest evolution in constructed wetland technology. Through a series of flood and drain cycles, effluent is moved from one wetland to another, increasing aeration and accelerating the filtration process. Tidal flow wetlands hold a number of benefits over traditional subsurface and surface flow wetlands, including reduced land requirements and enhanced pollutant removal.

A hybrid of surface and subsurface wetlands can be implemented where the primary treatments,

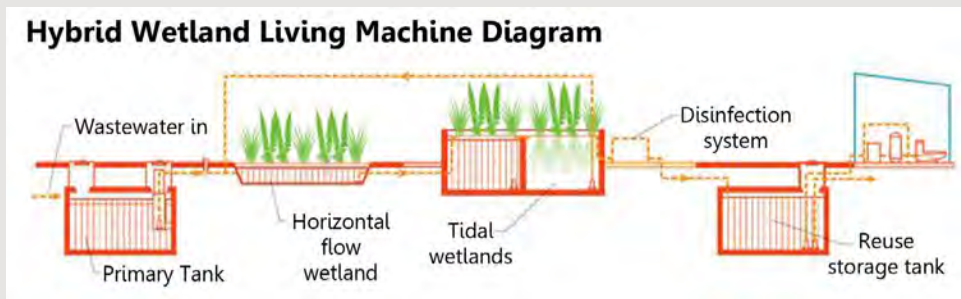


of more odorous wastewater, are subsurface and the later phases, with cleaner water, occurring above ground as surface flow. The living machine is a patented trademark brand name that uses a combination of vertical and horizontal subsurface, surface, and tidal flows to effectively treat blackwater for reuse. A number projects have been successful with this technology at a variety of scales from a single building to a community scale public works.

Constructed wetlands are an old technology, but are recently increasing in popularity in desert climates where water is scarce. They can be less expensive to build and maintain lower operational and maintenance costs than a traditional wastewater treatment center. They also keep water on site in a decentralized system keeping infrastructure costs down.

Several places around the world use remediated wastewater from constructed wetlands to irrigate edible crops. A small community in eastern Sicily, Italy uses tertiary treatment of water from a constructed wetland for the irrigation of olives orchards. A large village in Iraq uses the water from a subsurface flow constructed wetland to irrigate vegetables and fruit that are eaten raw (Vigneswaran 2004).

PRECEDENT STUDY



47)



48)

OLD TRAIL SCHOOL BATH, OHIO, USA

Old Trail School, in Cuyahoga Valley National Park, is the only school in the United States that is located within a national park. When the school's 40 year old treatment system started to fail, the administration decided it was a great teaching opportunity to construct a sustainable wastewater treatment facility.

They installed a Living Machine that is a hybrid of three types of constructed wetlands. After initial treatment in an underground primary tank, the wastewater enters a horizontal subsurface flow wetland to begin advanced biological treatment. The water then passes through a

tidal flow wetland inside a greenhouse, where the remaining nutrients and solids are removed. The final stage occurs in an outdoor vertical flow wetland, where the water is disinfected using ultraviolet light. This system treats wastewater from 600 faculty and students of approximately 5,000 gallons per day, and meets the highest standards for surface discharge.

Design Implications:

- **Constructed wetland inside of a greenhouse hinders odorous smells while making visible the wastewater treatment process**
- **Using a hybrid of different wetlands can meet design needs and offer educational opportunities**

PRECEDENT STUDY



49) Birds of Paradise are harvested in the constructed wetland and sold commercially.



50) Remediated wastewater is used to irrigate pineapple plantations.

DOLE TIDAL FLOW WETLAND OAHU, HI, USA

Wetlands are an essential part of Hawaii's ecosystem, providing home for flora and fauna as well as supporting agriculture, one of the state's largest economic drivers. On the island of Oahu, the coastal wetlands have suffered from intense residential, industrial, and resort development. The U.S. Army and U.S. Department of agriculture, in partnership with Dole Foods Company Hawaii, commissioned a Tidal Flow Wetland Demonstration to help restore the once-fertile wetlands. Using the Living Machine technology, which has a smaller footprint than conventional constructed wetlands with superior nitrogen removal, the system treats up to 100,000 gallons of wastewater per day. It is made up of a series of tidal cells, which drain and flood, bringing

oxygen to the microorganisms that clean the wastewater. The wetland cells contain cultivars of Birds of Paradise, an ornamental plant of high commercial value, and native wetland grasses used to enhance the removal of nitrate in its final stages. The resulting remediated effluent exceeds the quality standards set by the Hawaii Department of Health and is used for the irrigation of pineapple plantations, demonstrating a sustainable balance between the production of a valuable cash crop and the efficient reuse of wastewater.

Design Implications:

- **Cultivate plants in the wetlands that can be sold for profit**
- **Use treated wastewater for agriculture irrigation**

ECOLOGES

With the efforts to leave a minimal ecological footprint in the construction of ecotourism facilities The International Ecotourism Society (TIES) has created a set of international ecolodge guidelines. Representatives from 35 countries and 5 continents gathered for a set of forums and field seminars in Costa Rica. The resulting International Ecolodge Guidelines, edited by Mitesh Mehta, was compiled to help inform the process of selecting, designing and sustainably build an ecolodge. Staying true to the principles of ecotourism and the standards of LEED, the guidelines have also included components of green architectural design.

An import objective of a successful ecolodge design is the preservation of the special characteristics that make a place unique. Usually in a natural and culturally sensitive location, it is imperative to maintain a harmony between the ecolodge and its setting. There must be an understanding of the natural systems on the site and the cultural responses to the environments history. Observing how people historically interacted with the land and where they built their structures can be useful in selecting appropriate sites and land uses. Local traditional building forms and materials may provide insight to more efficient and ecologically sensitive design. Incorporating cultural motifs and vernacular architecture with the modern techniques that

are available today can help blend the barriers between the old and new.

Ecolodge design should emphasize the natural characteristics of the site with a strong relationship between the structures and the environment. The ecolodge should not intrude on the physical landscape as a foreign structure; it should appear that the building grew there just like the other plants. Structures should not be built along ridges or rise above the tree line and the form and color should be drawn from the surrounding landscape. Buildings should be placed to allow for natural plant growth and built on stilts to allow for animal movement. Efforts to minimize grade disturbances can be taken by making smaller units that fit around existing topography and vegetation.

The use of terraces, elevated walkways, and skylights, can be used to better integrate the build form into the environment and emphasize a connection with nature. Passive design strategies and use of local materials and renewable resources will also reinforce the connection with the environment. In the end, the overarching principles of the International Ecolodge Guidelines are to "leave the site better off after the development than before."

PRECEDENT STUDY

51) Building in stilts and using elevated boardwalks minimize impact on the forest floor.



52) A skylight allows visitors to gaze up through the tree canopies above, drawing them closer to nature.



TREEBONES RESORT BIG SUR, CALIFORNIA, USA

Treebones Resort, located among the tall redwoods of Los Padres National Forest in Big Sur, California, is built on an expired crude recycling wood mill from the 1960's. Much of the old wood from the mill found onsite was used during its construction, thus inspiring its name Treebones.

Today, Treebones Resort employs the concept of reuse and recycle in many aspects of its operations. Two propane-fed turbines power the resort and employee community. The heat exhaust from the turbines, in return, is used to create radiant flooring heat in the restrooms and main lodge and assists in heating the pool and hot tub.

The guests at Treebones stay in one of 16 yurts, circular tent-like fabric structures supported by wood lattice frames that rise to a center ring. A domed skylight rests on the top of the ring, naturally lighting the yurt, while allowing guest to gaze through to the trees and the stars, bringing them closer to nature. Large flap-like windows roll up on all sides of the yurt to allow for open views and cross ventilation.

These portable yurts require few resources to build and, only taking a couple of days to resurrect, exerting a low impact on the environment during construction. They rest on elevated platforms, made from the recycled redwood onsite, that are connected by a series of elevated walkways.

Design Implications:

- **Build on stilts to minimize impact on the ground**
- **Use large windows and skylights to bring the users closer to nature**
- **Utilizing materials onsite reduces cost and lowers the carbon footprint, while visually immersing the buildings into the natural environment**

TRADITIONAL MEXICAN ARCHITECTURE

Turning to traditional architecture for modern day design solutions is an insightful way to solve problems arising in energy use and sustainable design. In Mariana Yampolsky's, *The Traditional Architecture of Mexico* she points out that the "vernacular architecture is the result of good sense in the handling of practical problems...the shapes of the houses, sometimes transmitted through a hundred generations, seem eternally valid, like those of their tools." Looking to the past to understand how people traditionally survived climatic conditions and lived off of the land will get a design one step closer to living in harmony with Nature.



53) Many rural homes in the Baja Region were built on platforms of rock and mortar to protect the wood walls from rotting after heavy rains.



54) Families and neighbors come together to help each other build palm thatched roofs. The communal effort makes the process more affordable and helps justify using a thatched roof over more durable materials.

Native American Architecture

House forms built by Native Americans in Mexico varied depending on topography and climate, but were usually square, rectangular or round. Walls, especially in the hot drier climates, were made from adobe, sun dried bricks made from sand, clay, and water. Thick walls with a high thermal mass kept interiors cool in summer and warm in cold weather. In wet, more tropical regions, walls were made from sticks, wooden planks, and agave spikes, and were designed to be collapsible so that the structures can be moved (Yampolsky 1993). Thatched roofs from sun-dried palm fronds had a sharp incline to prevent rain from pouring through. High ceilings also allowed warm air to rise, leaving the living area below cool. Breezes could circulate through doorways and leave through openings at roof levels. Awnings drop low, beyond the footprint of the structures, to protect the wall surfaces from sunlight and erosion from rain.

A palm thatched roof, which are still widely used in Baja today, last about ten years before needing to be replaced. Constructing homes and re-building thatched roofs were a collective effort where family, friends and neighbors come together to help with the project, traditions still respected today. The communal effort

makes the process easy and affordable and helps justify using a thatched roof over a more durable material. The thatched roof also keeps the interiors much cooler than commonly used corrugated sheet metal roof that absorbs heat, making the interior hot and uncomfortable (Yampolsky 1993).

Homes were small and most of the activities took place outside. Sometimes they were tightly grouped together to form streets, in others they were irregularly dispersed through the landscape. Structures were often built on stilts or raised beds to prevent from flooding. Hammocks hung outside and inside of the house for sleep and daytime rest. Cooking took place in outdoor kitchens, where they would prepare the squash beans, maize, chilies, cacao, sugarcane, and limes that the land provided them.



Colonial architecture

The Mexican colonial architecture represented a mix between the Native American and Spanish European influences. Rooms were commonly grouped around a common inner courtyard, or patio, where water features and vegetation, were used to keep air cool. Jagüeyes, deep square basins used to collect and store rainwater, were also sources to help cool air and were often found in patios or in front of the house (Yampolsky 1993). The patios were often connected by long hallways which were used to channel breezes. Wrought iron window grills were placed on large openings into buildings to allow light and air to enter while providing security.

Public spaces in colonial towns

Central plazas and pavilions, usually with a church, made up the heart of colonial towns. Plazas act as the hub for community life and a place for weekly marketplaces. Street lined with colorful facades enlivened the town, and arcades, or covered walkways, in front of the buildings sheltered people from the sun and rain. Cafes and restaurants were situated under the arcades allowing clients to sit outside and remain cool. Long balconies lined the streets and large steps extruded from the front of homes to allow people to sit and watch the lively street life (Yampolsky 1993).

55) Interior courtyards, often consisting of a water feature and planted with bougainvillea, create cool microclimates during the hot summer months.



56) The main plaza in Todos Santos, anchored by the mission and a theater, is the grounds for large public events and gatherings.



57) A shaded pavilion in the center of the plaza provides an intimate shaded gathering space and acts as a stage during festivals.

Modern Mexican architecture

Luis Barragan and Ricardo Legorreta were two prominent Mexican modern architects who applied a magnificent use of color and play of light and shadow with geometric shapes. They drew inspiration from the colonial construction and held value in craftsmanship and uniqueness, which with vibrant colors and large murals still make up many Mexican towns today. When describing why many Mexican homes are so ornamental and flamboyant with unique hand craft details Barragan stated, “It is cheaper to construct a fence than buy one that has been commercially produced, and more challenging to personalize it than leave it plain.”



58) Luis Barragan



59) Ricardo Legorreta



60) Luis Barragan

CONCLUSION

The previous areas of research exhibit a number of design principles that will help attain a balance between tourism development, ecological protection, and the local community wellbeing. Below is a list of those design principles and to the right is a compilation of the design implications extracted from the precedents studies.

Design Principles:

- Create interactions (environmental, social, cultural)
- Promote walkability and offer multiple forms of transportation
- Protect ecologically sensitive areas and avoid building on potentially hazardous areas
- Use resources to enhance the ecology
- Designate zoning restrictions to ensure appropriate land use
- Integrate development into the landscape
- Utilize passive design strategies and alternative energy sources
- Encourage education
- Preserve cultural characteristics
- Give back to the local community
- Keep money in local hands and create jobs for local citizens
- Use local materials and architecture styles
- Create a strong identity
- Maintain public accessibility

Design Implications:

- Constructed wetland inside of a greenhouse hinders odorous smells while making visible the wastewater treatment process
- Using a hybrid of different wetlands can meet design needs and offer educational opportunities
- Cultivate plants in the wetlands that can be sold for profit
- Use treated wastewater for agriculture irrigation
- Build on stilts to minimize impact on the ground
- Use large windows and skylights to bring the users closer to nature
- Utilizing materials onsite reduces cost and lowers the carbon footprint, while visually immersing the buildings into the natural environment
- Elevated boardwalks through sensitive ecosystems can offer educational opportunities
- Wetlands can be used to clean storm water runoff from adjacent lands
- Using local building materials reduces a community’s carbon footprint.
- Creating an economic development fund for surrounding low-income communities can help boost an area’s economy and improve social interactions between communities.
- Preservation of natural open space increases property value
- Generating alternative energy and harvesting potable water can facilitate the community to be completely off the grid
- Rooftop terraces and gardens contribute to a more compact development
- Support local businesses by offering live/work studios
- Use traditional farm architecture/materials to passively heat/cool and light buildings
- Plant a variety of crops to be sold at an onsite restaurant and grocery store
- Offer cooking classes to introduce the visitors to the traditional lifestyle and foods
- The location within the local community encourages cross cultural interactions and an appreciation for the local culture
- Providing a variety of room prices allows for diverse range of tourist types to participate and interact
- Including a conference center in the program will not only facilitate large business retreats but can also be a venue for local classes and town meetings
- The passive cooling of the open air bungalows takes away the need for air-conditioning
- Building a modest size lodge and limiting the number of guests at one time, limits the negative impacts on the land
- Buying local material keeps money in local hands and reduces the carbon footprint
- Employing and training local employees puts money back into the local economy and introduces them to methods of conservation which they can adapt in their own life and introduce to their neighbors
- Building and operating of a local elementary school promotes community education on concepts of sustainable development and conservation
- Constructing around existing vegetation will better integrate the development into the natural surroundings
- Avoid building on sand dunes
- Anticipate storm surges and sea level rise
- Consider topography and existing conditions before zoning



ANALYSIS

SITE ANALYSIS & INVENTORY

INITIAL SITE ANALYSIS OF THE SITE AND REGIONAL CONTEXT WAS PERFORMED DURING THE PROJECTS CONCEPTION IN A MONTH LONG STUDY IN TODOS SANTOS, BCS. DURING THAT TIME THE REGIONAL CONTEXT WAS EXPLORED AND THE SITE WAS THOROUGHLY INVENTORIED AND PHOTOGRAPHED. THREE MONTHS LATER, AFTER CONCEPT DEVELOPMENT HAD INITIATED, A FOLLOW UP VISIT ALLOWED FOR MORE DETAILED OBSERVATIONS OF SPECIFIC CHARACTERISTICS TO BE ANALYZED. THE FOLLOWING IS AN OVERVIEW AND SYNTHESIS OF THE EXISTING PHYSICAL AND CULTURAL CONDITIONS.

SURROUNDING CONTEXT



Downtown El Pescadero 61)



Todos Santos Central Plaza 62)



Todos Santos colonial street 63)



Experimental Farm 64)



El Pescadero agriculture field 65)



Orchard in Todos Santos 66)



El Pescadero agriculture lands sprinkled with new developments 67)



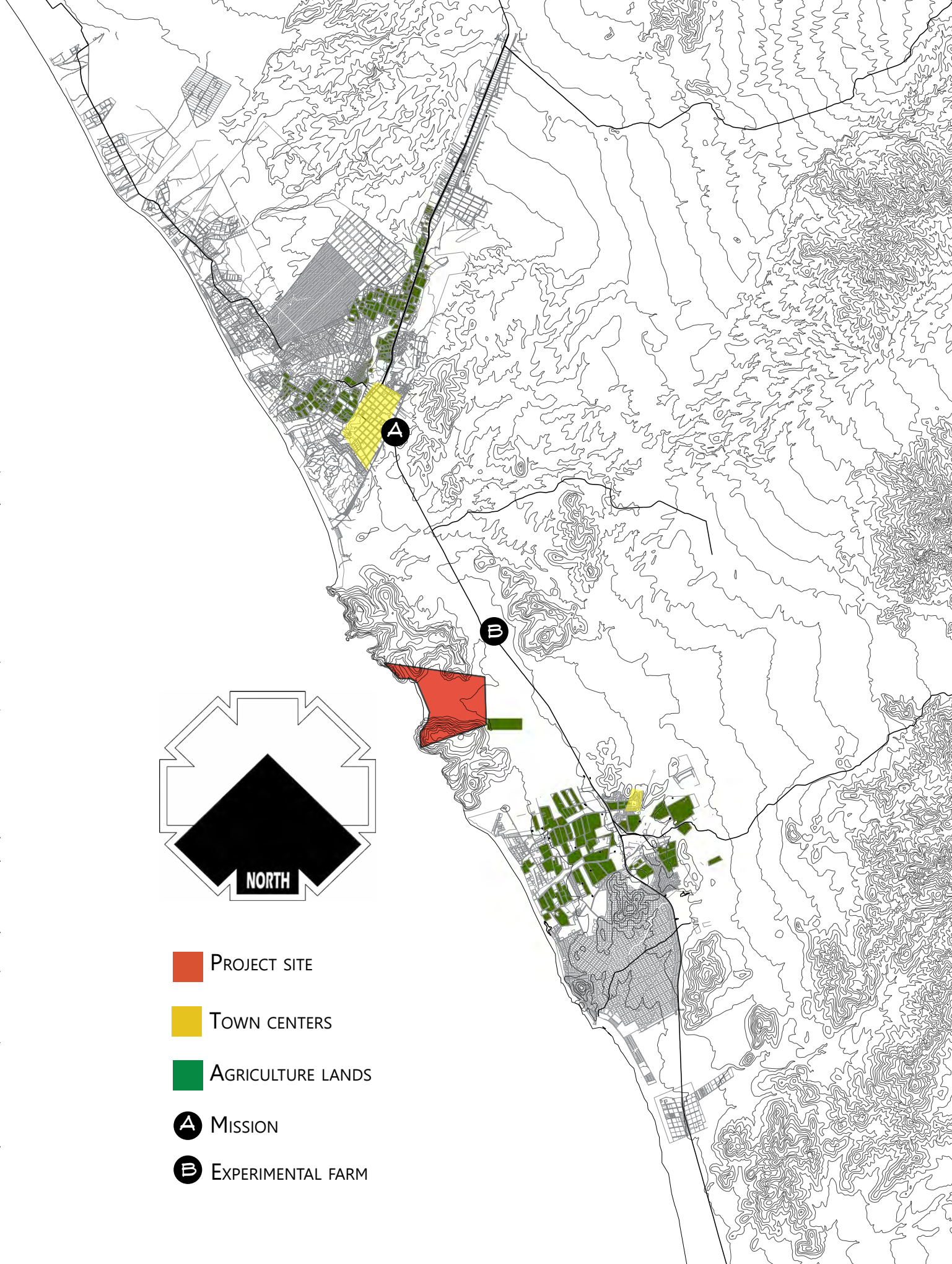
Beachfront hotels in El Pescadero 68)

Historically the most intensive land use in the surrounding areas is agriculture. Though slowly shifting towards tourism uses, agriculture still remains the predominant land use today.

In El Pescadero, agriculture lands along the beach are quickly converting to private vacation homes, hotels and resort communities, leaving a noticeable divide between the local population and new foreign arrivals. The Mex 19 highway is an actual physical barrier that separates the old town on the inland side and the new developments on the ocean side.

Todos Santos, though not as noticeably, is experiencing a similar divide. Todos Santos has a more defined down town center than El Pescadero, which has essentially just a few small restaurants and a gas station along the highway. Todos Santos is considered the “town” where one must go to find a hardware store, retail shops, or grocery market. It has a historic, more traditional style town, with a plaza anchored by a mission and theater.

In between the two towns, across the highway from Las Palmas is the government funded Experimental Farm. The Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP) studies scientific and technological innovations in agriculture and forestry to contribute to the development of sustainable agriculture practices.



SURROUNDING ACTIVITIES



 **Fishing** 69)



 **Whale Watching** 70)



 **Birding** 71)



 **Snorkeling** 72)



 **Kayaking** 73)



 **Surfing** 74)



 **Mountain Biking** 75)

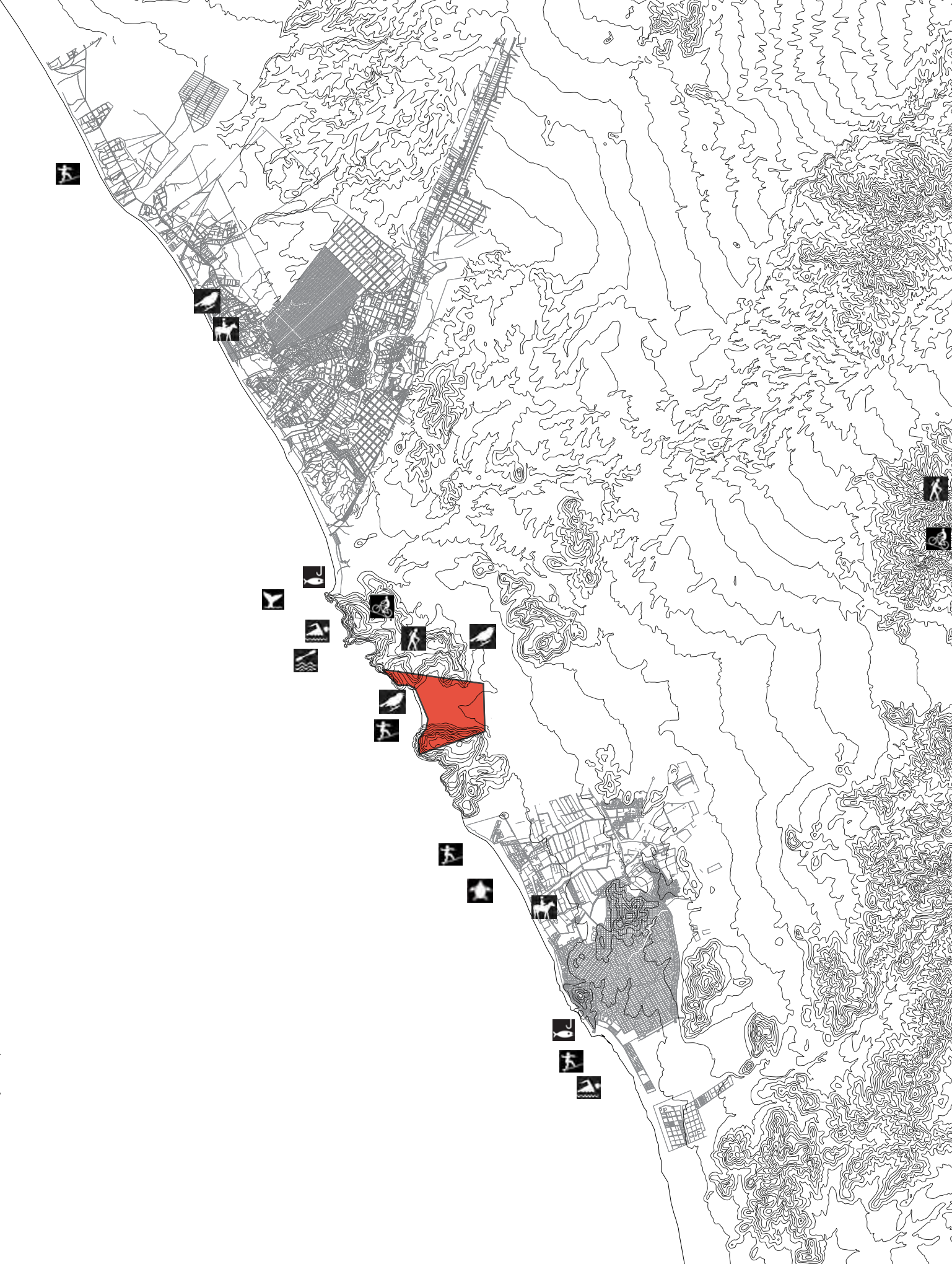


 **Hiking** 76)



 **Horseback Riding** 77)

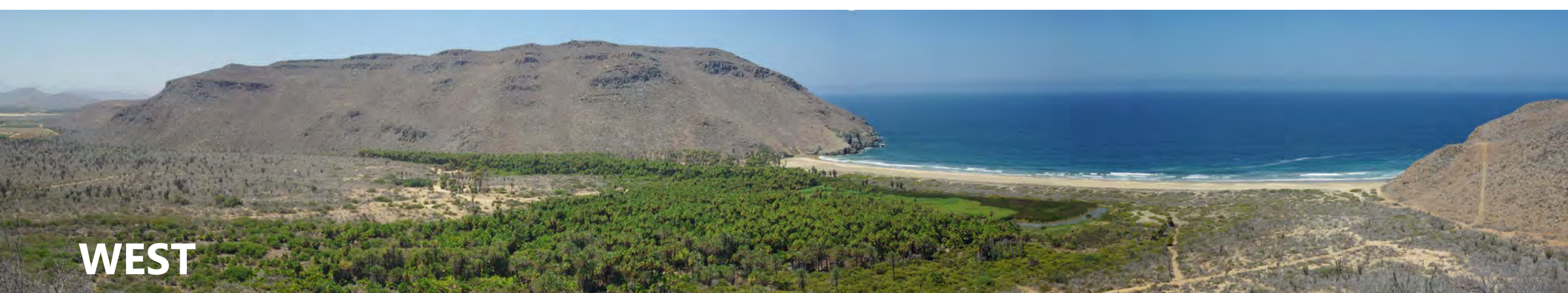
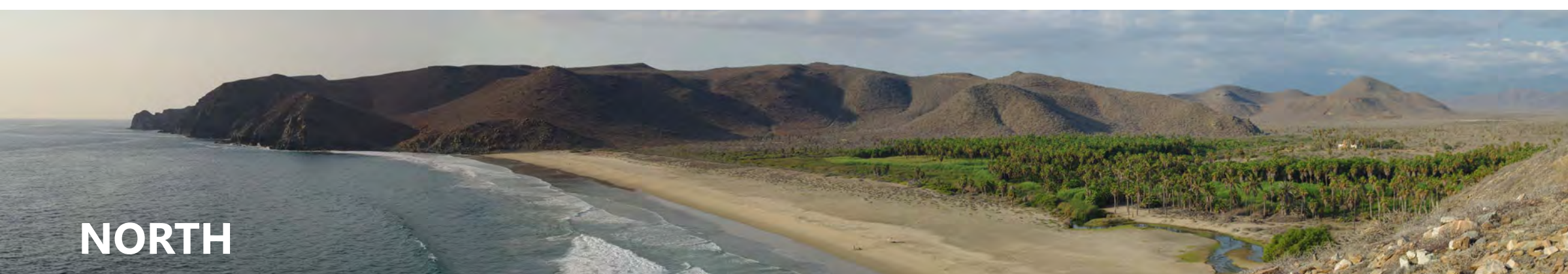
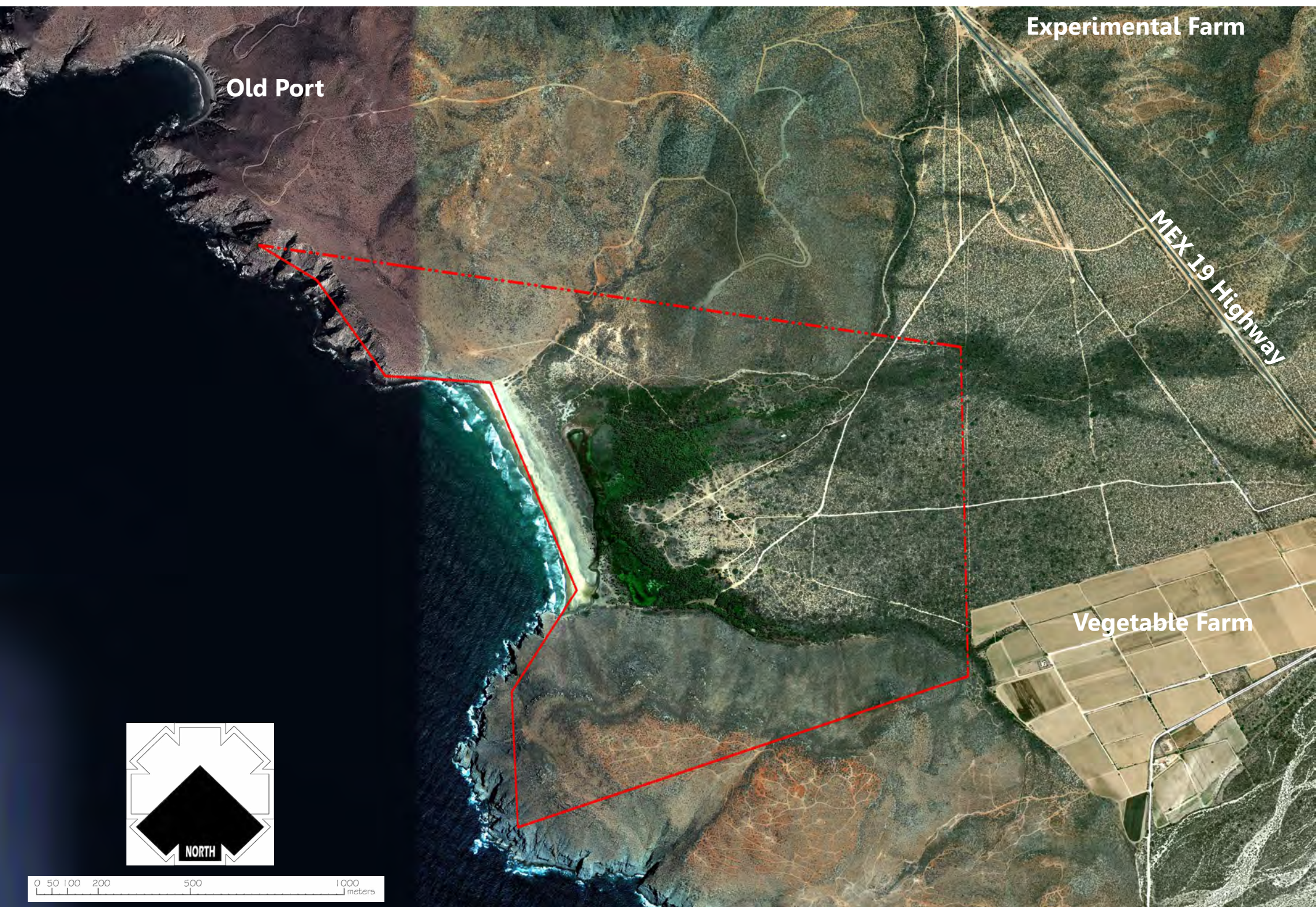
Aside from visiting the historic Todos Santos town center or navigating through the El Pescadero agricultural fields, there are a number of physical outdoor activities to partake in. Visitors can ascend the Sierra de Laguna mountain peaks or explore the coastline by bike, horse or by sea. Listed here are a few of the popular activities that locals and tourist enjoy.



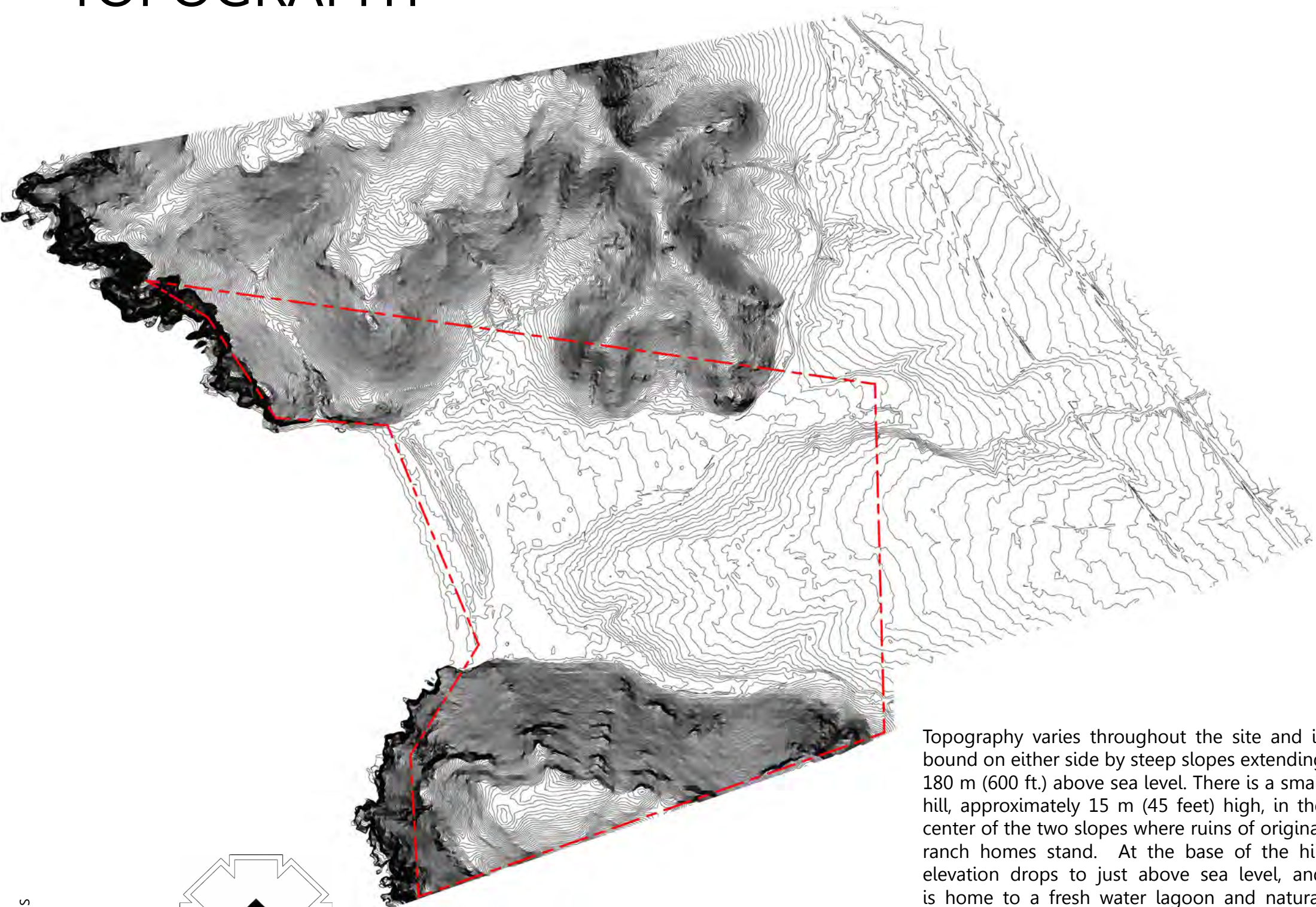
SITE CONTEXT

The 490 acre project site at Las Palmas is bordered on its southeastern corner by farmlands of El Pescadero. The Experimental Farm, on the MEX

19 highway just north of Las Palmas, is directly connected to the site with a dirt access road. The highway is buffered from the property by a kilometer of undisturbed desert scrub. The ruin of an old port, a popular dive site, is in the first cove north of the Las Palmas.



TOPOGRAPHY



Topography varies throughout the site and is bound on either side by steep slopes extending 180 m (600 ft.) above sea level. There is a small hill, approximately 15 m (45 feet) high, in the center of the two slopes where ruins of original ranch homes stand. At the base of the hill elevation drops to just above sea level, and is home to a fresh water lagoon and natural wetland. Topography rises again in a series of sand dunes before dropping into the sea. Topography on the site, whether too steep or too low in elevation, will have a determining factor on land uses.



0 50 100 200 500 1000 meters



78) An old ranch ruin stands on a small hill surrounded by palm groves.

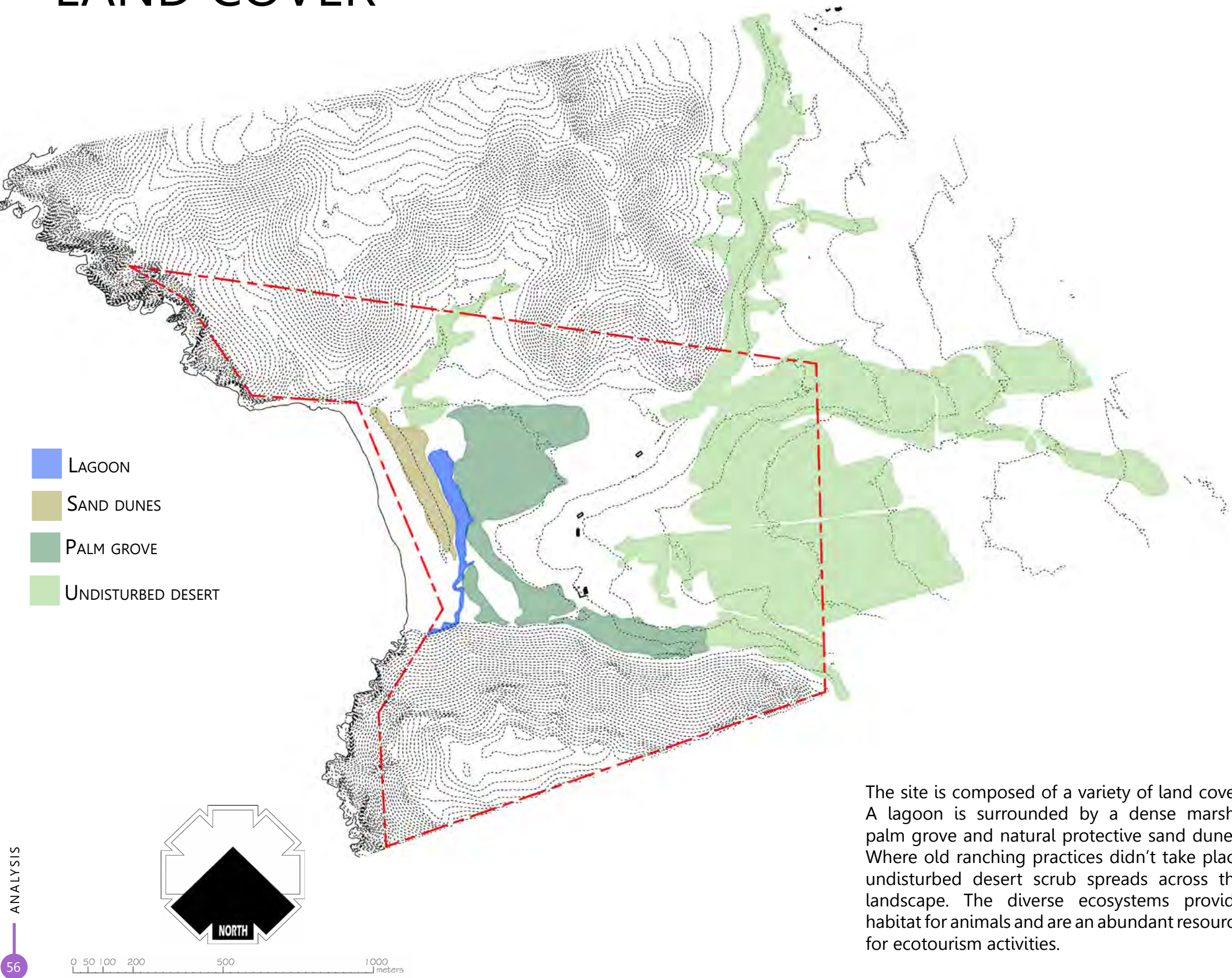


79) Larger hills, on either end of the beach seclude the beach from the neighboring properties.



80) Sand dunes protect the natural wetlands from the ocean.

LAND COVER

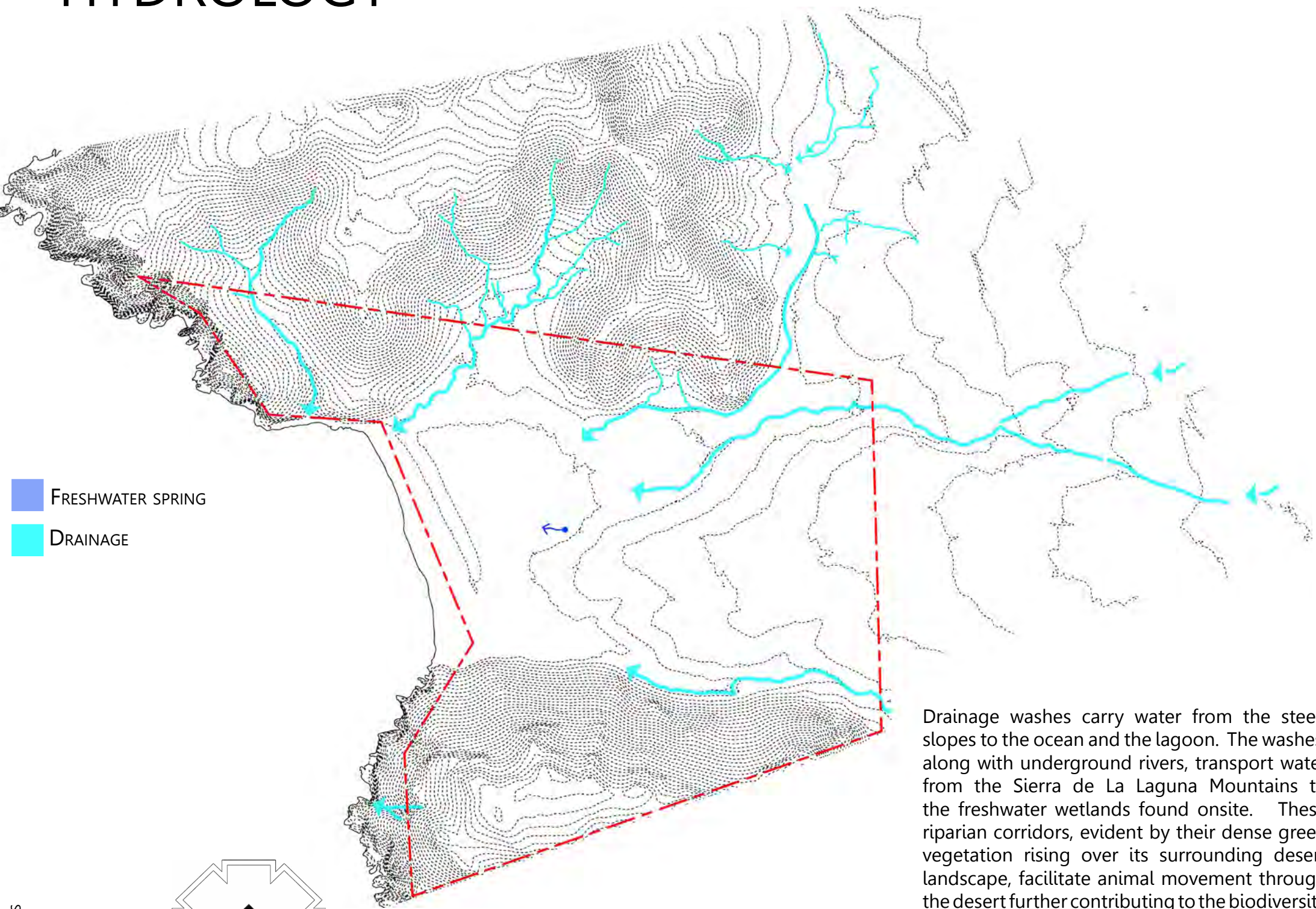


The site is composed of a variety of land cover. A lagoon is surrounded by a dense marshy palm grove and natural protective sand dunes. Where old ranching practices didn't take place undisturbed desert scrub spreads across the landscape. The diverse ecosystems provide habitat for animals and are an abundant resource for ecotourism activities.



81) A cross section illustrates the variety of land cover and ecosystems found on site.

HYDROLOGY



FRESHWATER SPRING
DRAINAGE

Drainage washes carry water from the steep slopes to the ocean and the lagoon. The washes, along with underground rivers, transport water from the Sierra de La Laguna Mountains to the freshwater wetlands found onsite. These riparian corridors, evident by their dense green vegetation rising over its surrounding desert landscape, facilitate animal movement through the desert further contributing to the biodiversity on site. They withstand large flows of water during the tropical storms and hurricanes and are important to recognize their locations and protect their function.



0 50 100 200 500 1000 meters



82) A freshwater spring surfaces in the palm groves and flows towards the lagoon.

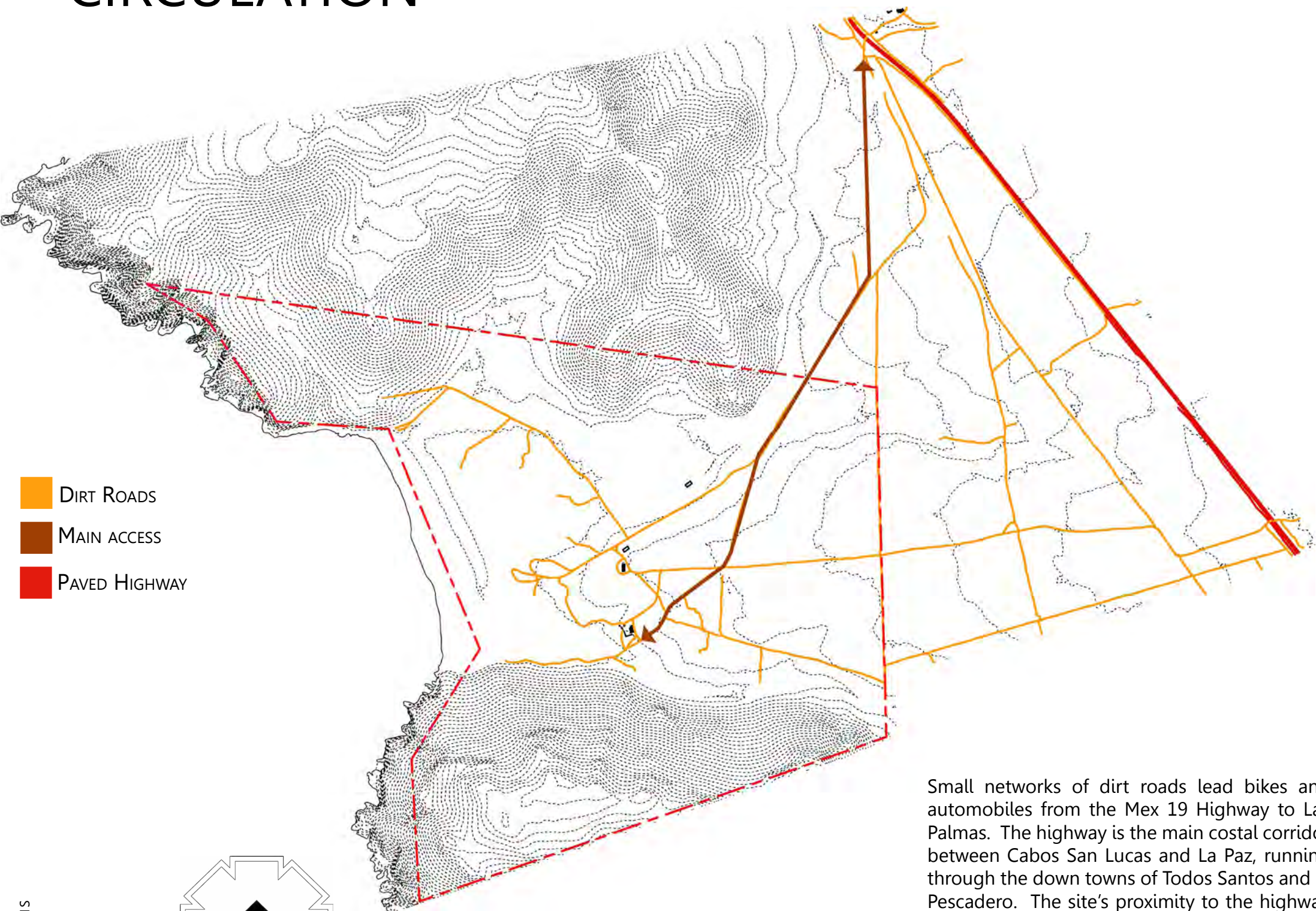


84) This perennial freshwater lagoon attracts wildlife, contributing to the biodiversity on site.



83) A riparian corridor, running along the base of the southern slope, feeds water to the palm groves on site.

CIRCULATION



- DIRT ROADS
- MAIN ACCESS
- PAVED HIGHWAY



0 50 100 200 500 1000 meters

Small networks of dirt roads lead bikes and automobiles from the Mex 19 Highway to Las Palmas. The highway is the main costal corridor between Cabos San Lucas and La Paz, running through the down towns of Todos Santos and El Pescadero. The site's proximity to the highway corridor is advantageous as it is far enough away to be to avoid noise pollution and close enough to provide convenient access for users and services.



85) A view of Las Palmas from the highway.



88) Dirt roads wind across washes and around large cardón cactuses on its way to Las Palmas.

86) Utilizing existing roads will minimize impact to the palm groves and other fragile ecosystems.



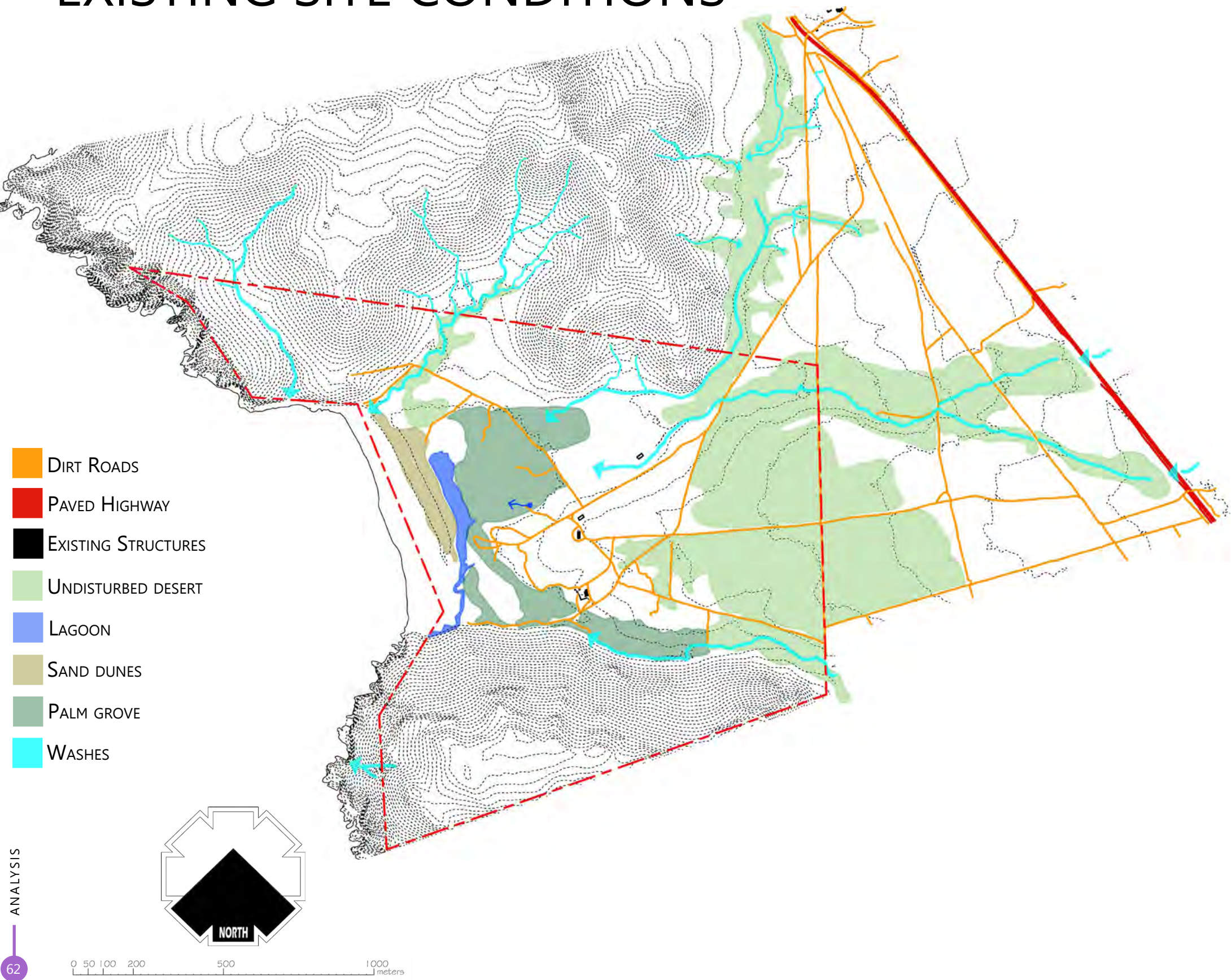
87) With no formal parking, people park their car along the side of the dirt roads.



89) Dirt roads leads pedestrians through the palms to the beach.



EXISTING SITE CONDITIONS



90) Stone from a quarry adjacent to Las Palmas provides the stone for this reservoir.



92) The main ranch home sits atop the center hill and is surrounded by a small stand of palms. Walls are made of adobe and local stone, reflecting the archetype found in the region during the 1800's.



91) The worker's home utilizes the palms on site to make the thatched roofs.



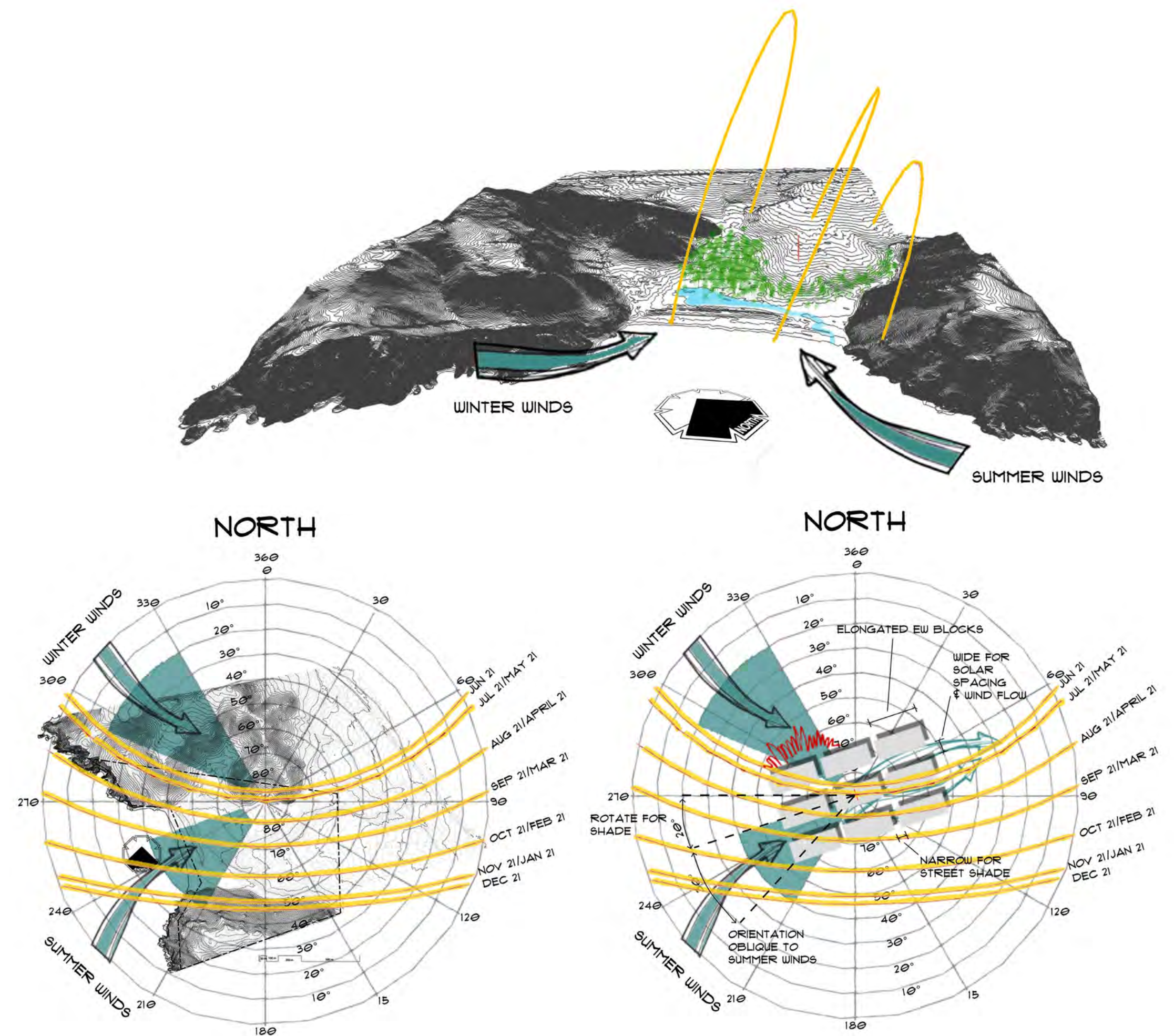
93) Rooms are built deep into the base of the slopes over the sea were most likely used to keep food cool during the long hot summers.

SUN AND WIND ANALYSIS

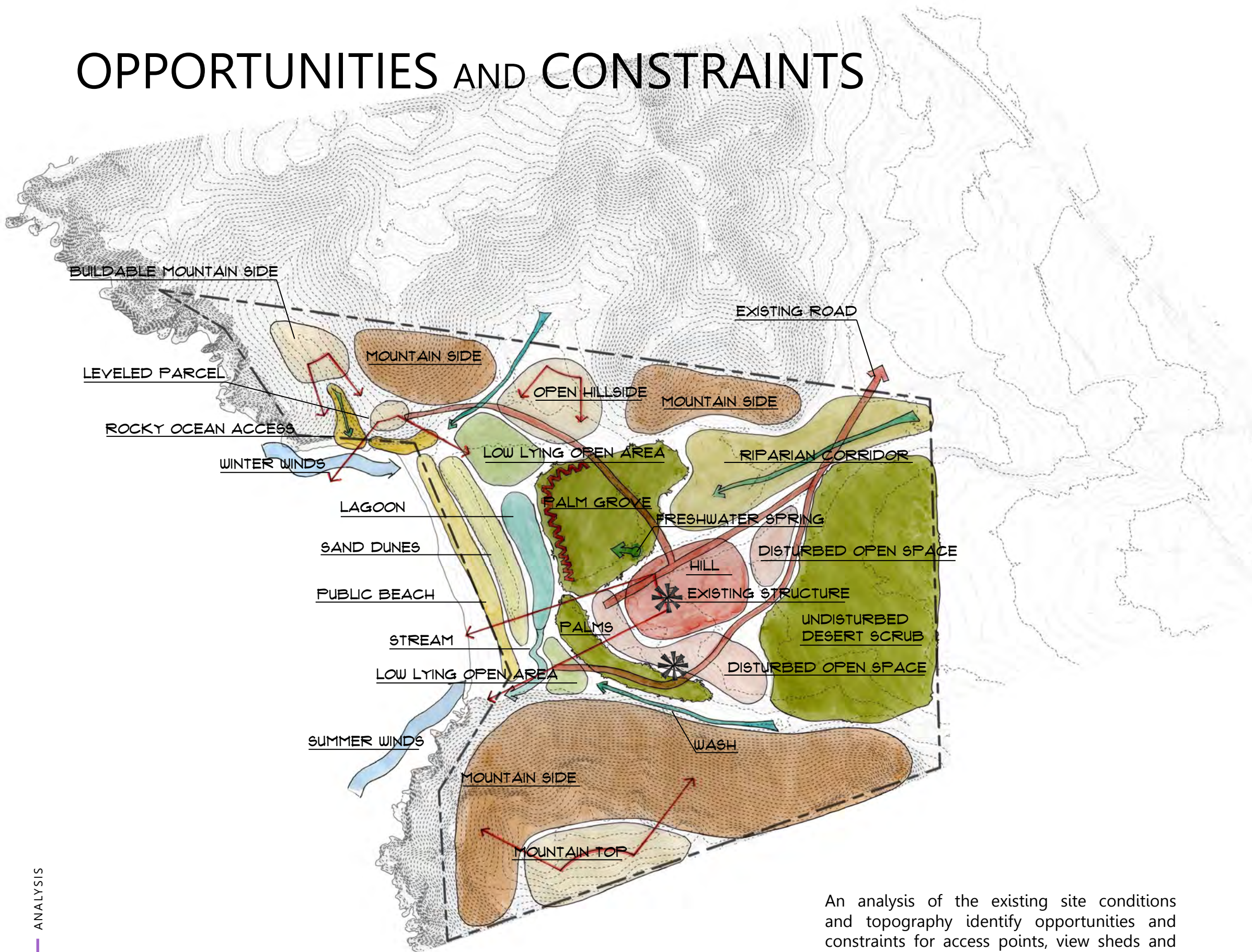
Las Palmas has an arid climate with hot summers and moderately cool winters. A number of design strategies in the placement and alignment of buildings can be integrated to passively harvest sun, shade and light to create comfortable year-round microclimates. In a hot arid climate like at Las Palmas, it is wise to produce an abundance of shade in the summer while capturing the cool ocean breeze. In the winter, it is desirable to create pockets of sun while blocking the cold tough winds.

The orientation and layout of streets and buildings have a significant effect on the microclimate around buildings and on the access to sun and wind for use inside the buildings.

- **Narrow north-south streets create year-round shade**
- **Wider east-west streets offer opportunities for sun in the winter**
- **Elongated east-west blocks will capture the winter midday sun and minimize exposure year-round to the hot summer afternoon sun.**
- **Orienting streets 30 degrees oblique to the cardinal directions will maximize year-round shade on the streets.**
- **Orienting blocks 20-30 degrees toward the summer southwesterly winds will direct air moment through streets while blocking the winter winds from the northwest.**



OPPORTUNITIES AND CONSTRAINTS



An analysis of the existing site conditions and topography identify opportunities and constraints for access points, view sheds and buffers for various land uses.

BUILDABLE MOUNTAIN SIDE

- OPP:
- Great views
 - Seclusion from public beach
 - Receives ocean breeze
- CON:
- No control over neighboring development
 - Visually obtrusive from beach
 - Must engineer for slopes
 - Hazardous drainage

HILL

- OPP:
- Sunset views
 - Receives SW (summer) breeze
 - Protected from NW (winter) breeze
 - Previously disturbed
 - Site of old sugar cane ranch = historically significant
 - Buffered by vegetation
 - Distance from neighboring property
 - Can be seen from highway
- CON:
- Lack of shade
 - Not close to beach
 - Lack of visual privacy from highway

MOUNTAIN SIDE (SOUTH)

- OPP:
- Great views
- CON:
- Too steep to build on

MOUNTAIN TOP

- OPP:
- Views over entire site
- CON:
- Difficult access
 - Visually intrusive by building on ridge
 - Must engineer for slope stability
 - No buffer from neighboring property

RIPARIAN CORRIDOR

- OPP:
- Rich in wildlife
 - Access to water
- CON:
- Floodplain

ROCKY OCEAN ACCESS

- OPP:
- Access for fishing
 - Access for snorkeling and kayak
 - Good location for jetty = boat landing
 - Whale watching platform
- CON:
- Disturb waves and ocean current
 - Hazardous during big swells
 - Stormwater drains
 - Visually intrusive

DISTURBED OPEN SPACE

- OPP:
- Area already disturbed
 - Proximity to existing roads
 - Proximity to existing structures
 - Adjacent to palms and wash
 - Potential for development
- CON:
- Current public access runs through it
 - Lack of privacy
 - Limited shade = hot

LAGOON

- OPP:
- Attracts wildlife
 - Research and education
 - Source of fresh water
 - Wetlands can treat water
 - Tourist attraction
- CON:
- Fragile = may be threatened by development
 - Home to wildlife
 - Lack of breeze = hot

OPEN HILLSIDE

- OPP:
- Great ocean views
 - Already created access
 - Receives ocean breeze
 - Potential for development
- CON:
- Mostly undisturbed
 - No control over future development
 - Few large trees=lack of shade

SAND DUNES

- OPP:
- Preserve for research and education
 - Protect lagoon from storm surges
- CON:
- Lack of trees = no shade
 - Limit beach front development

EXISTING ROAD

- OPP:
- Proximity to highway
 - Access to T.S.
 - Utilize existing infrastructure
- CON:
- Can handle limited traffic
 - Predetermined arrival sequence
 - Dust

PALMS

- OPP:
- Dynamic space to navigate through
 - Not too dense to block breeze
 - Stable soil

LEVELED PARCEL

- OPP:
- Already leveled
 - Existing access road
 - Great views over entire site
 - Ocean breeze
 - Close access to beach
- CON:
- Visually obtrusive
 - Lack of visual privacy
 - Limited area to build
 - Steep access road

PALM GROVE

- OPP:
- Shade
 - Unique attraction
 - Feel secluded
 - Provide animal habitat
 - Creates buffer from NW wind
 - Iconic
- CON:
- moist soil
 - Lots of bugs
 - Hot and humid
 - No views out
 - Flooding
 - Tree litter require lots of maintenance

STREAM

- OPP:
- Perennial source of fresh water
 - Used for bathing
 - Used by wildlife

EXISTING STRUCTURE

- OPP:
- Restore and incorporate into development
 - Historically rich
 - Vernacular architecture
- CON:
- Expensive to restore
 - May clash with new archetype

LOW LYING OPEN AREA

- OPP:
- Views of beach
 - Breezes from ocean
 - Some trees provide shade
- CON:
- Flooding during storm surges
 - Rising sea level
 - Sandy soil may be difficult to build on
 - Wash runs through it

PUBLIC BEACH

- OPP:
- Attracts tourists and locals
 - Good for surfing
 - Breezes
 - Sea turtles lay eggs
- CON:
- Difficult to launch boats
 - Public access
 - Security

UNDISTURBED DESERT SCRUB

- OPP:
- Maintain natural preserve
 - Create a network of trails for visitors
 - Buffer from adjacent property
 - Provides wildlife corridor
- CON:
- Future development on neighboring property may disturb it

FRESHWATER SPRING

- OPP:
- Source of fresh water
 - Potential for bathing
 - Attracts wildlife
- CON:
- Little amounts of water
 - Lots of bugs
 - Lots of algae
 - Feeds lagoon and should be protected

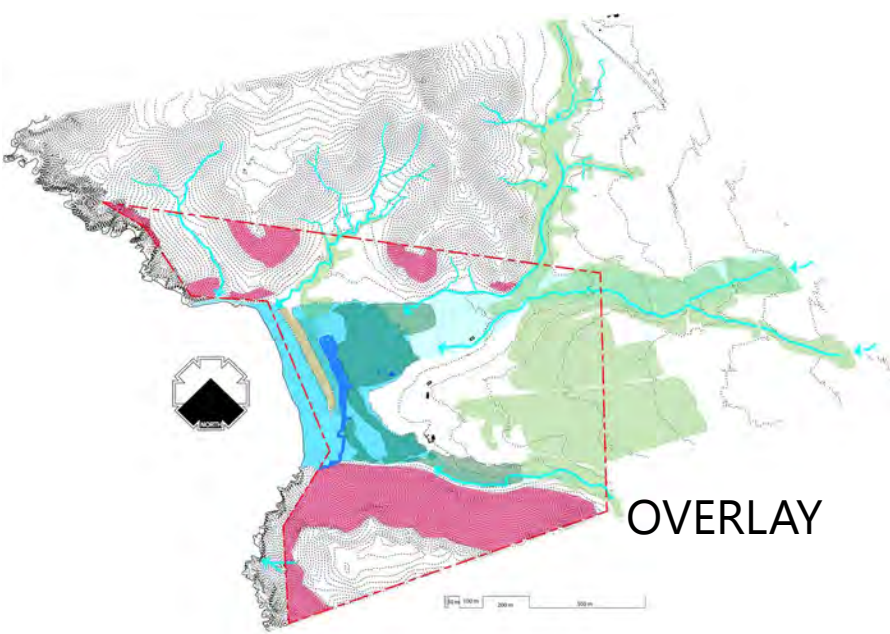
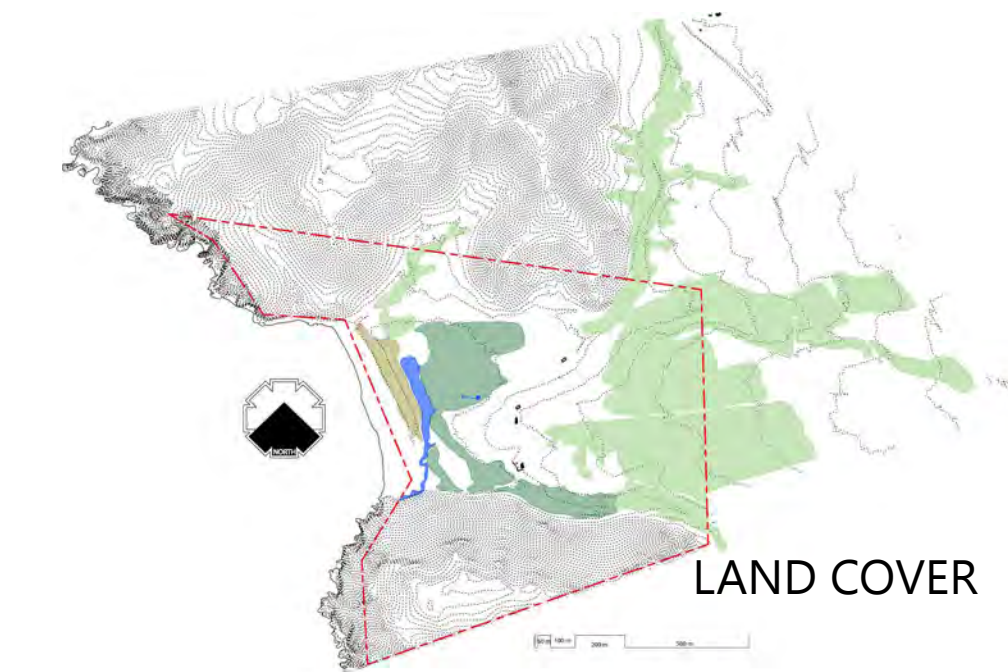
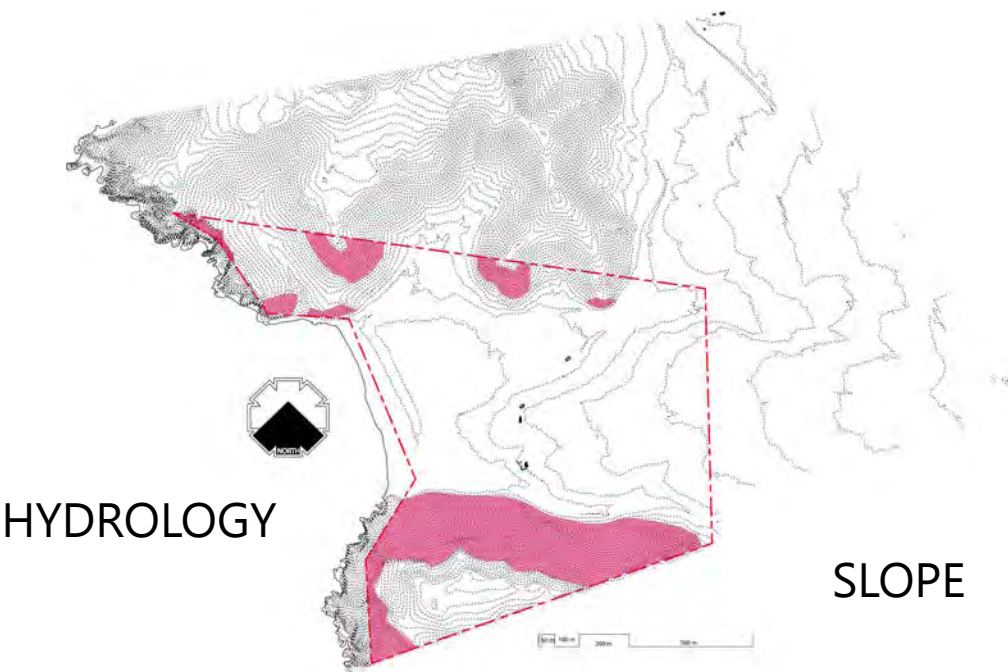
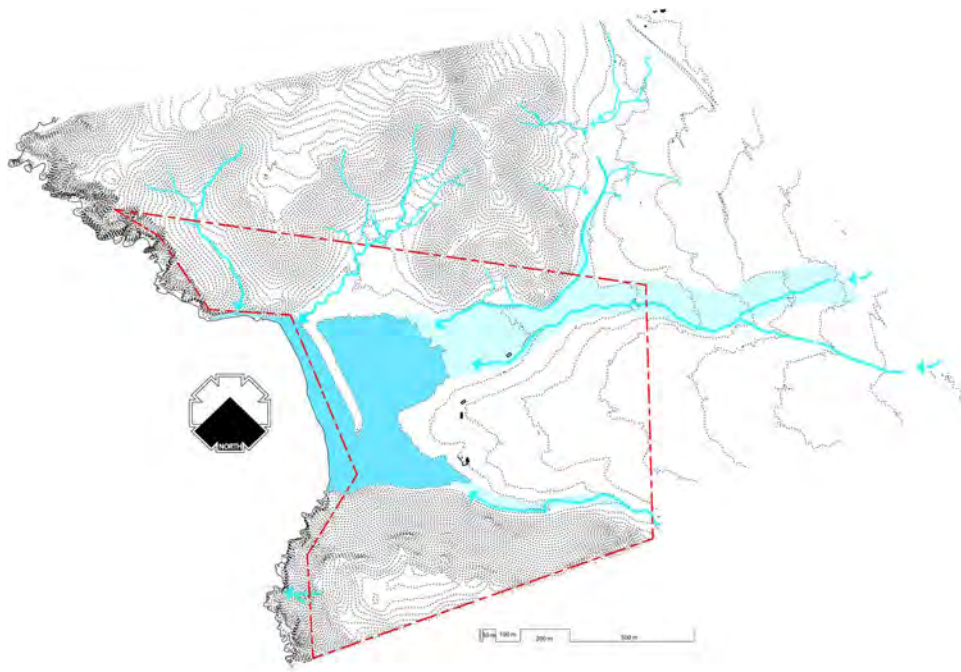
MOUNTAIN SIDE (NORTH)

- OPP:
- Nice views
 - Not visually intrusive
 - Accessible
- CON:
- Must engineer slope
 - Limited buildable land

WASH

- OPP:
- Can be used to clean and drain wastewater
 - Access to storm water
 - Healthy vegetation
- CON:
- May bring pesticides from farm upstream
 - Sensitive habitat

SUITABILITY ANALYSIS



A suitability analysis overlays slope, hydrology and land cover data to determine the land unsuitable for development. Incorporating best practices from the research that addresses problems with current development trends, the following criterion was set to determine land unsuitable for development:

- Slopes greater than 45 degree
- Undisturbed land cover (sand dunes, wetlands, palm grove, desert scrub)
- Washes, floodplains, and elevation below 5 m



UNSUITABLE LAND



DESIGN DEVELOPMENT

THE DESIGN AT LAS PALMAS SEEKS TO FIND A SUSTAINABLE BALANCE BETWEEN TOURISM, ENVIRONMENT AND THE COMMUNITY. IN AN ITERATIVE DESIGN PROCESS STARTING WITH THE INITIAL VISIT TO TODOS SANTOS, CONCEPTS WERE GENERATED AND REVIEWED IN MEETINGS WITH MY COMMITTEE CHAIR AND SMALL GROUP OF CLASSMATES. THESE WEEKLY MEETINGS, COMPRISING DESIGN CHARRETES AND CRITIQUES, HELPED SHAPE ALTERNATIVE CONCEPTS AND INFORM THE AREAS OF RESEARCH THAT NEEDED TO BE PERFORMED. THESE MEETINGS WERE INSTRUMENTAL IN THE DESIGN PROCESS AND THE DEVELOPMENT OF THE FINAL PREFERRED CONCEPTS AND RESULTING DESIGN.

A BRIEF OVERVIEW OF THE CONCEPT DEVELOPMENT IS PRESENTED IN THIS CHAPTER.

USERS

The types of users were determined in the initial phases of this project which was the driving force behind the goal statement and concept development. With the goal to create an authentic Baja experience for tourists and incorporate the local community, the design of Las Palmas intends to attract those who pursue genuine experiences through outdoor activities, that reflect the natural environment, and cultural interactions, that encourage social exchanges. The users can be of any age, economic class, or nationality as long as they maintain ethics of responsible and respectful travel. This project offers an alternative type of tourism experience, different to those found in Los Cabos, which encourages the users to leave the resort and immerse in the culture and natural environment.

Users include:

- National and international overnight stay tourists
- Local and international day visitors from nearby towns or resorts
- Local and foreign permanent residents
- Resort staff and laborers
- Extended stay students and researchers



PROGRAM ELEMENTS

ENVIRONMENT

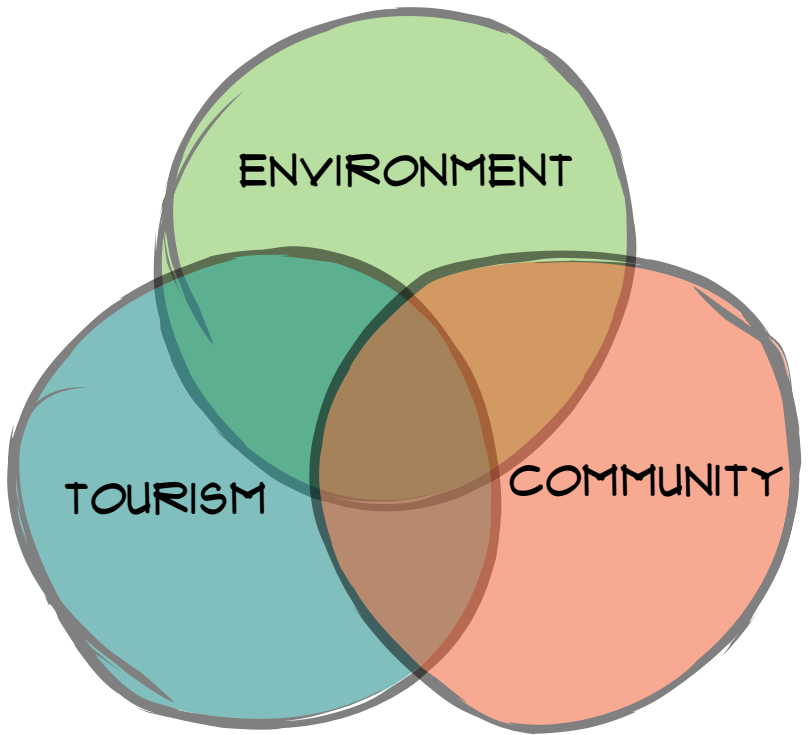
- **Constructed wetlands**
- **Nature preserve**
- **Canopy walk**
- **Interpretive center**
- **Ranger post**
- **Nature boardwalks/trails**

TOURISM

- **Variety of guest rooms/prices**
- **Water taxi/arrival jetty**
- **Services for day visitors/locals**
- **Beach club**
- **Main lodge/reception**
- **Observation decks**

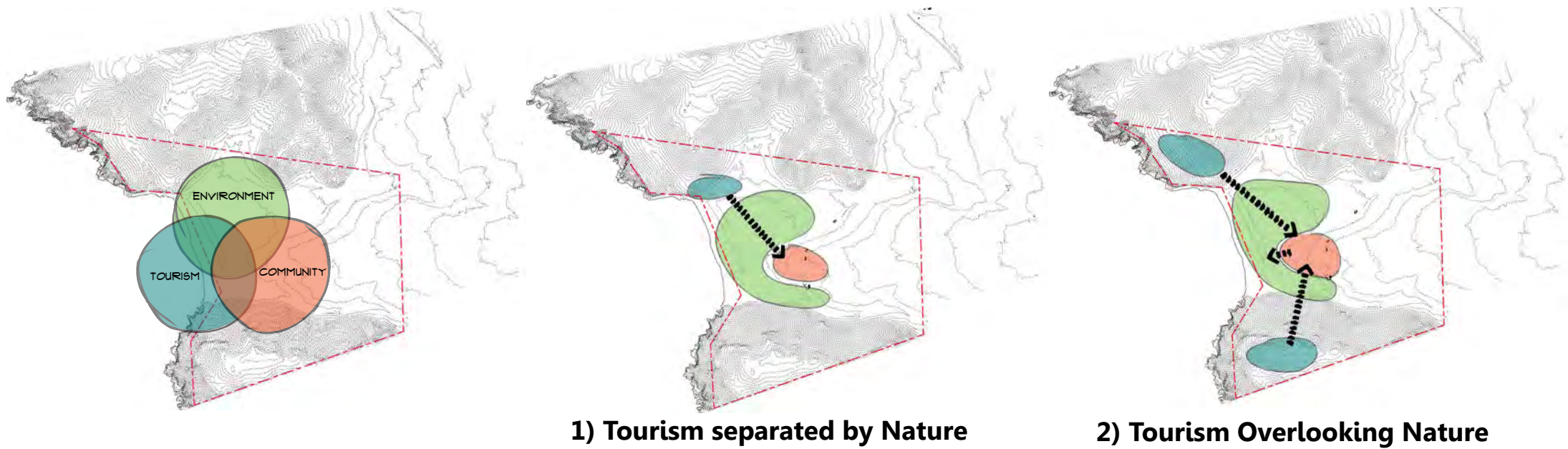
COMMUNITY

- **Research center (ag/water)**
- **Art gallery**
- **Agriculture**
- **Farmers market**
- **Restaurants**
- **Retail**
- **Plazas**
- **Conference /community center**
- **Fitness center**
- **Variety of housing**
- **Surf/dive shop**
- **Live work studios**
- **Mixed use units**
- **Cultural center**
- **Soccer field**
- **Library**
- **Performance space**

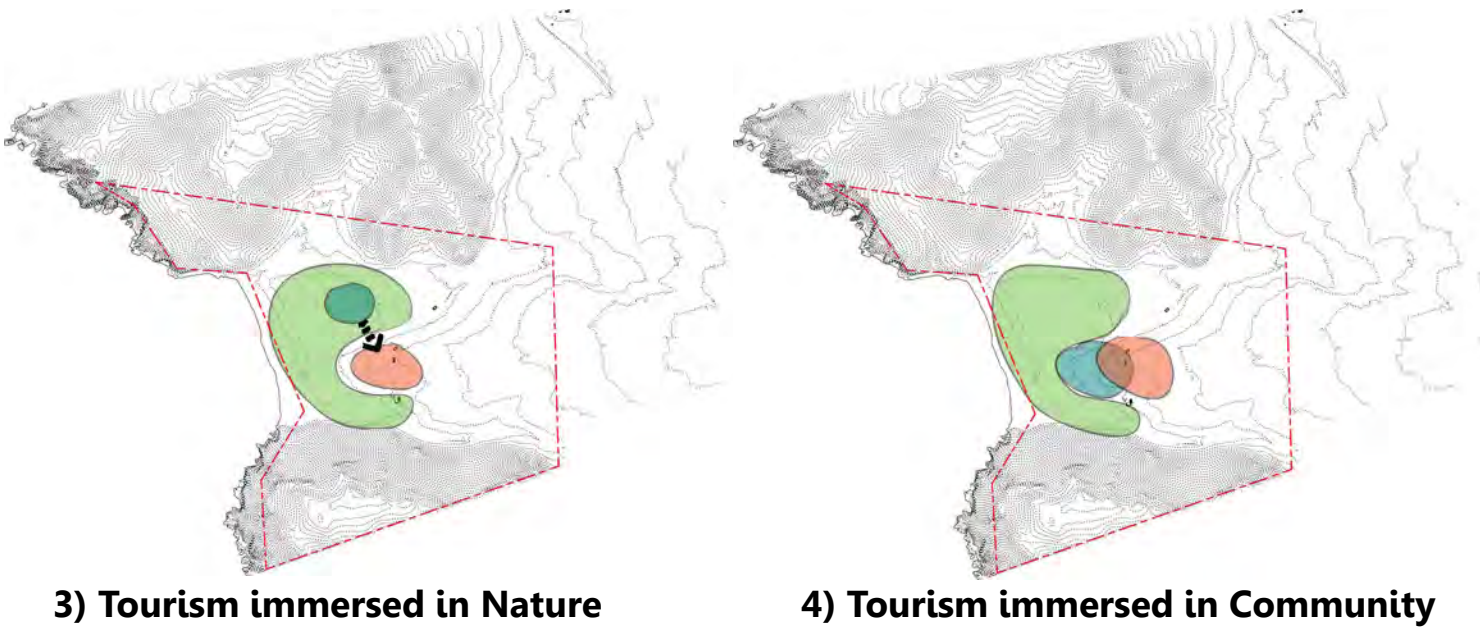


The program elements are chosen to balance the tourism, environmental and community goals set forth. Though many of the elements are interwoven and connected to each other, they are listed under separate categories to demonstrate how the program satisfies the respective goals.

CONCEPT DEVELOPMENT

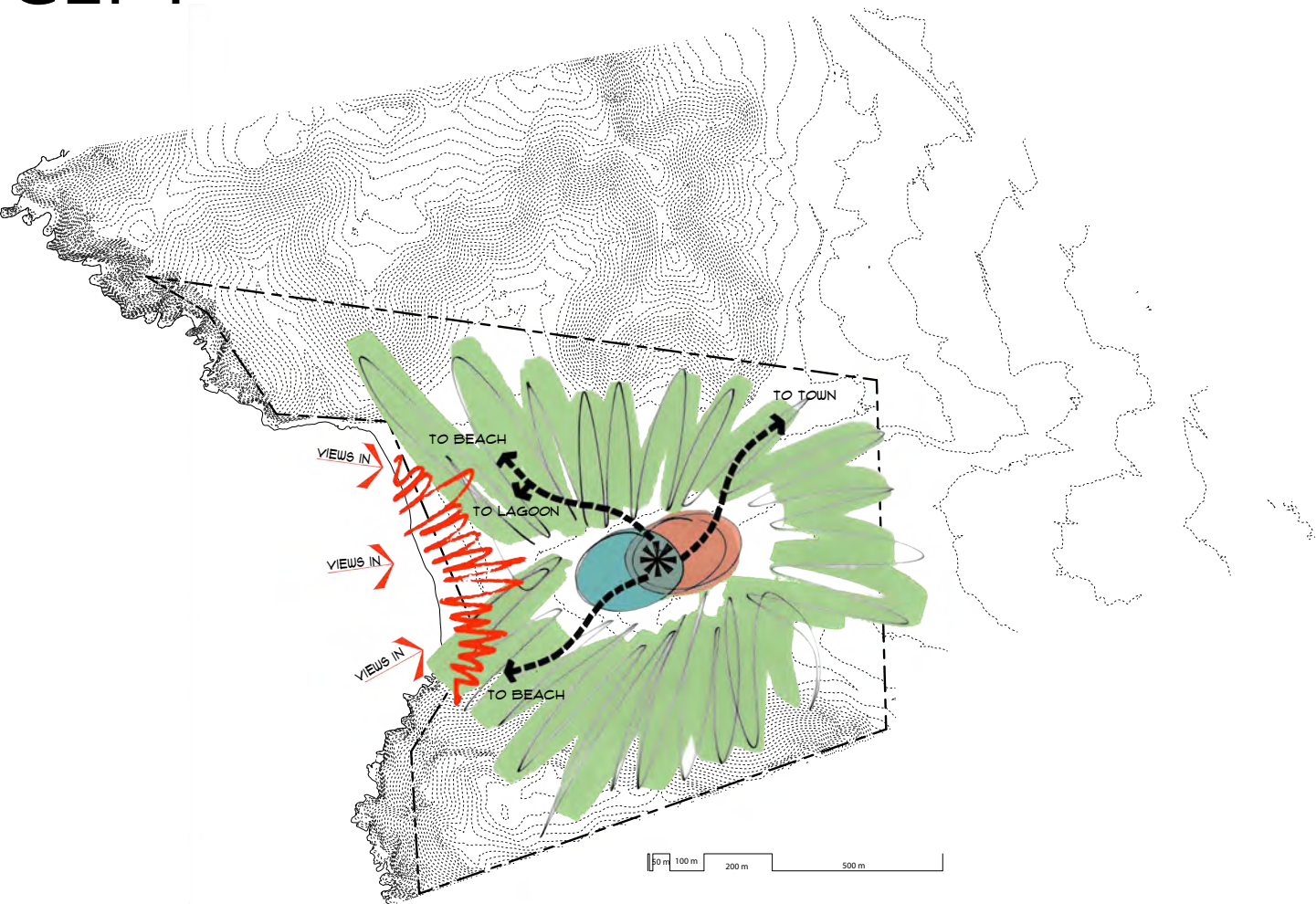


Various spatial arrangements test where the proposed program elements could be placed and their relationship with each other. Options one and two use the identified unsuitable lands for environmental uses which separates community and tourism activities. While they provide tourism with close proximity and views of the beach, they will potentially lose cultural interaction found within the community. Option three places tourism within the environmental protected space, bringing tourism uses slightly closer to the community and creating a dynamic tourism setting within the palm groves. However, it suggests development on unsuitable lands that can highly impact the unique palm grove environment. The fourth option immerses community and tourism together, surrounding them with environmental activities, which helps protect sensitive natural areas.

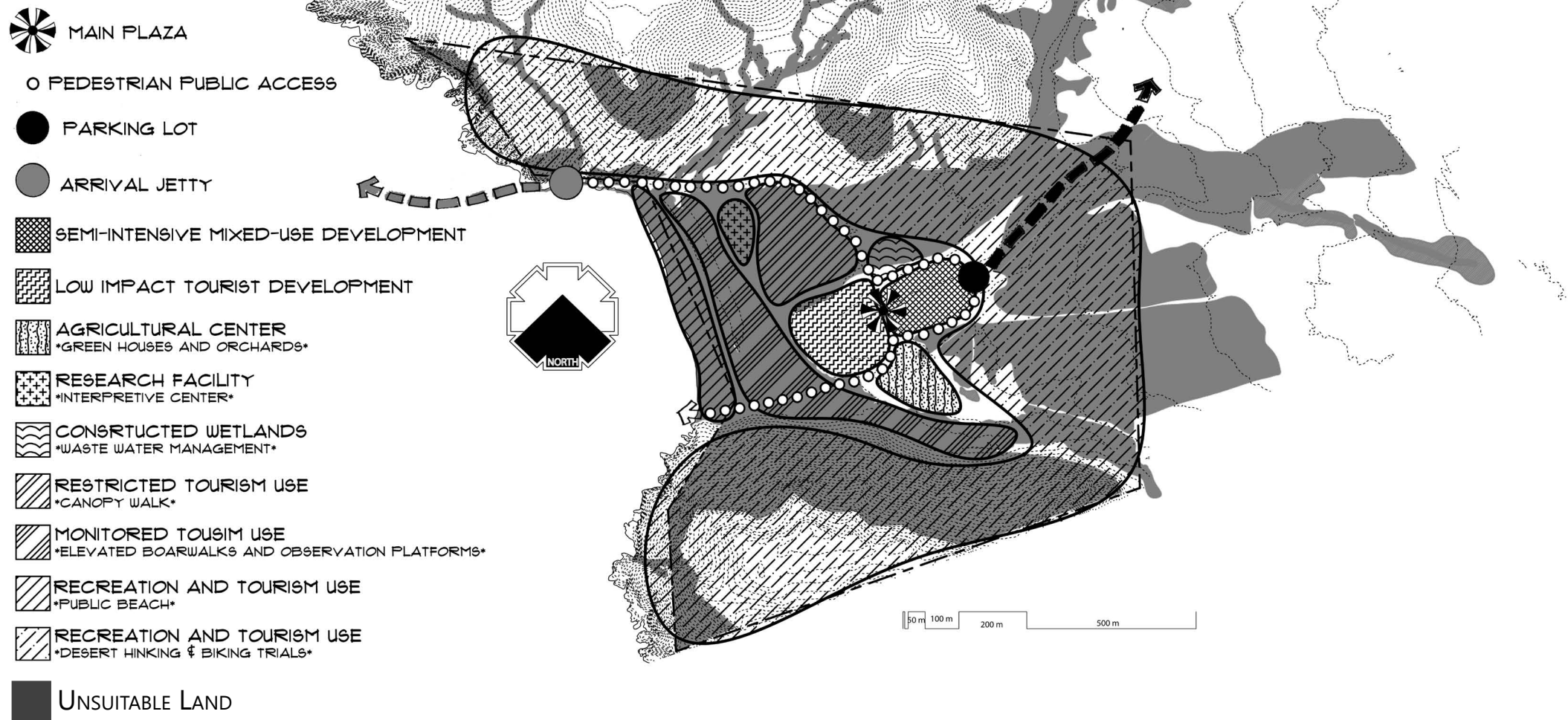


PREFERRED CONCEPT

The end result concentrates community and tourism development together minimizing the development footprint. It is surrounded by protected natural environment that acts as a buffer in various ways. **1)** It will buffer the resort and community from future undesirable development on the neighboring properties. **2)** It will buffer and protect the fragile coastal ecosystems from unintended pollutants and waste runoff from the tourism and community facilities. **3)** Lastly, the natural environment will visually buffer buildings from views at the beach. While within a quarter mile from the beach, close enough to comfortably walk to the beach and view the ocean from the resort, it will allow people at the beach to enjoy the natural environment without seeing any built structures. With all development hidden behind a grove of palms, one can be at the beach and have a feeling of being in a secluded, undeveloped environment.



ZONING CONCEPT

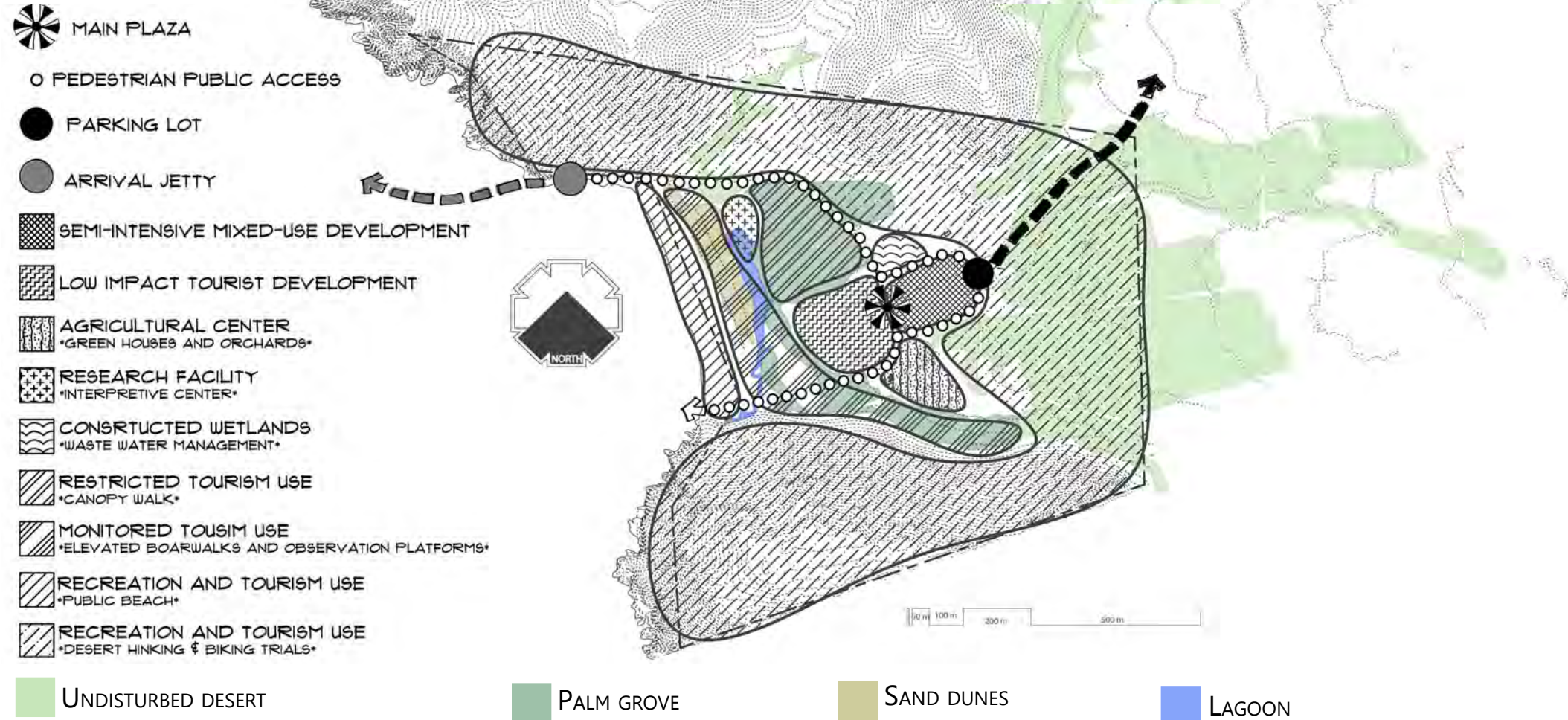


Responding to the restrictions on site that were evaluated in the previous site analysis chapter, a zoning concept separates the land into different zones for various levels of development and limited uses. The zoning helps insure the compatibility of adjacent land uses and the appropriate selection land for the more intense uses.

The areas of most intensive uses, tourism, agriculture and mix-used development are

located in the center, avoiding the unsuitable lands. The unsuitable lands, comprised of undisturbed desert, palm groves, wetlands, and sand dunes, are split up into zones of varying tourism uses and restrictions in order to protect the natural ecologies. **Recreation** zones on the beach and in the desert scrub are open to the public for selected tourism uses. The beach is open to passive recreation including surfing, diving, and kiting. The dense desert scrub is permitted for hiking, horseback

riding, and mountain biking through a network of trails. The **Monitored Tourism Use** zone has elevated boardwalks traversing the sand dunes and wetlands with provided interpretive signage and observation platforms. This zone is open to the public with monitored oversight to ensure users behave appropriately and stay on the paths. The **Restricted Tourism Use** zone allows a limited number of visitors per day and is strictly monitored and protected. An elevated canopy walk and zip line route

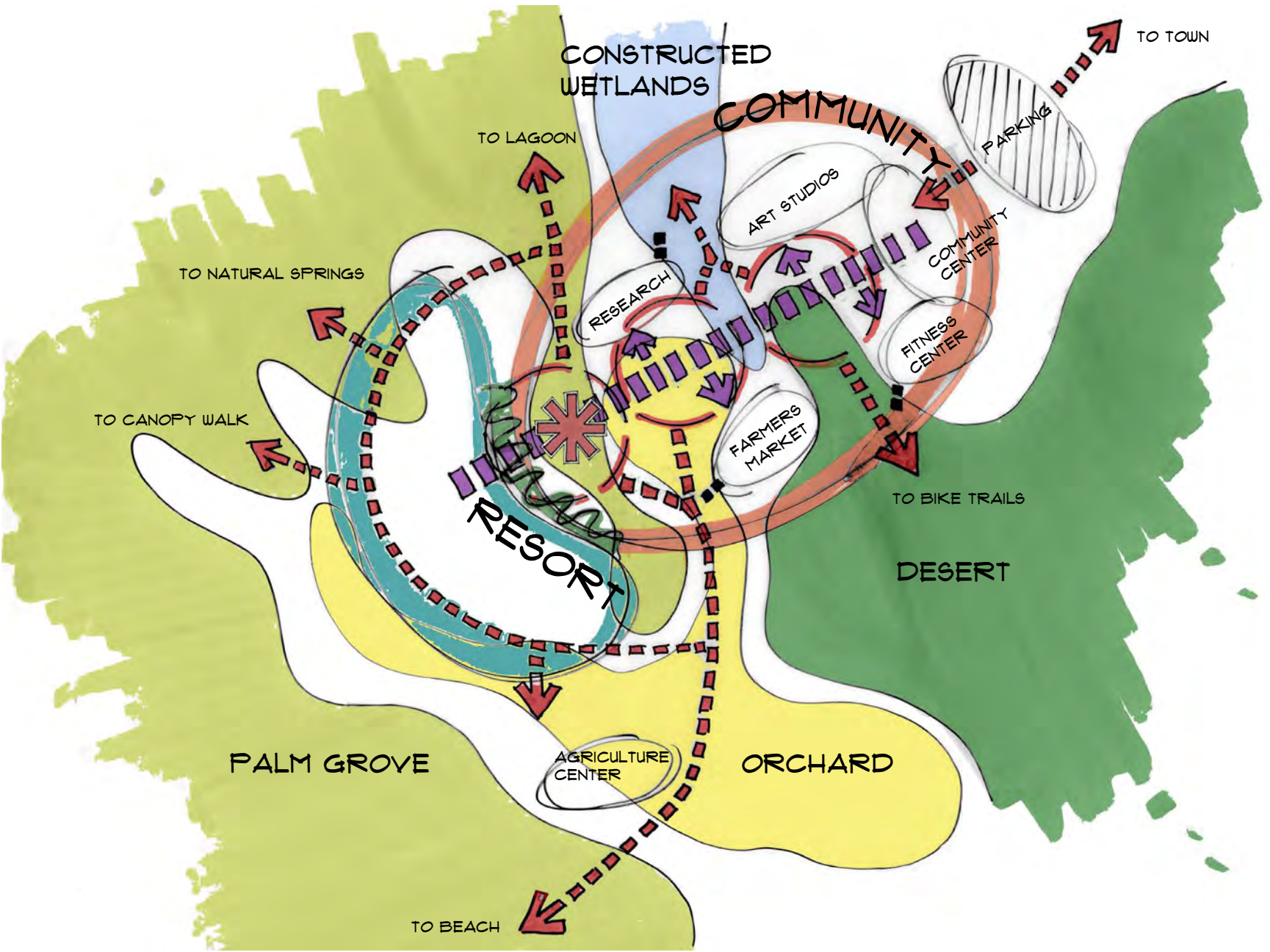


navigates tourists through a dense palm grove and along the lagoon. Although no financial studies were performed, it seems appropriate to charge fees to access this zone which can be used to employ guides and park rangers, and help fund the adjacent Research Facility. The **Research Facility** studies water quality on the lagoon and includes an interpretive center open to the public. A small fee may also be charged to maintain its operations though a discounted fee for locals and students may be appropriate.

Low Impact Tourism Development neighbors the Monitored and Restricted Tourism zones and is adjacent to a **Semi Intensive Mixed-Use Development**. Where the two zones intersect, a **Main Plaza** marks a focal point. A **Constructed Wetland** is adjacent to the most intense development and naturally filters and cleans all wastewater generated from the tourism and mixed-use zones. The **Agriculture Center** uses the remediated wastewater from the constructed wetlands, to practice innovative low water use

farming techniques. Access around the site is solely pedestrian and bicycle, with electric carts available for staff and maintenance, limited mobility guests, or for porting luggage to the resort. A parking lot is located at the east end of the site for those arriving by car and arrival jetty allows visitors to arrive by sea.

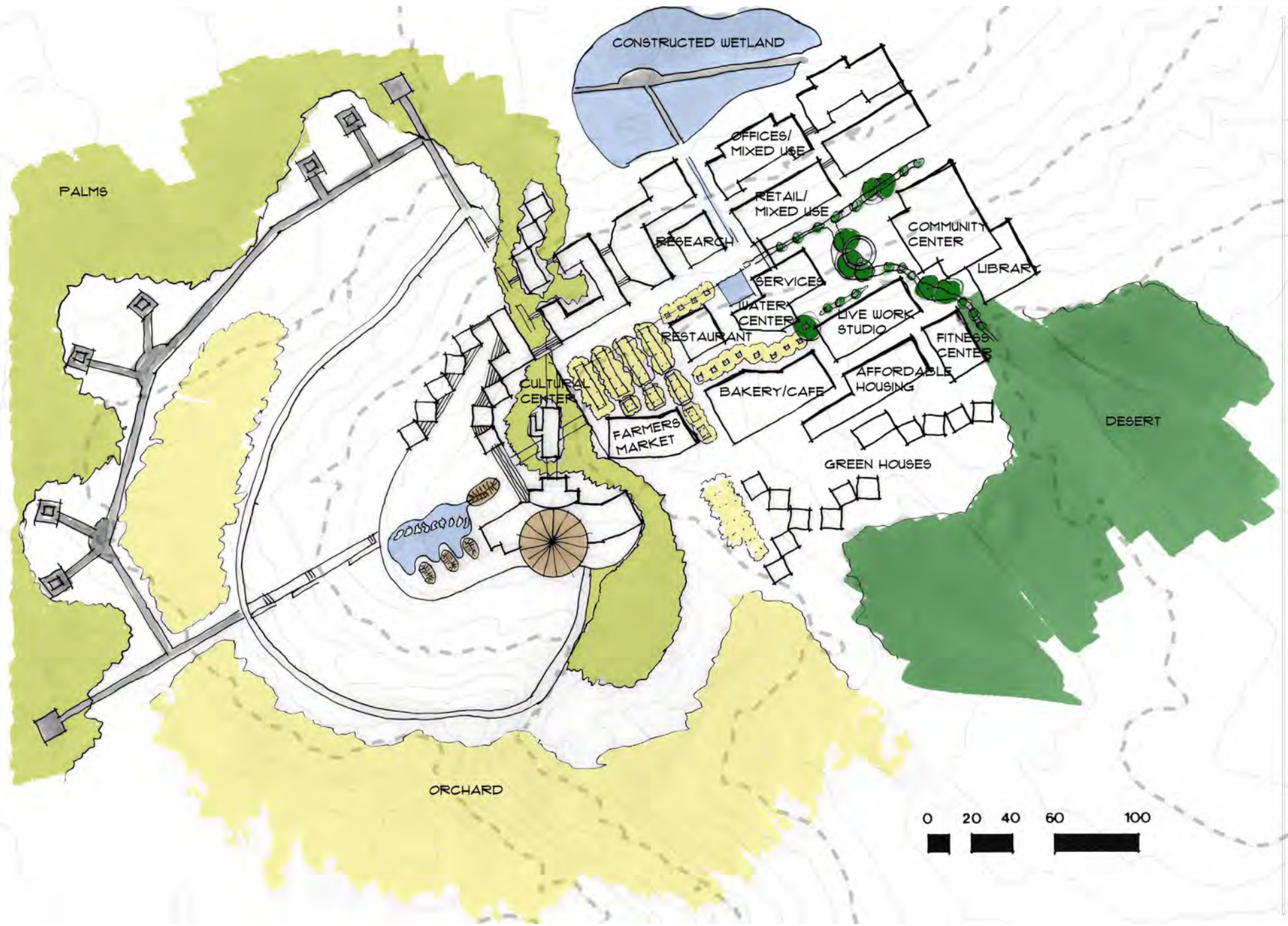
CENTRAL CORE CONCEPT



In the central core, the resort and community sit side by side and seamlessly connect into the surrounding landscapes. The adjacent land cover sweeps through the community creating circulation nodes at different themed plazas. Ribbons of palms, orchards, desert and wetlands wrap across the community drawing users from the central core out to their respective environments and suggesting the programming

of building spaces. The resort is connected with the community along a central access that is anchored by a community center and school at one end and the restored ranch building at the other. A pedestrian-only development, a number of paths branch out from the core leading to various amenities the park has to offer.

CONCEPTUAL PLAN



The conceptual plan diagrammatically lays out the building massing and the plazas to better illustrate the design intent for the development footprint.



FINAL MASTER PLAN

LAS PALMAS IS A PARK, COMMUNITY, AND RESORT INTERCONNECTED TO FUNCTION AS A SUSTAINABLE LIVING SYSTEM. THE PARK SEAMLESSLY WEAVES IN AND OUT OF THE COMMUNITY PROVIDING FOOD, COMFORTABLE MICROCLIMATES, AND WILDLIFE. A CONSTRUCTED WETLAND EMERGES FROM THE COMMUNITY, NATURALLY TREATING ALL WASTEWATER PRODUCED BY THE RESORT AND COMMUNITY. THE REMEDIATED WATER IS REUSED FOR NON-POTABLE HOUSEHOLD USES, GROUNDWATER RECHARGE, AND THE IRRIGATION OF CROPS. THESE HIGHLIGHTED SUSTAINABLE PRACTICES EDUCATE THE USERS AND ATTRACT MORE TOURISTS, CONTRIBUTING TO ECONOMIC OPPORTUNITIES FOR THE COMMUNITY AND ENCOURAGING CROSS CULTURAL INTERACTIONS. THIS POSITIVE FEEDBACK LOOP BENEFITS THE ENVIRONMENT, COMMUNITY AND TOURISTS.

THE LAS PALMAS DESIGN WILL BE PRESENTED AT VARIOUS SCALES IN ORDER TO SHOW THE EXTENT OF THE PARK, RESORT, AND COMMUNITY, AND HOW THEY INTEGRATE TOGETHER. SUPPORTING PERSPECTIVES AND SECTIONS ARE PROVIDED, WHERE APPROPRIATE, TO DEMONSTRATE THE USER'S SEQUENCE THROUGH THE DESIGN.

MASTER PLAN

- CONSTRUCTED WETLAND
- AGRICULTURE
- PROTECTED PALM GROVES
- NATURAL DESERT SCRUB
- MIXED-USE COMMUNITY
- RESORT
- RENOVATED EXISTING STRUCTURES
- LAGOON
- SAND DUNES
- MAIN PATH
- ELEVATED BOARDWALK
- BIKE TRAIL
- INTERPRETIVE TRAIL



0 50 100 200 500 1000 meters

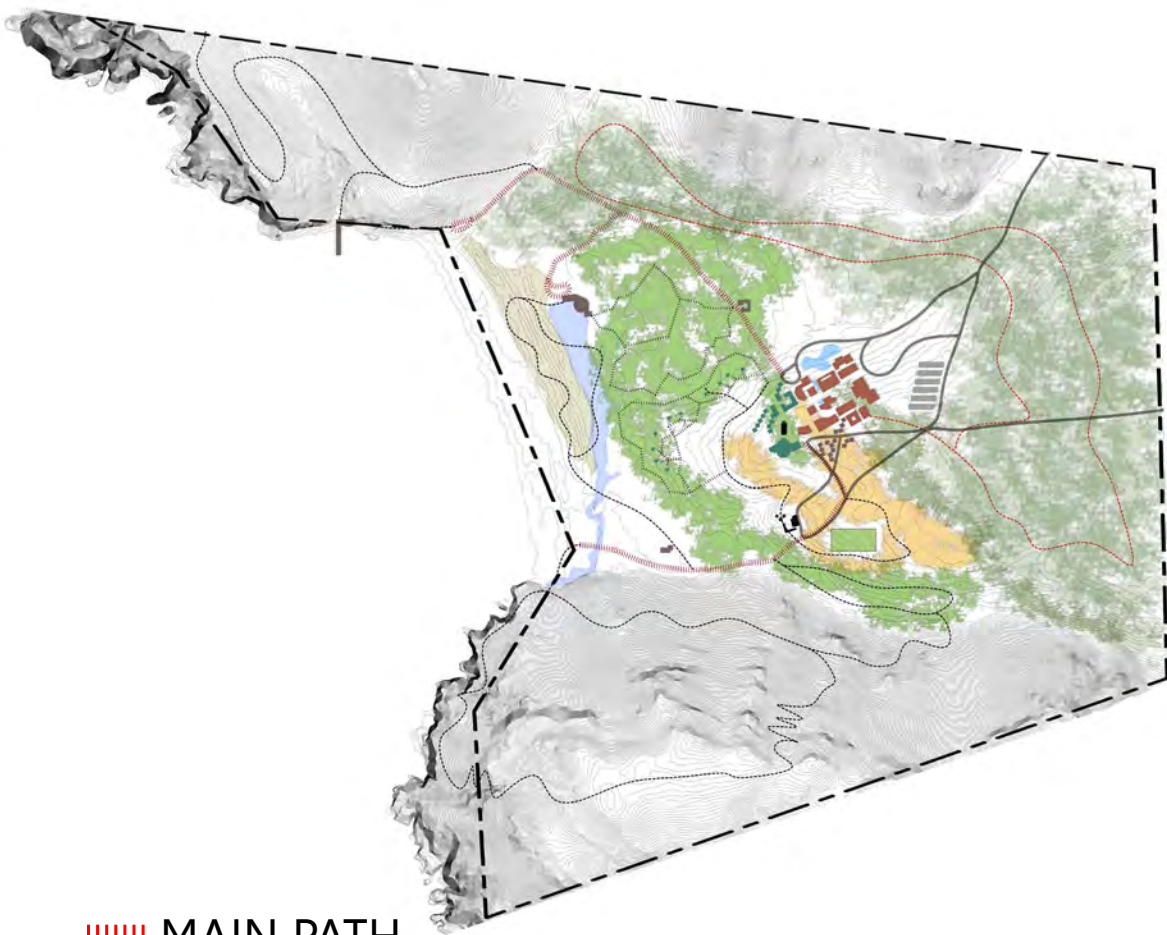
This plan shows the extent of the park and the network of trails connecting to the central core. 95% (460 acres) of the land is preserved as park open space. Of the remaining 5%, 2.5% (14 acres) is tourism and mixed use development and 2.5% designated for agriculture uses. An agriculture center, retrofit into a restored ranch building, provides agritourism and educational opportunities for tourists while providing jobs and food for the local community. A public soccer field is surrounded by fruit orchards providing spectators and players with scenic agricultural landscapes and comfortable tree canopies to sit under.

- 1 MAIN LODGE
- 2 COMMUNITY CENTER
- 3 RESORT RECEPTION
- 4 SOLAR PARKING
- 5 CONSTRUCTED WETLAND
- 6 AGRICULTURE CENTER
- 7 SOCCER FIELD
- 8 BEACH CLUB
- 9 ARRIVAL JETTY
- 10 RANGER POST
- 11 CAMP GROUNDS
- 12 INTERPRETIVE CENTER
- ↑ OBSERVATION DECKS
- ⊙ ARCHEOLOGICAL RUIN



0 50 100 200 500 1000 meters

TRAIL NETWORK



||||| MAIN PATH



The main path provides main access through the park, connecting the central core to the key amenities and a number of interpretive trails and boardwalks.

..... INTERPRETIVE TRAILS



A series of interpretive trails highlight the parks natural and archeological features. The circuit integrates trees and building ruins transforming the park into an open air museum. Following the interpretive trails, visitors experience the parks four primary habitats; the sand dunes, lagoon, palm groves and desert scrub with signs providing information about wildlife and stories of the past.



A path on the northern bluffs leads to a jetty where visitors can access boats and kayaks to explore the nearby coves. Visitors can take fishing tours or hire boat taxis to explore nearby beaches or visit Todos Santos' historic town center. The path ascends up the natural grade with the paths widening to create interpretive viewpoints. The path continues over the hill to the old fishing port. Remarkable ruins mark the location of the old port, making some of the coastline's best snorkeling.

..... BIKE TRAIL



A trail for bike and horseback riding flows out of a fitness center moving through the dense desert scrub and riparian washes. It ascends up a gentle slope along the northern hill before it circles back setting up a downhill ride with remarkable views.



For a more challenging hike, visitors may traverse the southern slopes along a steep rocky bluff. At its highest point the trail opens up into a terraced edge for a climactic overview of the entire site and expanse of the Pacific Ocean. Along the path the ruins of ancient structures are harmoniously integrated into the mountain side. The path is lined with local stone echoing the architectural ruins.

ELEVATED BOARDWALK
& SKY WALK

The sky walk is a route of zip lines and hanging bridges that lead visitors through the tall palm canopy. A ranger post operates the sky walk, and an interpretive center monitors the lagoon and sand dune boardwalks, and hosts a campground facility.



CENTRAL CORE PLAN

The central core integrates tourism with the local community by creating an authentic tourist destination while providing amenities, homes and jobs for local residents. A low impact tourism resort is attached to a small mixed use community encouraging cultural interactions outside of the resort. Ribbons of the adjacent landscapes weave through the resort and community connecting users to the surrounding ecosystems and demonstrating sustainable practices. Las Palmas is a prototype for sustainable tourism development, enhancing the environment while contributing to the community. Las Palmas generates renewable energy from a solar farm parking lot and naturally treats and reuses all of its wastewater allowing it to be completely off the grid.

RESORT

- ① 16 2-STORY CABINAS (128 SQ. METERS)
- ② 10 ELEVATED CABINAS (64 SQ. METERS)
- ③ 20 HOTEL ROOMS (64 SQ. METERS)
- ④ MAIN LODGE (1,000 SQ. METERS)

46 TOTAL ROOMS

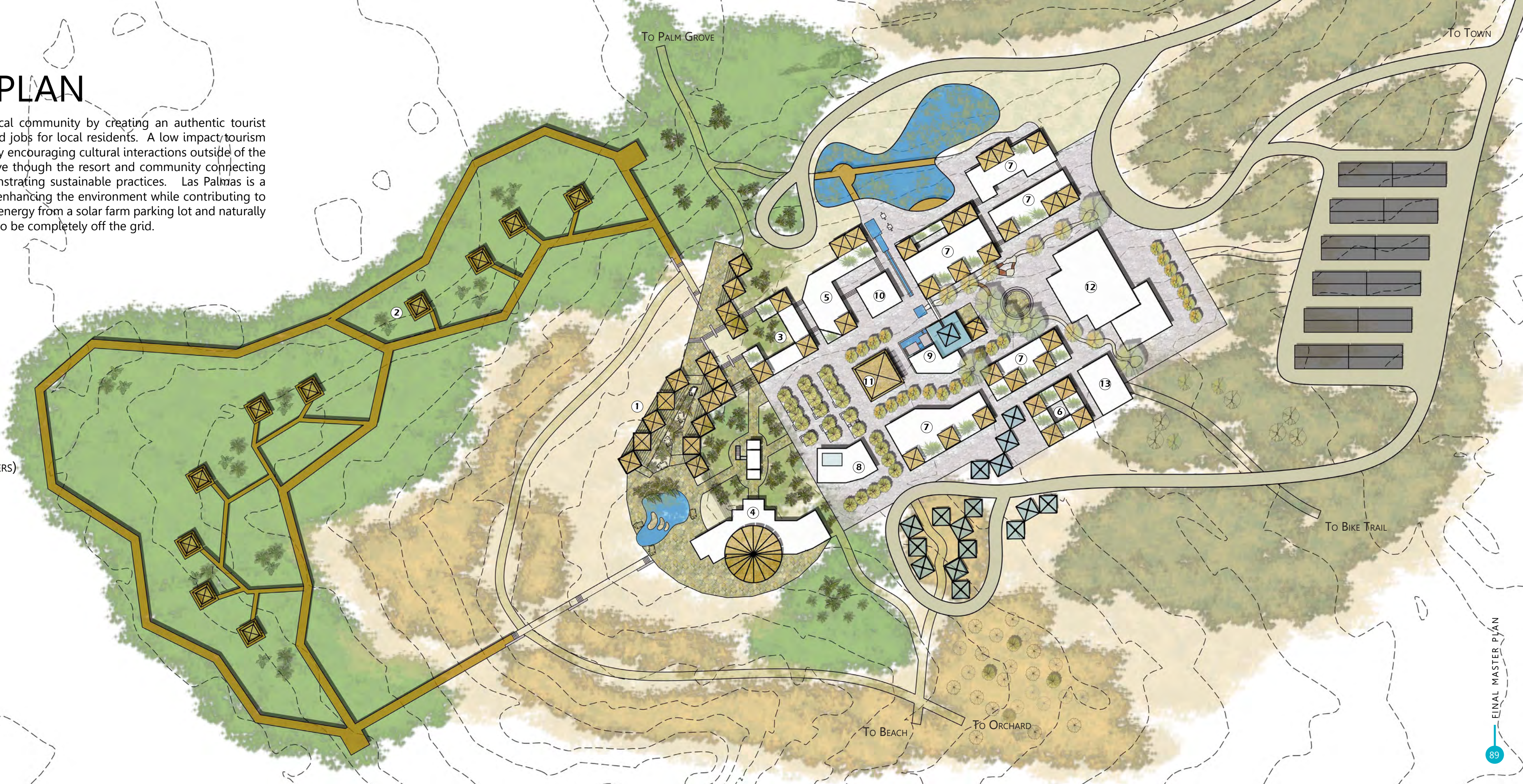
COMMUNITY

- ⑤ 30 RESEARCH DORM ROOMS (64 SQ. METERS)
- ⑥ 30 AFFORDABLE HOUSING UNITS (64 SQ. METERS)
- ⑦ MIXED USE
 - 64 APARTMENTS (128 SQ. METERS)
 - 20 OFFICE/STUDIO UNITS (64 SQ. METERS)
 - 20 RETAIL UNITS (64 SQ. METERS)

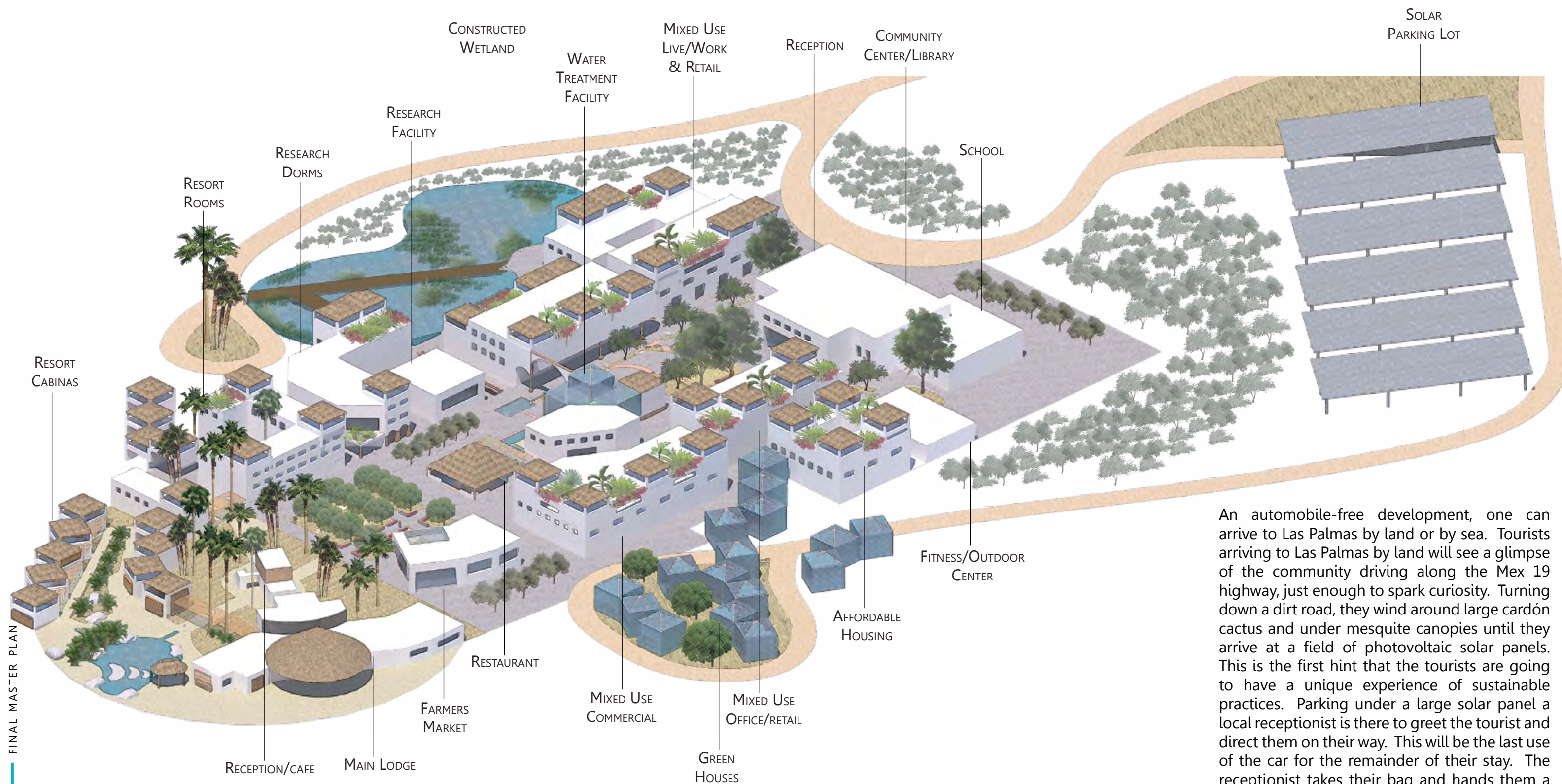
124 TOTAL HOUSING UNITS

40 COMMERCIAL UNITS

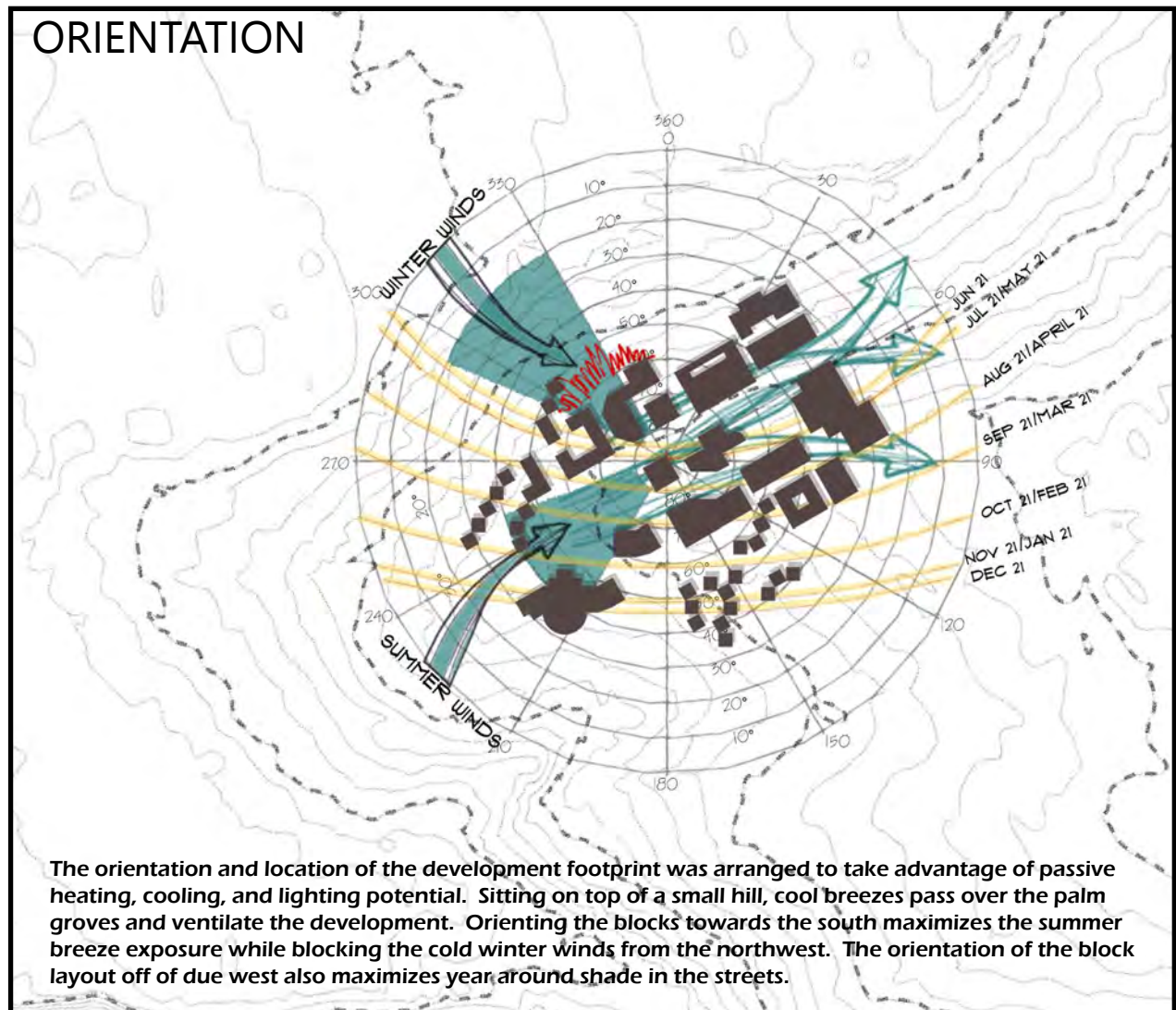
- ⑧ FARMERS MARKET (384 SQ. METERS)
- ⑨ WATER TREATMENT (768 SQ. METERS)
- ⑩ RESEARCH CENTER (512 SQ. METERS)
- ⑪ RESTAURANT (256 SQ. METERS)
- ⑫ COMMUNITY CENTER (1,344 SQ. METERS)
- ⑬ OUTDOOR/FITNESS CENTER (384 SQ. METERS)



CENTRAL CORE

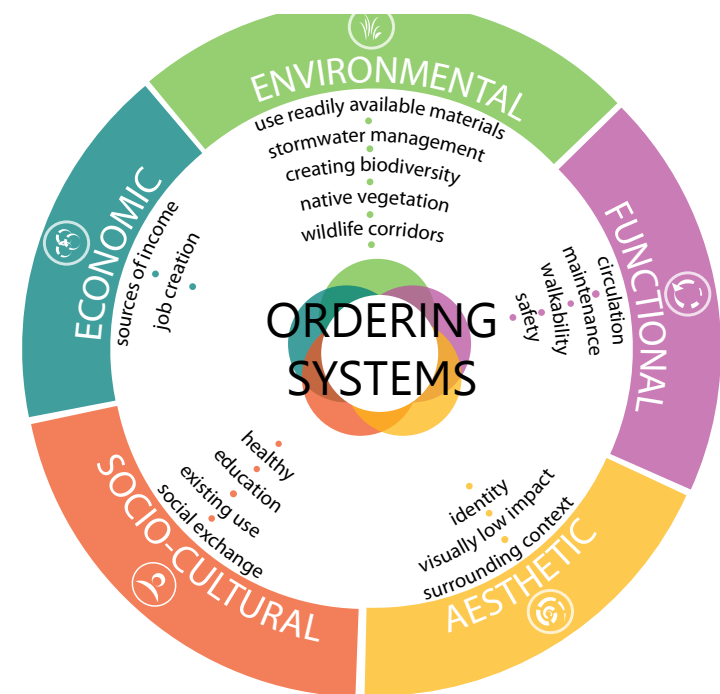


An automobile-free development, one can arrive to Las Palmas by land or by sea. Tourists arriving to Las Palmas by land will see a glimpse of the community driving along the Mex 19 highway, just enough to spark curiosity. Turning down a dirt road, they wind around large cardón cactus and under mesquite canopies until they arrive at a field of photovoltaic solar panels. This is the first hint that the tourists are going to have a unique experience of sustainable practices. Parking under a large solar panel a local receptionist is there to greet the tourist and direct them on their way. This will be the last use of the car for the remainder of their stay. The receptionist takes their bag and hands them a map of the community and points them the way.



To reach the resort the guest will walk through four different plazas of authentic Mexican life and highlighted sustainable practices, exposing them right away to the cultural components the community offers.

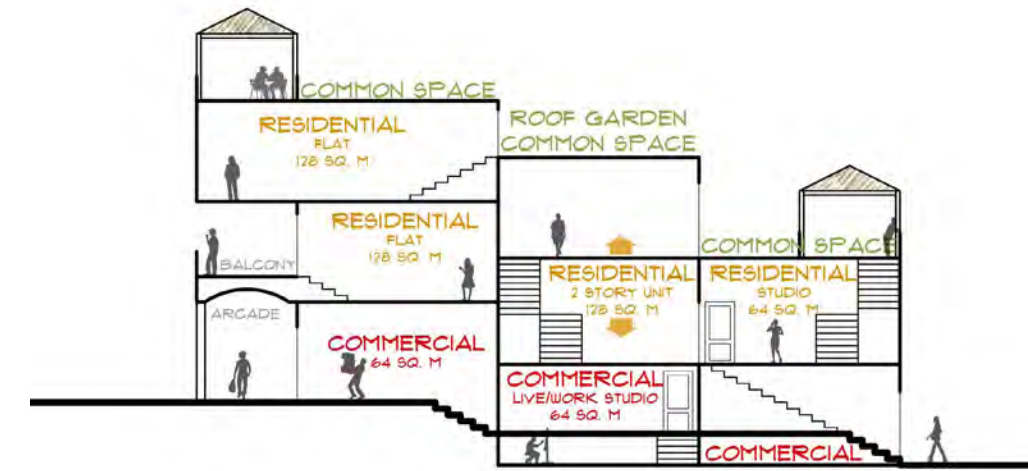
The design is evaluated under the ordering systems to track **environmental, economic, socio-cultural, economic, functional** and **aesthetic** achievements.



DESERT PLAZA

Entering the community a traditional Mexican plaza of native vegetation offers a platform for performances and cultural exchange. Drainage swales mimicking a riparian wash carve across the plaza capturing rainwater during storms and guiding it to the wetland for storage. Large Encino Negros (native oaks) mark the entrances into the plaza and shade a central performance platform that is surrounded by clusters of sculptural cacti. Multiple layers of canopy

provide ample shade replacing the need for the roofed pavilion found in traditional plazas. Arcades line the plaza with shops and art studios on the ground floor and residential apartments on the upper stories. The plaza is anchored by a cultural center and highlighted by a large greenhouse that leads through an archway to the next plaza that integrates with the wetlands.



A cross section of a typical mixed-use building around the plaza.



- Naturally vegetated drainage basins attract wildlife and control storm water



- Mixed use plaza encourages cultural exchange
- Anchored by a community center supporting community involvement
- Stage for performances and art exhibits



- Bottom floors of art studios and commercial retail generate income



- Arcade and dense tree canopies produce ample shade
- Plaza mimics form and function of traditional plaza and acts as a central gathering space



- Elements from traditional Mexican plazas, art, and architecture reminisce of traditional Mexico

WETLAND SQUARE

A constructed wetland utilizing Living Machine technology naturally treats wastewater and storm water on site and cleans it for re-use. A portion of the process takes place in a large, architecturally intriguing greenhouse which showcases the sustainable wastewater treatment process. An architectural style infusing the brick found in the traditional buildings on site with large glass windows and crisp modern lines, the greenhouse is an iconic element and the largest

structure on site. Emphasizing the water process makes visitors aware how precious water is in this region and will encourage them to rethink their daily water use. After the process in the greenhouse the water falls down an old wall that mimics the ruins found on the interpretive trail. The water cascades into a small pond that contrasts the hard edge urban form with the natural vegetation found in the wetland. The pond, in the shade, creates comfortable

microclimate for visitors to sit over and enjoy a meal. At this point the water flows out of the central corridor towards a constructed wetland where it moves through its final remediation process. Any storm water that is collected can join the remediated water at this point. An open air restaurant connects the wetland pond with the orchard plaza beyond.



Wastewater from the resort and the community is naturally treated and reused for non-potable uses and agriculture irrigation.



- Treated wastewater recharges ground water, enhancing the health of the surrounding environment
- Sustainable wastewater treatment and reuse reduces the demand of potable water



- Greenhouse demonstrates sustainable practices encouraging users to rethink daily water use
- Traditional stone wall water feature references ruins on site



- Decentralized wastewater treatment facility is more economically efficient



- All wastewater on site is treated and reused
- Water feature creates comfortable microclimate to sit over

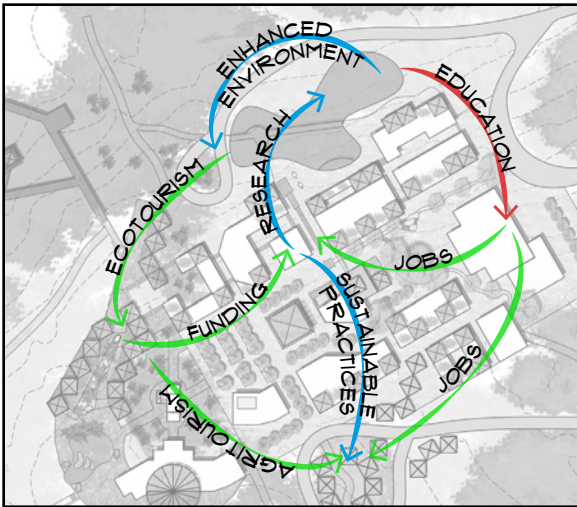


- Greenhouse is architecturally intriguing, infusing the brick found in the traditional buildings on site with large glass windows and crisp modern lines
- Hard geometric urban form is contrasted with the vegetation and natural function of the wetland

CONSTRUCTED WETLANDS

Following the water, the visitor will arrive at the constructed wetland, which creates an urban/nature interface rich with wildlife. A narrow alley peers through to the Desert Plaza and creates a shady, intimate corridor that is brought down to the human scale. Bright red bougainvillea spilling over walls enlivens the street and reminisces of a traditional Mexican village. Small deep windows in the northwest facing façade protect the building's interior from harsh

summer sun, while providing sufficient natural daylight. The roofs of the buildings are used as active patio space, and planted with vegetation providing a cool and healthy microclimate.



Research in water treatment and agriculture generate income while educating the community and enhancing the environment.



- Green roofs reduce heat island, maintaining a healthy environment



- Urban interface with nature encourages an active healthier lifestyle
- Roofs are used as communal active patio space, condensing the development footprint



- Wetland attracts visitors providing more opportunity for economic activity



- Deep small windows block the building interiors from harsh afternoon sun while providing sufficient natural daylight
- Narrow intimate alleys produces year-round shade



- Bougainvillea enlivens street and reminisces of traditional Mexican village

ORCHARD PLAZA

The orchard plaza provides a dense canopy of mango trees dropping fruit in the spring and providing shade throughout the hot summer. A more formal arrangement, mimicking the orchards in the neighboring farms, contrasts the organic form in the desert plaza. A farmers' market sells the locally grown fruits and vegetables and provides the restaurant with its ingredients. The restaurant spills into the plaza and offers traditional cooking classes, engaging

the visitors in the sustainable farming process and the everyday life of a traditional farmer. The plaza is laid out to host fairs and markets where locals can sell art and food. Tables and kiosks set up on platforms under the trees to sell produce and art. Shop can also be set along the seat walls that line the central corridor towards the old ranch and the palm plaza.



Agriculture practices provide local jobs and agritourism opportunities while providing healthy organic food to the community.



- Incorporates the organic farming techniques practiced on site



- Market encourages cross cultural interactions
- Cooking classes engage visitors in traditional farming practices



- Local farmers market provides jobs and support for local farms
- Plaza for locals to sell art and food



- Designed to hosts fairs and markets
- Comfortable microclimate under tree canopies

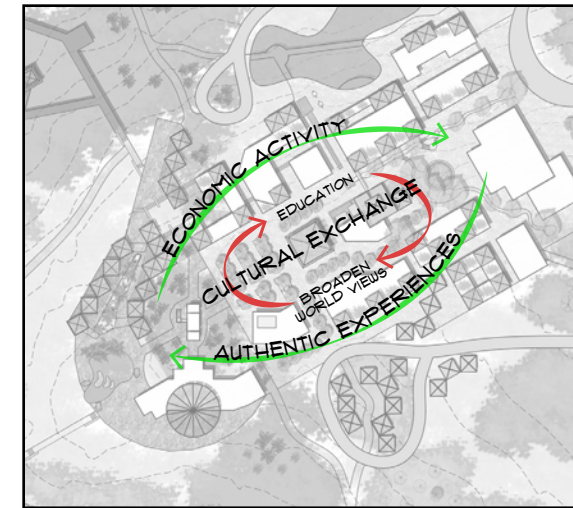


- Geometric shapes inspired by Mexican modern architect Luis Barragán

PALM PLAZA

An old ranch building is renovated and, surrounded by a stand of palms, is the focal of the final plaza before entering the resort. The bottom floor of the restored ranch is the resort reception and the upper floor is a small café open to the public for a drink overlooking the community. The palm grove sweeps across the plaza and marks the entrance into the resort. Eliminating walls and hard barriers between the community and resort, the palms act as a

porous boundary. The palms provide a dynamic plaza to navigate through and preview what the visitors will see inside the park. Follow the palms and it takes the visitor towards the entrance of the park and to the beach.



Cross cultural interactions can mutually benefit tourists and locals.



- Local materials are used in the building construction, reducing the carbon footprint



- Restored ranch building highlights the sites history
- Porous boundary eliminates hard barriers between the community and resort reducing the exclusion of the local community



- Capitalizing on the sites history attracts local and foreign tourists



- Palms lead visitors out of resort to explore surroundings



- The dense palms provide interesting shadows and a dynamic space to navigate through

RESORT ENTRANCE

Passing under a wood trellis overhang the tourists have arrived at the resort. The horizontal shadows cast on the ground juxtapose the vertical trunks of the palms which shoot up through the lattice ceiling. Walking along a palm trunk path the visitor steps through an opening in the vegetation to arrive at a large natural pool. The pool, cleaning itself through natural process, does not use chemicals and resembles the aesthetic and function of a

miniature wetland. Large rocks skip across the pool allowing guests to sit over the water and gaze at the view of the ocean through the palms. Horizontal wood slats similar to the trellis overhead act as blinds, passively cooling the interior of the buildings. Sliding glass windows provide natural ventilation reserving a cooling system for the hottest days of summer.



•Pool mimics form and function of a miniature wetland, cleaning itself through natural processes and not using any chemicals



•Rocks across pool provide cool microclimates to sit over



•Slats on buildings help passively cool building interiors, reducing the need for HVAC



•Trellis overhang acts as a threshold between the resort and community



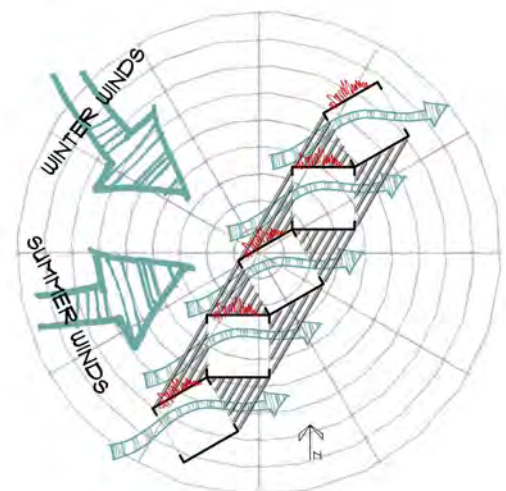
•Repetitive elements such as the palms trunk pavers help establish an identity

RESORT CABINAS

One of several room options, these are the largest rooms consisting of an upstairs open air kitchen and dining room. Kitchens are provided in all rooms to encourage guest to leave the resort and take a cooking class or explore the local farmers market.

In a modern interpretation of traditional architecture, a simple square structure with only two walls allow for wind to move through the

rooms and open up views to the palm groves below.



Rooms are oriented to capture the cool summer breeze and block the harsh winter winds



- The more intensive resort development (as shown here) is located outside of the palm groves to minimize environmental impact



- Kitchens are included in rooms to encourage guests to leave resort and explore the local market



- Walls open to passively ventilate rooms and allow for natural lighting, minimizing energy costs



- Views of ocean are provided in the open-air second story
- Trellis overhangs block morning and afternoon sun



- Traditional palm frond roofs and adobe walls mimic regional architecture

ELEVATED BOARDWALK

Similar to what is found in the park, an elevated boardwalk navigates along the edge of the palm groves. Rooms on stilts are scattered along the boardwalk allowing visitors to sleep in the forest. The elevated rooms facilitate the natural movement of wildlife below and allow air movement under the structure to passively cooling the room. A similar archetype as the other rooms in the resort, walls open to visually draw the surrounding palm forest into the room

while allowing for an abundance of daylight to illuminate the interior. A skylight in the peak of the roof further provides natural light and allows visitors to gaze through the palms up into the stars.



Traditional palapa palm roof integrated with a skylight further immerse the guests into the palm forest.



•Elevated boardwalk minimize impact on environment and allow for fee wildlife movement bellow



•Interpretive signs along the boardwalk educate the visitors



•Air movement under the elevated structures passively cool the rooms eliminating need for HVAC



•Large open walls visually draw the surrounding palm into the room and naturally ventilate the rooms



•Traditional palapa roof structures with a skylight in the top visually connect the visitors with the palm groves above

EVALUATION

Labels in the image include: SERVICE ROAD, OPEN-AIR ROOFTOP TERRACES, SOLAR PARKING, DROP OFF, COMMUNITY CENTER & SCHOOL, NATIVE VEGETATION, TRADITIONAL MEXICAN ARCHITECTURE STYLE AND PLANT MATERIAL, AFFORDABLE HOUSING, SERVICE ROAD, AGRICULTURE RESEARCH, ROOFTOP GARDENS, FARMERS' MARKET, RESTORED RANCH BUILDING, NATURAL POOL, NATURE BOARDWALK, CONSTRUCTED WETLAND, NATURALLY VENTILATED & DAYLIGHTED ROOMS, LOCALLY USED STONE & PALM FRONDS, NATURAL WASTEWATER TREATMENT GREENHOUSE, BIOSWALES, MIXED-USE TRADITIONAL PLAZA, TRADITIONAL STONE WALL WATER FEATURE, WATER RESEARCH, CENTRAL CORRIDOR, and TRADITIONAL MEXICAN ARCHITECTURE STYLE AND PLANT MATERIAL.

Evaluating the design for Las Palmas under the ordering systems, demonstrates that **environmental, socio-cultural, economic, functional, and aesthetic** success was attained. Many design elements satisfy more than one category and are in fact deeply interwoven together through a complex framework of feedback loops.

ORDERING SYSTEMS

- ENVIRONMENTAL** (Green): use readily available materials, stormwater management, creating biodiversity, native vegetation, wildlife corridors.
- FUNCTIONAL** (Purple): circulation, maintenance, walkability, safety.
- AESTHETIC** (Yellow): identity, visually low impact, surrounding context.
- SOCIO-CULTURAL** (Orange): healthy, education, existing use, social exchange.
- ECONOMIC** (Teal): sources of income, job creation.

RESEARCH

Ecology, Research, Education, Sustainable Practices, Agriculture, Funding.

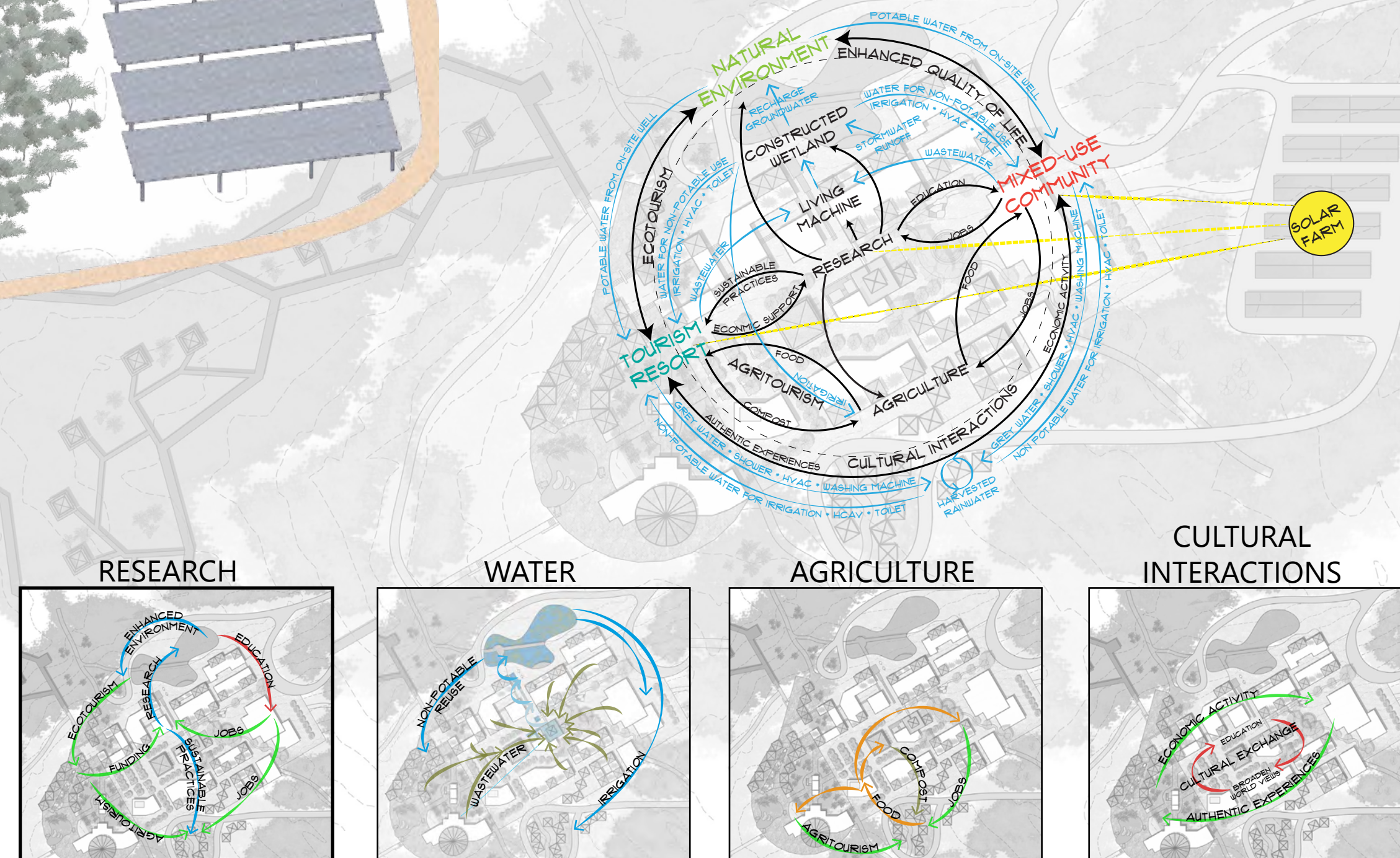
FINAL MASTER PLAN

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ORDERING SYSTEMS

- ENVIRONMENTAL** (Green segment, top):
 - use readily available materials
 - stormwater management
 - creating biodiversity
 - native vegetation
 - wildlife corridors
 - Icon: Grass
- FUNCTIONAL** (Purple segment, top-right):
 - Circulation
 - Maintenance
 - Walkability
 - Safety
 - Icon: Person walking
- AESTHETIC** (Yellow segment, bottom-right):
 - identity
 - visually low impact
 - surrounding context
 - Icon: Eye
- SOCIO-CULTURAL** (Orange segment, bottom-left):
 - healthy
 - education
 - existing use
 - social exchange
 - Icon: Group of people
- ECONOMIC** (Teal segment, top-left):
 - sources of income
 - job creation
 - Icon: Dollar sign

Research in water treatment and agriculture engages sustainable practices that educate the local community and enhance the environment, drawing in more tourism potential. More tourism economically boosts the community and provides more opportunities for cross cultural interactions, which all together create more meaningful, authentic experiences.



FINAL THOUGHTS

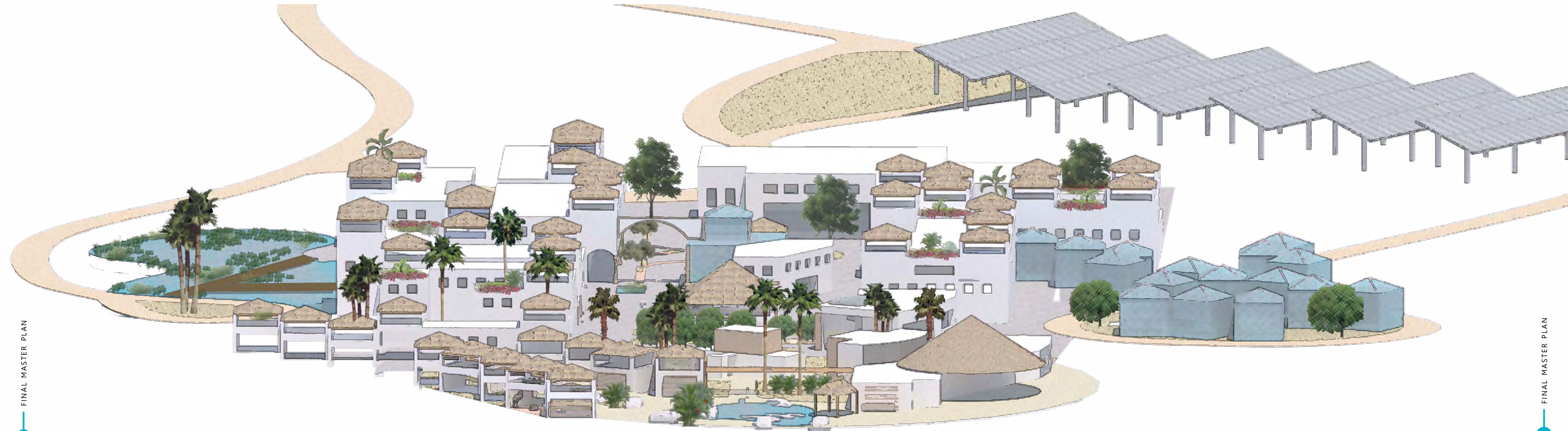
Las Palmas represents a new approach towards tourism development in Baja California that integrates a balance between tourism, community, and environmental fundamentals. These systems do not function as separate entities, but are in fact interwoven together generating either positive or negative interactions. The success of one is highly dependent on the health of the others and

an understanding of these feedback loops is essential in sustaining long-term success. Tourism is more prosperous with a biodiverse environment and culturally strong identity, so it is important to support their healthy existence. Embracing the assets while not exploiting the natural and cultural resources is essential in balancing these goals. Taking a holistic approach with efforts to economically

support the community and enhance the natural environment will produce a more resilient development that will get stronger as it matures. Finding the appropriate balance is critical and difficult, but if achieved can support a tourism development that can mutually benefit the environment, tourists, and local community.

The exact design that is proposed does not need to be implemented for Las Palmas to be a successful tourism development. The ideas presented are conceptual and can be executed at a variety of scales and incorporated for a number of applications. The hope is that certain elements from the proposed design are pulled and utilized when development at Las Palmas occurs and are considered for

other tourism developments in the Southern Baja Region. Even though the concept was designed specifically for the Las Palmas site and surrounding context, the design principles utilized can serve as an example for future tourism development in other parts Latin America and around the world.



CITATIONS

LITERATURE CITED

INTRODUCTION

Context

Rebman, Jon P. 2012. Baja California Plant Field Guide. San Diego, CA: Dan Diego Natural History Museum

RESEARCH

Tourism

Berger, Diana. 2006. The Development of Mexico’s Tourism Industry. New York: Palgrave Macmillan.

Delgado, Kevin. 2011. Los Cabos and Baja California Sur. Woodstock, VT: The Countryman Press.

Krutch, Joseph Wood. 1986. The Forgotten Peninsula: A Naturalist in Baja California. Tucson, AZ: The University of Arizona Press

Lumson, Les and Jonathan Swift. 2001. Tourism in Latin America. New York: Continuum.

Niemann, Greg. 2002. Baja Legends. San Diego, CA: Sunbelt Publications.

Porter, Michael E. 2008. Microeconomics of Competitiveness: The Baja California Sur Tourism Cluster in Mexico. Boston, MA: The Harvard School of Business.

Rains, Wendy. 2007. Genuine People of Interest of Todos Santos. La Paz, Mexico.

Honey, Martha. 2008. Ecotourism and Sustainable Development. Washington DC: Island Press.

McCool, Stephen F. and R Neil Moisey, eds. 2009. Tourism Recreation and Sustainability: Linking Culture and the Environment. Cambridge, MA: CABI.

Przezborska, Lucyna and Michal Snajder. 2009. Agrotourism. Cambridge, MA: CABI.

Przybylski, Maya and Mason White, eds. 2010. On Farming. New York: Actar

Smith, Melanie and Nicola Macleod. 2010. Key Concepts in Tourist Studies. Los Angeles, CA: Sage.

Sustainable Development

Beatley, Timothy. 2009. Planning for Coastal Resilience: Best Practices for Calamitous Times. Washington DC: Island Press.

Wong, P.P. 1993. Tourism vs Environment: The Case for Coastal Areas. Dordrecht, The Netherlands: Kluwer Academic.

EPA. Smart Growth for Coastal and Waterfront Communities.

Swaback, Vernon D. 2007. Creating Value: Smart Development and Green Design. Washington DC: ULI.

Swaback, Vernon D. 2011. Designing for Living: Society’s Greatest Challenge. Scottsdale, AZ: Two Worlds Foundation

Swaback, Vernan D. 2005. Designing with Nature. Scottsdale, AZ: Skyfire Press

Arendt, Randall. 1994. Rural by Design: Maintaining Small Town Character. Chicago, IL: APA

Moscardo, Gianna. 2008. Building Community Capacity for Tourism Development. Cambridge, MA: CABI.

Barnabe, Gilbert and Regine Barabe-Quet. 2000. Ecology and Management of Coastal Waters: The Aquatic Environment. Chichester, UK: Praxis.

Eagles, Paul F. et.all. Sustainable Tourism in Protected Areas. Ed. Adrian Phillips

Gannaway, Noeline. 1995. Sustainable Wetlands Development

Gonenc, I. Ethem and John P. Wolflin. 2005. Coastal Lagoons: Ecosystem Processes and Modeling for Sustainable Use and Development. Washington DC: CRC Press.

Odum, William E. 1976. Ecological Guidelines for Tropical Coastal Development. Morges, Switzerland: IUCN.

Green Building Design

Mehta, H., Baez, A. & O’Loughlin, P., eds. 2002. International Ecolodge Guidelines. Burlington, Vermont: The International Ecotourism Society.

Mehta, Hitesh. 2010. Authentic Ecolodges. New York: Collins Design. Tiempo, Issue 18 (December)

Green Building Education Services. 2011. LEED Green Associate Study Guide. Lewisville, TX: Green Building Education Services.

Senosiain, Javier. 2003. Bio Architecture. Burlington, MA: Architectural Pres.

IMAGE SOURCES

The cover, abstract, and each of the chapter heading photographs were taken by Kamal Rodriguez.

1) www.monkeypuzzleblog.com

2) www.cabo-travel.com

3) www.tripadvisor.com

4) www.palmorchard.com

5) www.palmorchard.com

6) Aaron Liggett

7) Aaron Liggett

8) Aaron Liggett

9) Michael Julian Berz

10) Aaron Liggett

11) Aaron Liggett

12) Aaron Liggett

13) Kamal Rodriguez

14) www.travelbaja.com

15) Kamal Rodriguez

16) www.palmorchard.com

17) www.palmorchard.com

18) www.palmorchard.com

19) Michael Julian Berz

20) www.palmorchard.com

21) Kamal Rodriguez

22) www.mexicotravelnet.com

23) www.bajainsider.com

24) Aaron Liggett

25) www.oceanlight.com

26) Aaron Liggett

27) Aaron Liggett

28) www.cabosanlucastours.net

29) www.resort-cancun.com

30) www.nationalgeographicstock.com

31) Aaron Liggett

32) Aaron Liggett

33) Programa Subregional de Desarrollo Urbano de Todos Santos

34) www.laparios.com

35) www.kasbahdutoubkal.com

36) www.kasbahdutoubkal.com

37) www.flora-farms.com

38) www.flora-farms.com

39) www.cecac.org

40) www.treearth.com

41) www.blueandyellow.ca

42) www.ia.ucsb.edu

43) www.va-la.com

44) www.huber.de

45) www.natsys-inc.com

46) www.natsys-inc.com

47) www.ecobuildingpulse.com

48) www.hasenstabinc.com

49) www.worrellwater.com

50) www.worrellwater.com

51) www.treebonesresort.com

52) www.treebonesresort.com

53) Kamal Rodriguez

54) Aaron Liggett

55) www.todossantosguide.com

56) www.palmorchard.com

57) Aaron Liggett

58) www.trendir.com

59) www.legorretalegorreta.com

60) www.donquijote.org

61) Aaron Liggett

62) Aaron Liggett

63) www.fineartamerica.com

64) Aaron Liggett

65) Michael Julian Berz

66) Michael Julian Berz

67) Aaron Liggett

68) Aaron Liggett

69) Aaron Liggett

70) www.palmorchard.com

71) www.palmorchard.com

72) www.baja.com

73) www.palmorchard.com

74) www.todossantos-baja.com

75) www.tripadvisor.com

76) www.tosea.wordpress.com

77) www.palmorchard.com

78) Aaron Liggett

79) Aaron Liggett

80) Aaron Liggett

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