



Experiencing Nea Kydonia

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PREFACE AND ACKNOWLEDGMENTS

PREFACE

The focus of the course was sustainable tourism planning, the study and practice of reducing the environmental impacts of the tourism industry on the earth and human settlements, while achieving the benefits of tourism for both the place and the tourists. Sustainable tourism planning involves research on the impacts from existing touristic activities; development of business practices that minimize and mitigate negative impacts to the environment from tourists and the businesses that service them; the creation of financial sources that support environmental management and preservation; the inclusion of all stakeholders; and a long-term vision for sustaining the people and place in the touristic area (SustainableTourism.net, 2019).

For most of the students, this was the first visit to Crete. After two orientation meetings in Denver the class met in Athens on May 21, 2019. After visiting Athens for four days, Naxos for two days, and Santorini for two days we arrived in Crete on May 29, 2019. Visiting Athens, Santorini, and Naxos gave the class a perspective on the types of tourism throughout Greece, and the effects on daily life, the economy, and the island landscape. The students employed systematic observations of the street life, creative writing, and sketching to digest what they experienced in these other locations.

The group resided in the study site for two weeks and presented preliminary findings and proposals to the municipality on June 12th, 2019. The valuable discussion following the presentation guided our research and deliberations for this final report.

Group discussions and brainstorming sessions were helpful in facilitating creative thinking and accelerating the team's decision making. We reached a general consensus about the economic and environmental future of the area, which led us to the following overarching **Guiding Principles**:

- Harmony with Nature
- Economic Resiliency
- Enhanced Connectivity & Mobility
- Community Livability

Detailed analysis of the existing conditions and the above principles directed the recommendations in this document.

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City of Chania

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Photo of Students, instructors, and City of Chania staff



INTRODUCTION: EXISTING CONDITIONS IN THE STUDY AREA

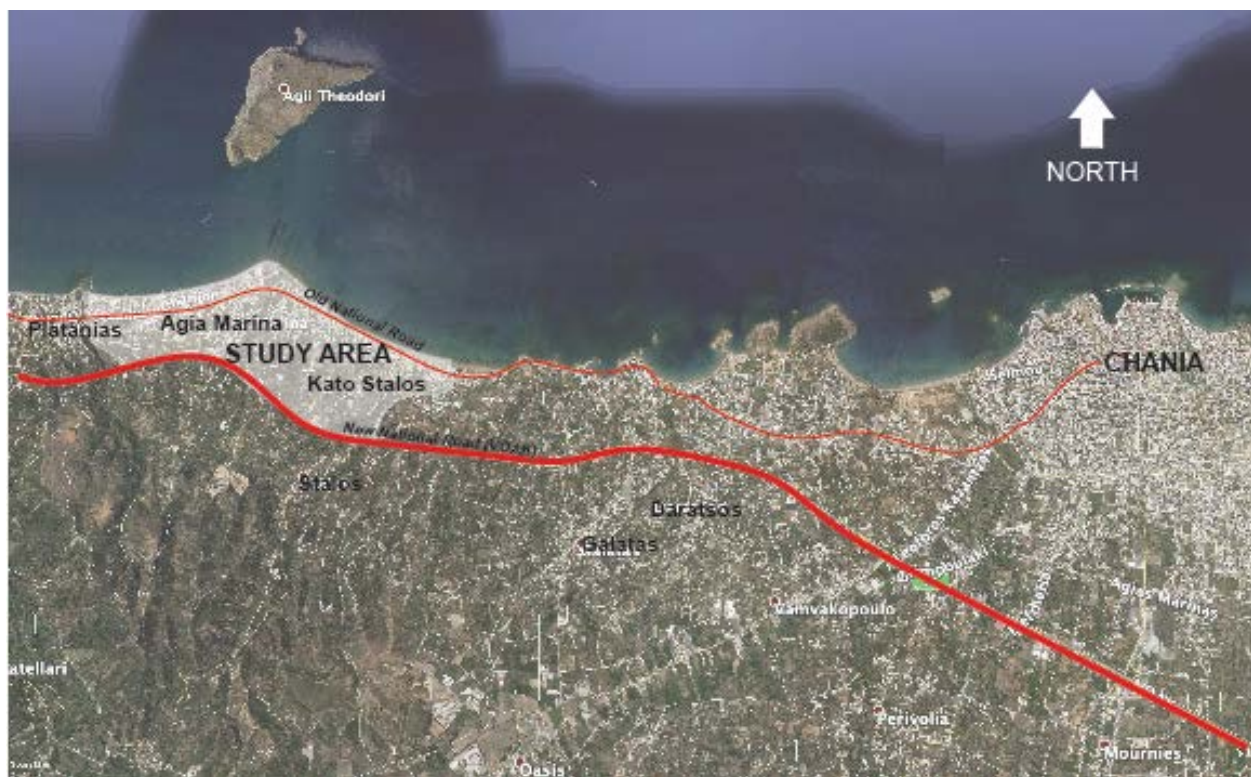
The City of Chania suggested this site for a case study on sustainable tourism planning. The city and the business association recognize the area is vulnerable to environmental degradation, climate change, competition from other sites, and the ability of business owners to continue to meet the demanding nature of the intense tourism season.

The studio team began the project with an existing conditions analysis of the study area based on primary observation by foot and car and secondary data from maps, satellite images, and planning documents from the City of Chania. Our goals for this phase of the project was to understand the current state of the economy, environment, and livability in relation to the tourism industry in this area in order to develop a framework for sustainable tourism planning.

STUDY AREA

The general area defined for this study included Stalos, which is divided into two subareas, Stalos (including Kato Stalos to the north, near the coast and Pano Stalos to the south, on the hillside) and Agia Marina, shown shaded in Figure 1. The boundaries are the border between Agia Marina and Platanias to the west, the public road along the east side of Kato Stalos to the east, the Aegean Sea to the north and the New National Road or VOA to the south (Figure 2).

Figure 1. Regional map of Nea Kydonia with study area



Source: Google Earth

Figure 2. Boundaries of Stalos and Agia Marina*Source: Google Earth*

URBAN MORPHOLOGY AND BUILDING TYPOLOGIES

Urban Morphology of Stalos

Stalos was developed as a tourist and recreational settlement along the coastal zone to the west of the city of Chania. The tourist zone is concentrated along the Old National Road with more local residential and villa-style tourist accommodations stretching into the hillside south of the coast. Stalos was developed without central planning, growing organically as the area developed. Before the 1980s, the area was undeveloped alongside rural agricultural settlements until the demarcation of the settlement (Daskalakis et al., 2014). The majority of the existing structures were built in the 1980s and 1990s. The area contains very limited public space and civic amenities with no main settlement center. There is one church in Kato Stalos (Figure 3), and only a couple of offices. The majority of uses are residential (homes and apartments), tourist uses (e.g., travel agents and souvenir shops), restaurants, supermarkets, and retail. Public access to the beach is limited due to the highly developed beachfront, and most access occurs through private property.

Figure 3. Ναός Αγίου Παντελεήμονα, Stalos- The only church in Kato Stalos



Photo credit: Kenna Davis

The General Urban Plan does not identify any architecturally or historically significant assets in the area, nor any specific architectural or cultural identity in the area (Daskalakis et al., 2014). Stalos has the highest density of buildings in the area, with 77% of the area having been developed. According to the General Urban Plan, city staff, and Stalos residents there is currently a demand for more housing in Stalos. The 2001 Census of the area showed that 59% of buildings were used as residences (1st residence: 186, 2nd residence: 28, Ratio: 1:0.2), with 32% of the buildings categorized as other urban uses, 66% of which were used for tourist purposes. This ratio has likely changed by now since the advent of Airbnb and other short-term rental services. Tourist accommodation consists mainly of medium-capacity hotels and furnished apartments/villas in the hills that are available through Airbnb, other property managers, and travel agents.

Urban Morphology of Agia Marina

The village of Agia Marina first came into existence during the Byzantine period. During the Venetian period, the settlement was documented through three censuses (1577, 1583, and 1630). Additionally, there are the ruins of a Hellenistic settlement within the town, south of the Old National Road (Daskalakis et al., 2014).

Agia Marina was developed in two parts, one as a tourist destination along the coastal zone and the second as an older core settlement within the hillside to the south of the coast (Figure 4). In the older core settlement, the original road network has been preserved but the buildings are not original

and have no architectural significance. The Old National Road was developed in the 1980s and 1990s as a touristic center with very little open space left. The old core settlement contains residential, agricultural, limited cultural uses, including a Folklore Museum, and limited tourist uses (Daskalakis et al., 2014).

Figure 4. Urban form and original street layout of the core settlement in Agia Marina



Photo credit: Kenna Davis

Agia Marina's tourist facilities consist of medium-capacity hotels and some resort-style accommodations. The building character is similar to the surrounding settlements of Stalos and Plantanias and categorized as generic in the General Urban Plan (Daskalakis et al., 2014). As in Stalos, there is limited public beach access with most of the shoreline having been developed for touristic purposes. Additionally, 71% of Agia Marina's land area is developed. According to the 2001 Census, 66% of buildings are used as residences (1st residence: 496, second residence: 94, Ratio: 1:0.2). Again, this number has probably changed since the advent of Airbnb and the Global Financial Crisis (2007-2010), which forced many Greeks to rent their homes for income. Other urban uses make up 30% of the building stock, with 68% used for a touristic purpose. In addition to residential and tourist uses, the remaining uses consist mostly of retail and restaurants (see Table 2 below).

Building Typologies

We developed the following typologies using the General Urban Plan (Daskalakis et al., 2014) and on-the-ground research of the study area. These building typologies are not an exhaustive list of all development types in Stalos and Agia Marina but give a sense of the character and development

patterns in both villages. Our typology includes local housing styles, tourist accommodations, mixed-use buildings, and vacant or unfinished buildings.

Local Housing

Low-density apartments are spread throughout the study area, with two to three stories and no more than ten units (Figure 5). As previously mentioned, the majority of the buildings were built during the 1980s and 1990s, and therefore are beginning to show their age. While some of these lower-density apartments are along the Old National Road, the majority are to the south within the hillsides, mainly within two or three blocks of the Old National Road. Many are interspersed with touristic villas and mixed-use buildings in both Agia Marina and Stalos, as well as congregated in the core settlement of Agia Marina.

Figure 5. Low-density apartments



Photo credit: Kenna Davis

There are few examples of single-family homes along the Old National Road, as most are within Pano Stalos, interspersed with the low-density apartments and villas. Single-family homes are also located towards the south of the study area among agricultural lands. These homes are a mix of older homes from the latter half of the 20th century (Figure 6), as well newer homes interspersed throughout Stalos and Agia Marina (Figures 7 and 8).

Figure 6. (Left) Older single-family house

Figure 7. (Right) Multiple villa-style homes



Photo credit: Kenna Davis

Figure 8. Newer single-family house



Photo credit: Kenna Davis

Tourist Accommodations

Tourist accommodations vary throughout the study area and range between modest family-owned villas to larger all-inclusive resorts. Most hotels and villas are located along the Old National Road, with some spreading south into the hills of Pano Stalos.

Residential villas used for tourists, identified through advertisements in the area and signs on the buildings, are spread throughout both Stalos and Agia Marina (Figure 9). Most are congregated

within a few blocks of the Old National Road. Like the residential housing stock, most vacation villas were constructed during the area's tourist boom during the 1980s and 1990s.

Figure 9. Residential villas



Photo credit: Kenna Davis

Medium-capacity resorts are located in Agia Marina (Figure 10). These resorts are less publicly visible from the Old National Road as they often have walls that block views of the resorts from the street. Some have constructed pedestrian bridges over the Old National Road to account for the lack of pedestrian facilities and crosswalks in the area. Some of these resorts are advertised as “all-inclusive.”

Medium-capacity hotels are one of the main building types within the study area. These hotels are primarily along the Old National Road and are located in both Stalos and Agia Marina (Figure 11). Many have beach-facing restaurants and/or bars attached to the hotel. Primary access to the beach is attained through these hotel access points.

Figure 10. Medium-capacity resort



Source: Google Maps

Figure 11. Medium-capacity hotel along the Old National Road in Stalos



Photo credit: Kenna Davis

Mixed-Use Buildings

Mixed-use buildings are located mainly along the Old National Road and include mixed-use apartments or villas and mixed-use houses. Many times, these developments are conglomerations of medium-capacity hotels or villas, local markets and shops, and restaurants (Figure 12).

Figure 12. Mixed-use villa

Photo credit: Kenna Davis

Mixed use villas/hotels are primarily located adjacent to the Old National Road. These buildings are characterized as having street-facing ground-floor retail uses such as retail shops or grocery markets. According to local sources and business owners, many are family-owned and operated, as well as passed down through generations of families.

Mixed use residential buildings are similar to mixed use villas/hotels but have attached single-family homes instead of hotels (Figure 13). Often, the owner of the restaurant or retail shop lives in the attached house.

Figure 13. Mixed-use residential

Photo credit: Kenna Davis

Vacant and Unfinished Buildings

Vacant buildings are scattered throughout Agia Marina and Stalos. According to for-rent and for-sale data in the area, many are not listed and it is unclear how long these structures have stood unused (Figure 14).

Figure 14. Vacant building



Photo credit: Kenna Davis

Unfinished structures can be seen throughout the study area (Figure 15). Many are concrete frames of buildings with exposed rebar in the concrete. Few of these buildings have finished ground floors with occupants.

Figure 15. Unfinished building

Photo credit: Kenna Davis

TOURISM AND ECONOMY

Snapshot of the Existing Tourism Economy in Nea Kydonia

Mass tourism is the act of visiting a leisure destination with large amounts of people at one time (UK Essays, 2016).

“Mass tourism,” which is very much present in the study area, is a concept that refers to a large proportion of people participating in similar tourism activities in a destination. Generally, mass tourism provides experiences that are easily replicated, and both marketed and consumed on a mass-scale (Wabash & Pigram, 1997). The economy in Stalos and Agia Marina is dominated by businesses and amenities that are almost entirely reliant on the mass tourism industry to provide customers and economic stability. Beachside resorts, hotels, traditional Greek restaurants and bars, and small-scale supermarkets and gift shops line the coastline. These types of offerings cater to the “sun, sea, and sand” tourist, resulting in a peak economic season that occurs within the summer months, when visitation is the highest, although the season stretches from April 1 to October 31.

This dependence on a singular tourism industry makes the economy within the study area overly dependent on a short peak season in which profits must be maximized for the success of the business and the livelihood of the owners and workers. The constant concentration of activity over a few months does not allow the environment to continuously recharge. It is also taxing on the

business owners who must work around the clock during the season in order to earn their annual revenues in seven to eight months.

The monocultural tourism market also leads to gaps in the businesses and services required to sustain a more permanent community – as it stands, the needs of tourists are seemingly given priority over the needs of residents. Furthermore, a lack of economic diversification and a reliance on coastal tourism makes the study area more vulnerable to changes in the global economy, the climate, and shifts in the preference and behavior of travelers.

Defining Tourism Carrying Capacity

“Sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building. Achieving sustainable tourism is a continuous process and it requires constant monitoring of impacts, introducing the necessary preventive and/or corrective measures whenever necessary. Sustainable tourism should also maintain a high level of tourist satisfaction and ensure a meaningful experience to the tourists, raising their awareness about sustainability issues and promoting sustainable tourism practices amongst them” (World Tourism Organization, 2004; SustainableTourism.net, 2019).

Universally, tourism introduces a delicate balance that destinations must attempt to achieve: Maintaining the economic and developmental benefits of tourism-related industries without overwhelming the environmental, physical, cultural, and social systems within the destination (Kennell, 2014).

A 2001 study published by the Environmental Planning Laboratory from the University of the Aegean suggests the existence of a carrying capacity threshold above which a location can no longer sustainably support tourism. In coastal areas, where large-scale construction and land development for tourism is common, carrying capacity is generally defined by the density of tourists and tourism infrastructure in beach areas, overuse of public services (like roads, water, and sewage), and pollution of natural coastal environments. Specifically, in island coastal areas, where resources tend to be more finite and the culture more rural, carrying capacity is examined in terms of the relationship of tourism to the quality of life of the local society and the competing resource demands of the tourism and production industries (Coccossis et al., 2001).

Essentially, carrying capacity measures how well the community can support both tourism and the local economy. Without proper planning, a community will feel the negative effects of tourism when the carrying capacity is exceeded. The following is a list of carrying capacity indicators developed by the Environmental Planning Laboratory (Coccossis et al., 2001) that relate to the tourism economy:

Socio-Demographic Carrying Capacity Indicators:

- Sense of local identity
- Number of tourists in a given time period
- Type of tourism opportunities
- Quality of the visitor experience
- Quality of the local experience

Physical-Ecological Carrying Capacity Indicators:

- Health of natural systems
- Quality of physical infrastructure
- Availability of social amenities and services
- Use and congestion of public utilities

Political-Economic Carrying Capacity Indicators:

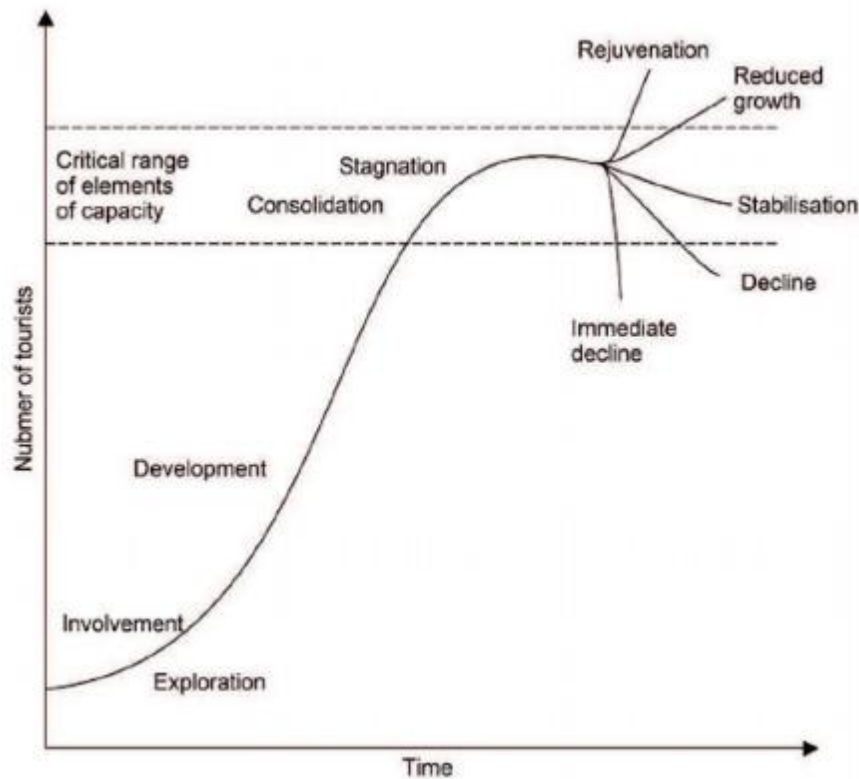
- Level of specialization in tourism
- Revenue distribution at the local level
- Level of tourism employment compared to human resource employment

Carrying Capacity in Nea Kydonia

Within the study area, several economic indicators suggest that Nea Kydonia may currently be at risk of reaching its carrying capacity for tourism. A singular type of tourism and a condensed number of visitors in a small time period create an oversaturation of mass tourism in the area. The existing beach and resort tourism model conflicts with the development of a sense of place and local identity. A visible lack of investment in the public realm and gaps in social amenities and community services suggest that the balance between tourist needs and local needs is off-center. The lack of investment in infrastructure is also starting to affect the tourists' experience.

The Tourism Life Cycle

To get an understanding of tourism in the area, we used Butler's (1980) Model for a Tourist Area Life Cycle. Figure 16 shows the different phases of the Tourism Life Cycle. Often, as tourism grows in an area, the capacity to maintain a healthy balance between tourism and the local culture shifts. This balance can quickly decline, if issues are not addressed.

Figure 16. Butler's Model of Tourist Destination Area Life Cycle

Source: Apollo, 2015

Table 1 below outlines the history of the Nea Kydonia area and notes observations of the current status of the region. We can use this history to gain an understanding of the area's existing conditions and how the Model for Tourist Area Life Cycle applies to the study area.

Table 1. Nea Kydonia Tourism Life Cycle Timeline

Phase 1 Explorations (Time prior to tourism development: beachfront is not developed; few businesses are developed in the area; few tourists)	3650 B.C. – 700 A.D. The ancient city of Kydonia was located where Chania now sits. Area artifacts date from the late Minoan period (1190-1170 BC) (Crete.gr., n.d.). It is said to have been the third-largest city on Crete at the time. Plato referred to the town as Alchania, which is believed to be the source of the current name. It was one of three cities built by King Minos. Kydonia (Alchania) remained a hub in Roman times until late Antiquity. 700 – 1645 Chania went through a period where it fell out of importance with the outside world. The Venetians controlled the area for a period and built fortifications in Chania before it was taken over by the Turks. 1645 – 1866 Turks remained in control of Chania until the Greek Revolution in 1821. In the early- to mid-1800s, Crete began to see the first “explorer” tourists. Wealthy artists and men explored the region due to its historical background. While there was turmoil in the government, tourism remained in small numbers. 1881-1940 The area was unified with the rest of Crete in 1881. Crete joined Greece in 1913. Despite this, Greece and Crete went through tumultuous times: there was resistance from Turks within the country, Greece faced a national bankruptcy in 1893, Greece fought the Balkan Wars (1912-1913), the world saw World War I (1914-1918), Greece saw the removal of the monarchy in 1922, the Great Depression affected the world in the 1930s, and regimes fought to control Greece up until World War II. As a result of all this, only a few thousand tourists were said to have visited Crete during this time (Greece: Building the Nation, n.d.). 1940-1945 World War II enveloped Crete, which disrupted the growth of tourism in the area. When the mainland of Greece was invaded and finally taken over by the Axis army, the government withdrew to Chania, Crete, in April 1941. 1945-1950 With the end of World War II, Greece faced a Civil War until 1949. It was not until the end of the Civil War that Crete was able to start rebuilding and welcome visitors once again. Until the 1950s, Stalos and Agia Marina were considered rural areas. (History of Our Village, Stalos Crete, n.d.). Few locals lived by the beaches in these areas, and those who did were involved in agriculture or brick making.
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Phase 2 Involvement ("Pioneer" hotels are developed; tourism increases; pressure to provide new infrastructure; seasonal pattern emerges.)	1950-1970 In 1950, Greece as a whole saw 33,000 tourists, the majority of which went to Attica (Alloush, 2014). It was reported that in 1962, Crete had 2315 hotel beds available, 15% of which were in Chania. These were primarily used by locals traveling through the area. 27% of the visitors in 1963 were from the US, 19% from the UK, 17% from Germany, and 11% from France. The number of farmers diminished drastically during this time. Local residents began to want more imported goods. Consumption of local wine and raki fell as imports became more popular.
Phase 3 Development (Tourism increases and visitors may outnumber locals; number of tourism-sector workers increases; traditional houses are converted for tourists)	1970-1990 Tourism became more prevalent in Stalos in 1970 (History of Our Village, Stalos Crete, n.d.). Early travelers to the town came to enjoy the beauty of nature in the area. They would return with their friends and family. The first tourism businesses were small, family-owned companies. With Greece's accession into the EU in 1981, Greece began to receive funds and pushed its economy forward. Tourism in Stalos grew rapidly in the 1980s and 1990s. The tourism trend in Greece shifted from Attica to the beaches and islands (Alloush, 2014). Mass tourism grew steadily throughout the world, including Greece.
Phase 4 Consolidation (Construction along beaches shrinks their size; local populations are pushed outside the area; construction of bigger hotels and businesses; foreign investors; beaches become inaccessible to locals due to ribbon construction; major part of the economy comes from tourism. Negative effects start to emerge.)	1990-2009 In the 1990s, Greece saw the peak of mass tourism. The state developed plans to promote alternative forms of tourism (Alloush, 2014). Agia Marina and Stalos Observations of the Agia Marina and Stalos beaches show that construction during this period created a dense composition of hotels and restaurants along the beach front. Few beach access points were created, requiring travelers to go through restaurant dining or hotel pool areas to get to the beach. Beaches were lined with beach chairs and umbrellas from the adjacent buildings, up to the water's edge in some places. Few areas of undeveloped beach remained

Phase 5 Stagnation (Little room for further expansion; new accommodations must be built inland; capacity levels are met or exceeded; lack of direction and regulation of resort growth results in environmental and social problems. Poor infrastructure provision.)	2009-2019 Greece's development between 1998 – 2012 was slow in comparison to the rest of Europe (Alloush, 2014). Interviews with local business owners state that nightlife in the Stalos/Agia Marina area died off around 2009. Clubs closed, which resulted in areas residents and tourists going to Chania for entertainment. A review of the current businesses shows a shift to family-oriented businesses: miniature golf courses, restaurants, and tourist shops dominate the area and beach front. Existing building and beachfront property show signs of erosion. Buildings have encroached on the sidewalks on the main road. Water channels that lead to the Aegean Sea have accumulated debris and garbage. Short-term rentals, while they have provided a source of income for locals and a place for tourists to stay, have also pushed some locals out of the area or kept them from moving to the area. The area is also starting to see foreign investment in luxury villas in Pano Stalos.
Phase 6a Decline	2019-? It does not appear that the area has gone into decline, but it potentially could if changes are not made to address problems from the previous phases. In decline, the area could see: • Fewer tourists returning to the area (especially as the current generation of repeat tourists from the Scandinavian countries ages). • Businesses closing (already, there are a number of vacant buildings along the Old National Road) • Increase in unemployment • Degrading of infrastructure • Degrading of community • Increased community vulnerability during economic downturns • Loss of natural environment and habitat
Phase 6b Rejuvenation	2019-- A shift to a more sustainable economy for the area could revive and sustain tourism and the community. The goal of the rejuvenation would be to: • Make the local economy and community resilient to environmental and economic disruption • Enhance or improve the natural environment • Draw new tourists, ideally ones who help protect the community and environment • Support the community • Allow business owners to diversify their products and services and operate on a more balanced annual cycle

Note: The timeline in the table is based on research conducted on tourism in Nea Kydonia. This is a suggested timeline of the tourism life-cycle of the area. Actual dates in the timeline may vary.

Existing Development and Tourism Efforts in Nea Kydonia

Development Organizations

Several organizations exist within Nea Kydonia with the goal of promoting tourism as a tool for economic development. On the local level, these groups include the Development Association of the Local Stalos Community, whose membership consists of 55 local business owners, and a Hotel Association. A similar business association once existed in Agia Marina, however the group recently disbanded during the 2018-2019 winter due to funding and organizational setbacks (Personal Communication, 2019). The Municipality of Chania engages in tourism development efforts, with dedicated staff and elected officials that oversee tourism-related initiatives within the municipality. On the regional level, Incredible Crete is the primary destination marketing organization for the island of Crete. Despite the existence of organizations dedicated to tourism development within and around the study area, the lack of consistent communication and collaboration between regional, local, public, and private groups may be preventing a cohesive plan for tourism in the area.

Current Marketing and Promotion

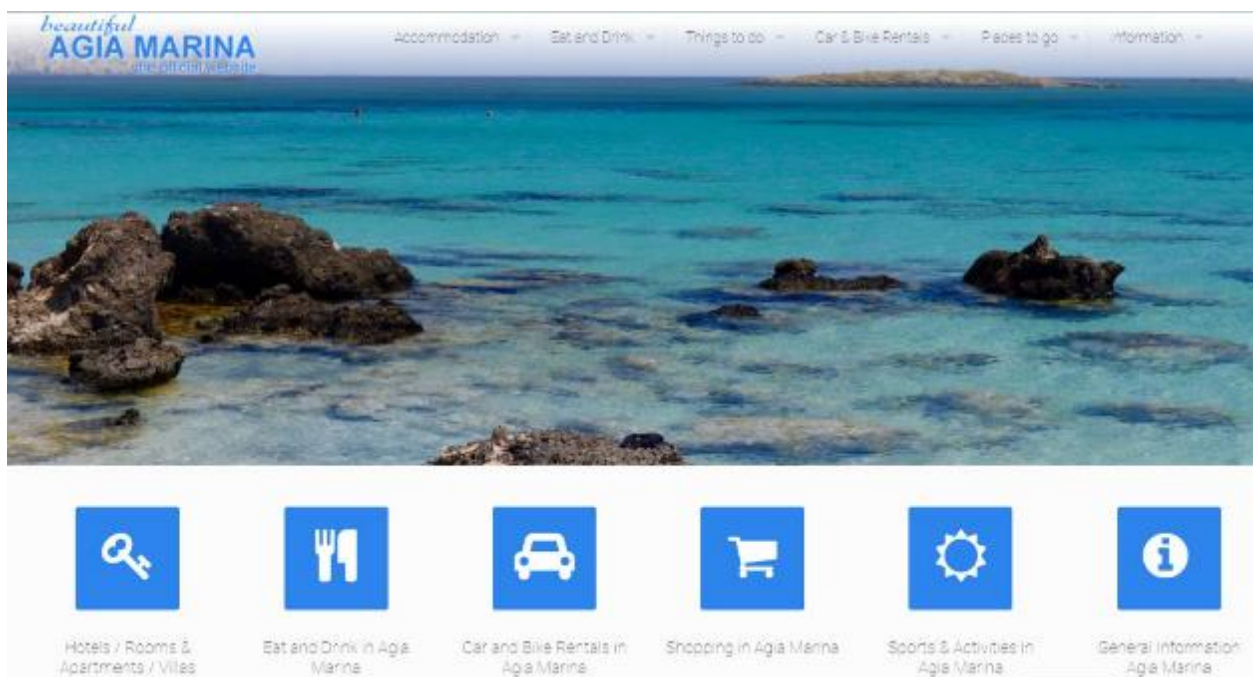
Each respective organization has online outlets through which they communicate information about the area, such as lists of restaurants and attractions, historical and cultural information, and safety information for travelers like contacts for emergency services. The existence of multiple websites reflects a lack of collaboration – each website communicates different information and there is no unified tourism brand or vision for the area. *Welcome to Stalos Village* (Figure 17) is the website operated by the Development Association of the Local Stalos Community, and *Beautiful Agia Marina* (Figure 18) is maintained by the former Agia Marina Business Association (known as Amazing Agia Marina). These two websites are locally based and contain information for tourists within their respective boundaries with very little overlap.

Figure 17. Screenshot of the Welcome to Stalos Village website homepage



Source: Development Association of the Local Stalos Community

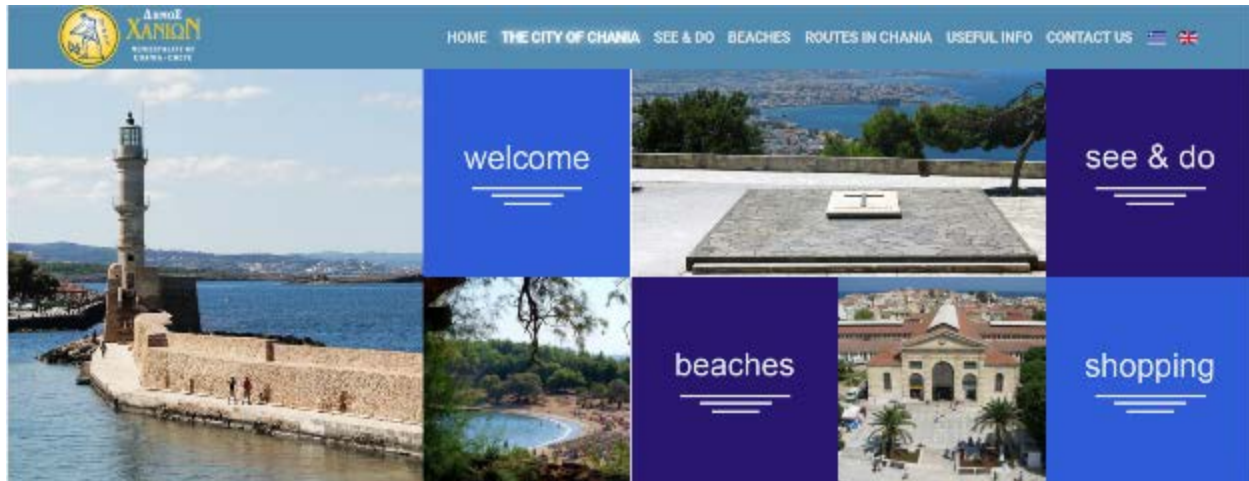
Figure 18. Screenshot of the Beautiful Agia Marina website homepage



Source: Amazing Agia Marina

The Municipality of Chania (Figure 19) operates a website dedicated solely to communicating tourism information within the city. Agia Marina and Stalos both appear under the “Beaches” section of the website, with brief descriptions of their sandy shores and resort amenities.

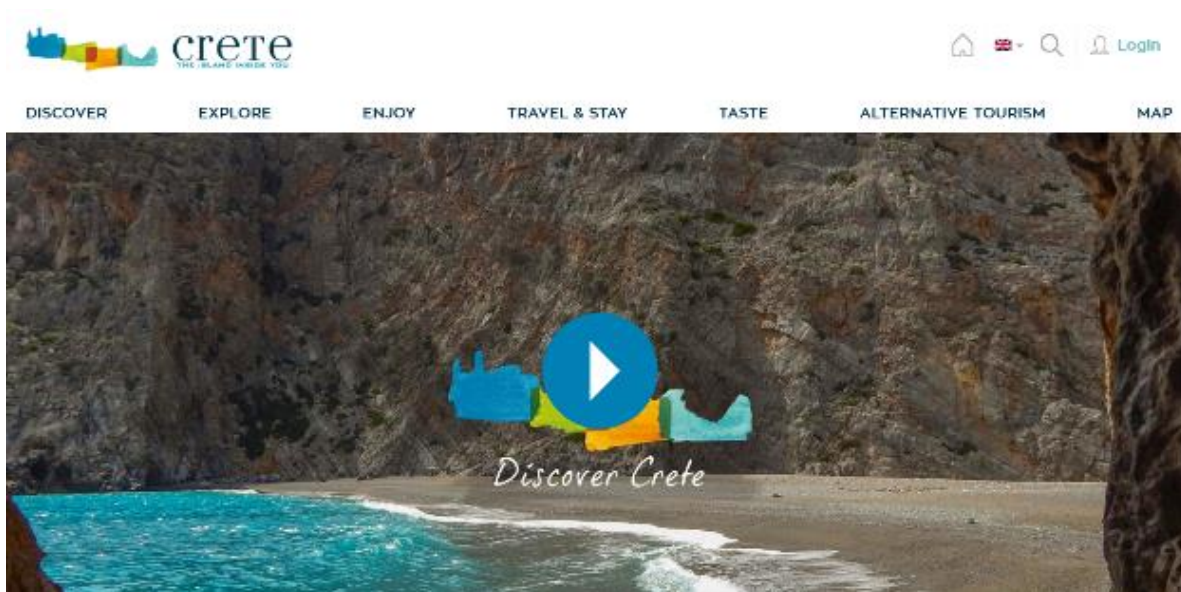
Figure 19. Screenshot of the Municipality of Chania Tourism website homepage



Source: Municipality of Chania

Similarly, the Incredible Crete website (Figure 20) mentions Agia Marina briefly as a beach destination. Stalos does not have a dedicated description but is included in the description of Agia Marina. As the destination marketing organization for the region of Crete, Incredible Crete has the most dynamic branding with print, online, and video marketing campaigns for the island. Examples of the group's campaigns include “365° - Reasons to Visit Crete All Year Round,” and “Crete Day Dreaming” which provide guides for different types of travelers.

Figure 20. Screenshot of the Incredible Crete website homepage



Source: Incredible Crete

Despite the undefined branding and marketing for the area, it is clear that both Stalos and Agia Marina are broadly regarded as a coastal destination for beach and resort tourism. A Google image search of the two locations produce similar images of their main attractions: sandy shorelines and sun beds (Figure 21).

Figure 21. Google Image search results for “Stalos” and “Agia Marina”



Source: Google

Existing Businesses and Services in the Study Area

During our observations, we noticed some monotony in the types of businesses in the study area. Many businesses appeared to be appealing primarily to the tourist: advertising excursions, selling souvenirs and gift cards outside their business, and writing their signs in English. We conducted a survey of the Old National Road and locations near the road to get a sample of the business composition of the area. Table 2 below summarizes our findings.

Table 2. Existing Businesses and Services in the Study Area

Category	Number of Businesses			Observations
	South side of street	North side of street	Total (286)	
Restaurant, bar, café	28	29	57 (19%)	Need to highlight bars for local night life; may need more cafés, bakeries, and take-away for locals and tourists
Super Market	9	18	27 (9%)	Potential for these businesses to offer prepared meals from local restaurants. There is also 1 fruit stand.
Shopping	17	9	26 (9%)	2 ceramics, 3 summer wear, 1 art, 1 hemp product store, 3 Cretan, 1 woman's clothes, 1 lighting and electric, 1 butcher, several souvenir shops
Car/Bike rental	17	7	24 (8%)	Some are combined with travel agencies; 5 offer bikes
Travel Agency	10	2	12 (4%)	Some are combined with transport rentals
Services, Other	12	5	17 (6%)	5 spas, 1 daycare, water sports, 1 hair salon, 2 health clinics, 2 pharmacies, building supply, several mini-golf, 1 gas station
Hotels/Apts.	16	46	62 (20%)	This may not include all units that are south of Old National Road in Pano Stalos
Housing	12	14	26 (9%)	Mix of old, new, and unfinished homes and apartments
Vacant/Boarded	24	18	35 (17%)	Provide assistance to owners; enforce regulations to clean-up properties
TOTAL	145	148	286	

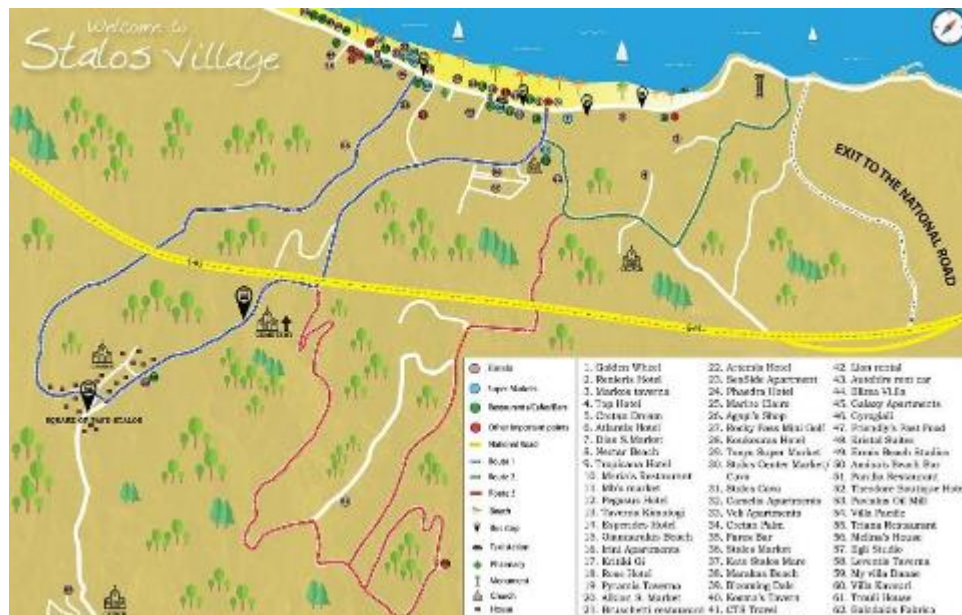
The area has a multitude of restaurant options for travelers. However, a search of the types of restaurants shows a consistent theme of traditional Greek food, often with a similar menu. Many of these restaurants also serve pizza, burgers, and other American food. Many of the restaurants also have a playground, which indicates the restaurant is seeking to appeal to families with children.

An interview with the local Development Association of Local the Stalos Community found that many of the hotels are locally owned. Many of them are small, boutique hotels. Even the larger hotels are owned by local business owners. A few foreign owners have bought villas in the hillside area between the Old National Road and the VOAK. The hotels employ a few to 20 or more employees, depending on the size of the hotel. Most of these employees are local residents, and some are managed by families.

Local business owners identified the “in-season” months from May through September. Many business owners close their hotels, restaurants or grocery stores in the tourism “off-season” to take care of their farms. The closing of these businesses requires that locals go into Chania to buy goods and services. Residents report that the area becomes a “ghost town” during that time.

The area offers few services for local residents and tourists. Only one bank appears to service the area. Business owners reported that they go into Chania to conduct their banking needs, which can be difficult during work hours. No library, post office, packaging/shipping, building supply, or social services were found in the study area. Other residential and business-serving goods and services also may be missing (Figure 22).

Figure 22. Stalos Village map

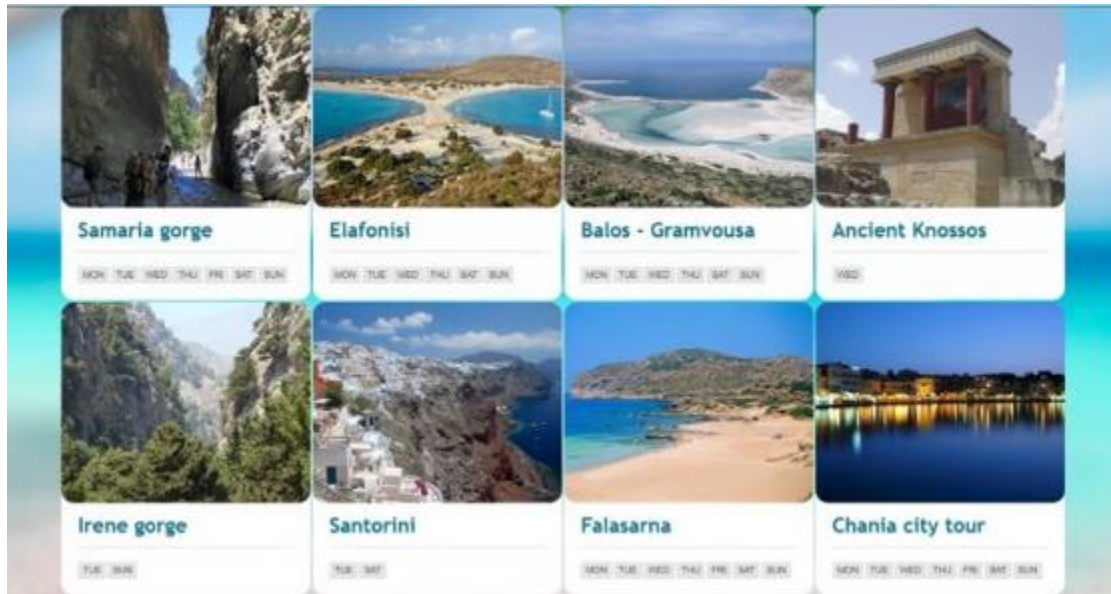


Source: Development Association of the Local Stalos Community

Existing Tourist Offerings

Most of the current amenities in the area are excursions to other locations on Crete such as: Rethymnos, Elafonisi, Balos Beach and Samaria Gorge, although one location advertised a tour of an olive oil processing facility and farm near the Nea Kydonia area. A sports club in Agia Marina offers water activities such as kayaking, stand-up paddle boarding, and motorized and unmotorized boat rentals, but it is the only activity in the study area (Figure 23).

Figure 23. Tour offerings from Chania



Source: <http://www.excursions-crete.gr/>

We did not identify any all-inclusive hotels within the study area, however, many hotels were isolated from the community. They often were fenced off by a wrought iron fence or brick wall. Some hotels featured a pool exclusive to guests, or a small shopping area for convenience items which prevented them from needing to buy from the local stores. One hotel provided their guests with a tunnel under the main road that would allow them to cross to the beach side without worrying about traffic. These hotel amenities are exclusive to hotel guests and may discourage guests from exploring the surrounding community.

The Stalos website offers only three options for entertainment in Stalos: Creta Travel Services (Bus), Rocky Pass Mini Golf, and Bloomingdale Spa. Agia Marina's website does not feature any entertainment opportunities. However, a scan of the Old National Road shows several entertainment options such as miniature golf, spas, water sports, go-carts, and bars that feature live music. The reason for the lack of information on Agia Marina's website may be the disbanding of the business association of Agia Marina and lack of time by the business owners given the demands on their time during the eight-month peak season.

Alternative Tourism

***Alternative tourism** involves travel that is personal and authentic and encourages interaction with the local environment, people and communities.*

-Bulgarian Association for Alternative Tourism

While not as widely promoted, the area does provide some alternative tourism. Gastronomy tours are available in the Chania city center. Many business owners that operate hotels and shops, also own agricultural endeavors that they operate during the off-season and allow their guests to tour. This does not appear to be widely advertised but is an opportunity for guests that forge connections with the community and seek these types of excursions or activities.

At a larger scale, the website and agency, Incredible Crete, promotes alternative tourism expeditions near Chania as a “return to nature” and to experience the island away from crowded beaches and stereotypical Greek summer island activities. These expeditions include Milia, an old abandoned village with 15th century stone huts that allows visitors to experience traditional Greek living with fresh locally sourced foods and a low carbon footprint. Additionally, Dalabelos Estates is a working farm outside Rethymno where tourists can partake in the day-to-day activities of the farm. These alternative tourism destinations and experiences set Crete apart from the other Greek islands, and their ability to exist on the island is a major strength that can be leveraged to help the region move toward sustainable tourism.

Strengths, Weaknesses, Opportunities and Constraints of the Tourism Economy

To understand our study area better, we looked at the strengths, weaknesses, opportunities and constraints of the tourism economy in Nea Kydonia. Some key points may be both a strength and a weakness. Below, we identified areas that should be considered for future planning in the area.

Economic Strengths

- **Existing tourism infrastructure:** The existing tourism economy in Stalos and Agia Marina provides foundational infrastructure for lodging, businesses, and services in the area.
- **Unpretentious hospitality:** The genuine friendliness of business owners and staff in the Stalos and Agia Marina area is undeniable. The prevalence of tourism in the area has equipped businesses with the hospitality tools needed to create a personalized and welcoming experience for customers.
- **Family-operated and family-friendly:** A large portion of the smaller-scale businesses within the study area are owned and operated by families, often with long-standing legacies. The result is a home-like, intimate community to which visitors and locals alike can connect.
- **Rural character:** Aside from the heavier development along the coastline, the study area is rural at its core, especially in the southern, more mountainous area of Pano Stalos. Where preserved, this rural character contributes to a sense of peacefulness, creates linkages to the surrounding land, and maintains a unique culture for the area. Many of the businesses and services reflect this culture through the provision of local products and an overall rural charm.
- **Accessibility of surrounding destinations:** Stalos and Agia Marina are commonly used as jumping-off points for excursions to other parts of Crete, such as Elafonisi, Samaria Gorge, and Balos Bay. Many of the most popular destinations are within two hours of the study area,

providing opportunities for easy access to and from such places. Excursions can be done individually or as part of a group, and many businesses and hotels sell packaged day trips and tours.

- **Proximity to transportation:** Stalos and Agia Marina's proximity to the Chania Airport, ports in Chania and Heraklion, and the KTEL bus system between the Chania city center and other surrounding areas allow visitors to reach and navigate the study area with ease.
- **Existence of development associations:** Several organizations exist within the study area that are dedicated to coordination among businesses and services, including a group for business development in Stalos and an association of hotels.

Economic Weaknesses

- **Reliance on monocultural tourism:** While tourism infrastructure is widespread and abundant within the study area, it caters to a single type of traveler: one seeking sun, sea, and sand. The dominance of this type of tourism creates an economy that exists within a strict, short season. Little economic diversity means that the business environment is particularly affected by external factors, such as fluctuations in the global economy, environment, and climate.
- **Influence of mass tourism on visitor preferences and behavior:** The prevalence of packaged experiences and beach-related amenities continues to establish "mass tourism" as the area's primary economic activity. This kind of tourism tends to draw visitors who are less interested in interacting with the local culture and environment and can bring a volume of visitors that surpasses an area's capacity to accommodate them.
- **Lack of services to support the local community year-round:** An economy based solely on tourism means that very few businesses cater to the needs of the community's residents. As a result, the study area can only support a seasonal population during the summer, as most shops and services close during the off-season. Those that live here are forced to travel elsewhere for community amenities, and others choose not to live in the area because of this.

Economic Opportunities

- **Addressing gaps in amenities and improving community services:** In the face of an economic environment based entirely on tourism, there is an opportunity to develop the missing and lacking community services in the area.
- **Off-season and year-round activation:** The economic gap created by a short peak tourism season offers space for activation through programs, infrastructure, and economic improvements that would stabilize the overall economy throughout the year and provide community benefits to year-round residents.
- **Ensuring stability through economic diversification:** A shift from a monoculture of tourism to a more diversified economy would not only make the area more resilient against the volatility of the tourism market but would also create a balance among the types of visitors and residents within the study area.
- **Regional partnerships:** The existence of development and hotel associations within the study area indicates that the motivation and capacity for economic coordination exists. However, these groups remain disconnected from each other and from the local government and operate with different goals and priorities. Coordination on a regional scale among these existing groups is an opportunity for the area.

- **Marketing and promotion for sustainable tourism:** Because marketing and promotion efforts are minimal in the area, outside of hotel and travel agency packages, there is an opportunity for the area to reinvent its image and the type of tourist it attracts.

Economic Constraints

- **Volatility of the tourism industry:** The success of tourism economies is dependent on external factors that may fluctuate, like the ability of people to spend money on travel and preference for certain types of tourism.
- **Dominance of mass tourism:** The mass tourism industry currently has a strong monopoly on the area's economy. Economic diversification and alternative entrepreneurship could be constrained by the current preference for and expectation of mainstream tourism offerings.
- **Lack of cohesive regional planning surrounding tourism:** Despite the existing organizations and motivation to create sustainable tourism in the study area, a lack of collaboration between groups could hinder potential progress.

CONNECTIVITY AND ACCESS

Existing Roadways

Road Network Hierarchy

The roadway network in Crete is organized into a hierarchy with primary arteries (i.e. the New National Road (VOAK) and the Old National Road) at the top, followed by secondary arteries made up of provincial streets and finally collector roads which are the main municipal and community roads. According to the General Urban Plan, the road network is organized as a “comb,” with the Old National Road forming the main trunk and smaller, local north-south streets leading to more rural inland settlements (Daskalakis et al., 2014). VOAK or E65 is referred to as the New National Road and serves as an expressway along the southern side of Chania. The collector roads, with few exceptions, do not connect to the New National Road and often end in private roads and driveways. This concentrates traffic to the Old National Road.

The Old National Road

The PEO Kissamou Chanion, more commonly referred to as the Old National Road, appears to be the main thoroughfare for activity within the study area. It serves as the most direct route into central Chania, traveling east and west along the northern coastline of Crete. There are two roadways which connect the Old National Road and New National Road; one unnamed road is east of the study area and one west of Platanias, called Epar.Od. Gerani – Koufou.

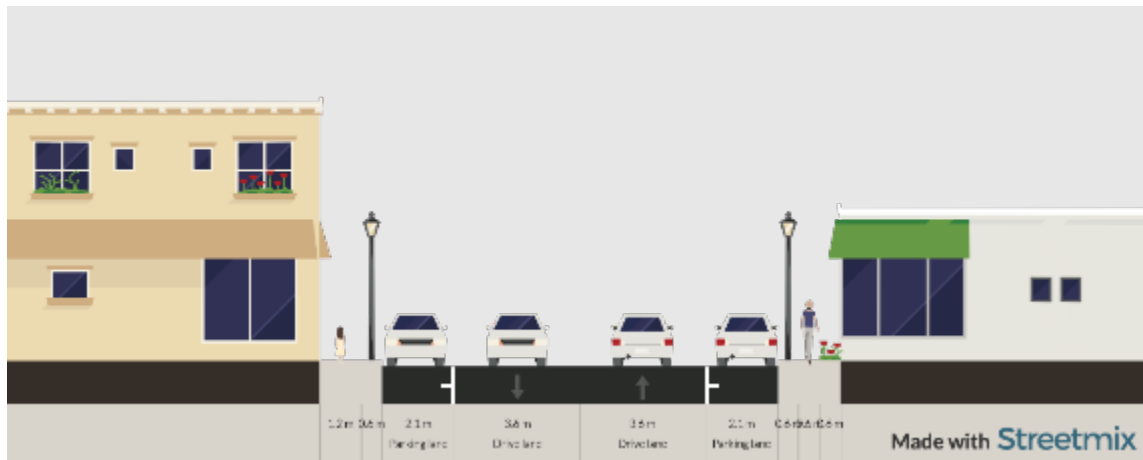
Due to its proximity to the Mediterranean Sea, tourist amenities are adjacent to the Old National Road. The stretch of the road through the study area is approximately 3.7 kilometers (2.3 miles) in length.

The following street dimensions (roadway, sidewalks, and right-of-way), are approximated from Google Earth. The dimensions vary but the most common dimensions are reported below.

East (from the eastern boundary of the study area to the curve at the coastal cape at Agia Maria; Figure 24)

- Right-of-Way (ROW) width (measured from back of sidewalk on each side of the street): Varies but approximately 15 meters (50 feet) in most places
- Street width: 11.4 meters (36 feet)
- Sidewalk widths (both sides): 1.8 meters (6 feet)

Figure 24. East existing Old National Road cross-section (looking west)

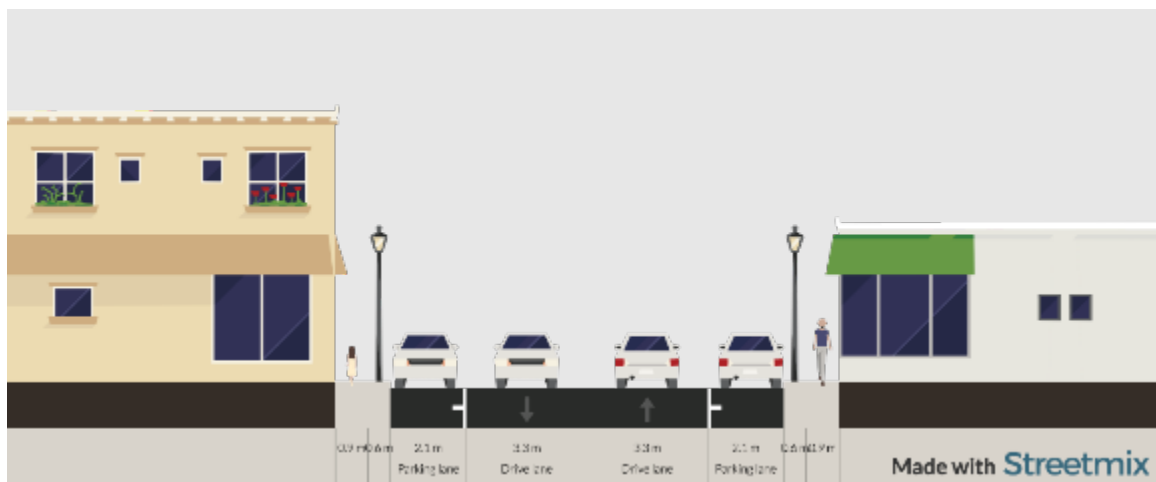


Source: Representation of Old National Road created with Streetmix.net

West (from the curve at the coastal cape at Agia Maria towards the western boundary at Platanias; Figure 25).

- ROW width (measured from back of sidewalk on each side of the street): Varies but approximately 14 meters (46 feet) in most places
- Street width: 9.8 meters (32 feet)
- Sidewalk widths (both sides): 2 meters (7 feet)

Figure 25. West existing Old National Road cross-section (looking west)



Source: Representation of Old National Road created with Streetmix.net

Existing Pedestrian Infrastructure

According to the General Urban Plan, there are no pedestrian trails in the area and footpaths are essentially non-existent (Daskalakis et al., 2014). The Old National Road is the only road observed to have sidewalks within the study area. Both the north and south sides of the Old National Road have sidewalks that average approximately 1.8 - 2.1 meters (6 - 7 feet) in width, but walking paths are often blocked by obstructions such as utility poles, street lights, trash receptacles, planters, and trees and are often encroached by parked vehicles, store displays and sandwich signs/advertising easels (Figure 26).

Figure 26. Sidewalk obstructions: Utility poles and street lamps



Photo credit: Shelley McMullen

The widths of the sidewalks vary where buildings or their surrounding walls are built more closely to the roadway. Some of the sidewalk widths are as narrow as approximately 0.6 meters (2 feet) which does not provide enough room for two pedestrians across, nor a wheelchair or stroller, often forcing pedestrians into the street. Due to vehicles parked along the curbs, pedestrians are often forced to walk between the parked vehicles and the bus and vehicle traffic on the road, which contributes to unsafe conditions for both drivers and pedestrians.

Accessibility for people with disabilities is also lacking along the Old National Road making mobility difficult for those in wheelchairs, those needing canes or walkers, parents of infants in strollers, and the elderly. Sidewalks are often narrow, uneven, and steeply inclined with high curbs and no curb ramps. Stormwater inlet grates are often located within the pedestrian walkway causing additional hazards. The team observed a man in a wheelchair being forced to wheel into the street and then back his wheelchair onto a curb because a stormwater grate was blocking his path to the sidewalk (Figure 27).

Figure 27. Stormwater grates, steep slopes and high curbs present obstacles for people with mobility challenges



Photo credit: Shelley McMullen

There are only two designated crossing locations within the study area. Both are signalized but there is approximately 1.2 kilometers (4060 feet) between crossings. Pedestrians are forced to dodge fast-traveling vehicles in order to cross at other locations, which can be particularly difficult during peak traffic hours (Figure 28).

Figure 28. An elderly woman using a cane was observed calling for a shop owner to stand in the street to stop traffic, so she could cross the Old National Road



Photo credit: Shelley McMullen

There are two pedestrian bridges that go over the Old National Road. The bridges appear to be privately owned by hotels and are intended to connect to the hotels that flank each side of the road; however, the bridges are easily accessible by the public without mobility issues. Both appear to be constructed in recent years and are in good condition. The eastern-most bridge is at Hotel Galina; the western-most bridge is at Iolida Beach.

Existing Bicycle Facilities

According to the General Urban Plan, there are no bike paths in the Nea Kydonia area (Daskalakis et al., 2014). There have been some studies recommending cycle tracks in an adjacent municipality, but none have been implemented. The Old National Road does not have bicycle lanes nor were any bike racks observed. Cyclists were occasionally observed on the Old National Road but bicycle travel does not appear to be common among tourists or locals. According to Google Maps, there are five locations for bike rentals in the study area. Hellas Bike in Agia Marina also offers bicycle tours; however, the bicycle tours do not occur along the coast in the study area but are offered south to north, beginning with having a van drive to a location (Figure 29).

Figure 29. Map of bicycle tours from Hellas Bike



Source: Hellasbike.net

Hellas Bikes' website says that their clientele is "70% Scandinavians (mostly families), 15% British, 10% German-speakers and 5% of diverse nations" (Hellas Bike, n.d.).

There are two bicycle-share stations in the municipality of Chania, however, none near the study area (Figure 30). Google reviews noted the bike share bicycles were in need of maintenance.

Figure 30. Map of existing bicycle share stations in Chania



Source: Google Maps

Existing Taxi Services and Infrastructure

Taxis cost approximately €13 to €14 from the study area to downtown Chania with a travel time of approximately 15 minutes. Taxi services advertise to tourists with fixed prices to cruise ships, hotels, and the airport. The Santa Mariana Plaza hotel has designated taxi parking in front, but taxis are also readily available by phone. Because the majority of residents have personal vehicles, taxis are likely a more popular transportation choice for tourists than for locals to travel to and from downtown Chania.

Parking Conditions and Regulations

There is no organized parking plan or regulation in the study area. This is noted in the General Urban Plan for the area (Daskalakis et al., 2014) and confirmed by on-site observations during our field work. While no formal curbside parking exists, on-street parking is widespread throughout the study area. The street is wide enough to accommodate curbside parking on both sides of the road, however, the lack of formal regulations has led to many issues with cars parked on the sidewalk, or in front of business entrances, loading areas, alleys and private driveways, infringing on both the pedestrian environment and on private access to businesses and residences. We also observed parked cars obstructing access to bus stops (Figures 31-34).

Figure 31. (Top left) Observed site conditions along the Old National Road showing cars parked on-street

Figure 32. (Top right) Car parked on the sidewalk, infringing on the pedestrian environment

Figure 33. (Bottom left) Cars blocking access to a bus stop along the Old National Road

Figure 34. (Bottom right) A car blocks access to a private driveway along the Old National Road



Photo credit: Annelies van Vonno

This has led to a situation where many businesses and residents have taken parking regulation into their own hands. In the field, our team observed many ad-hoc “No Parking” signs, both in Greek and English. Some looked more professional or “official” than others, but many had a hand-made quality to them. All seemed to have been installed by private entities such as hotels, restaurants, and residences (Figure 35). We observed no official signs installed by the municipality. Enforcement of these private ad-hoc parking regulations is essentially non-existent, and we observed many cars parked directly in front of “No Parking” signs without consequence.

Figure 35. A wide variety of “No Parking” signs, some distinctly handmade, were observed in the study area



Photo credit: Annelies van Vonno

Off-street parking was also observed in the study area. Many of the restaurants, bars, and hotels in the area have provided ample off-street parking lots for their customers. Empty and vacant lots are also used for parking. The map below shows observed off-street parking lots highlighted in orange. In Stalos, most off-street parking lots are small and located at either the back or side of the building. Many other businesses and hotels in this area do not seem to have parking at all. Further west in Agia Marina, parking lots are much bigger and are increasingly located at the front of the building, adjacent to the street (Figures 36 and 37). There are several sections of Agia Marina where parking forms the dominant street-facing use, taking up a much greater portion of land than the buildings. In these areas, the buildings are not easily accessible to pedestrians on the street, and pedestrians must walk through vast parking lots in order to reach the businesses. This has a distinctly negative effect on the pedestrian environment. During our observations, many of these large parking lots were empty. However, our observations were not conducted during the height of the tourist season or during peak periods of usage. Further study is needed to determine if these parking lots are fully utilized or if this land could be put to better uses.

Figure 36. An aerial view of the study area, with large parking lots highlighted in orange



Source: Graphic by Kenna Davis

Figure 37. Large street-facing parking lots in Agia Marina. In many cases it is hard to even see the business that the parking lot is meant to serve from the street



Photo credit: Annelies van Vonne

All parking, both on-street and off-street, observed in the study area was free (or free for customers), with one exception. Santa Marina Plaza has an underground parking garage, which is advertised as “Public Parking.” The price at the time of observation was €3 for four hours, €4 for eight hours, or €6 for 24 hours, though it is unclear why one would choose to pay for parking when there is so much free parking within the study area. Further study is also required to determine if hotels in the area charge their guests for parking on site.

The General Urban Plan for Nea Kydonia states that there is a “significant lack of parking spaces” in the study area and that growing population and tourist activity is likely to increase the demand for parking (Daskalakis et al., 2014). While our field visits and site observations would agree that the area lacks *organized* parking and regulations, we did not observe a *shortage* of parking. We observed ample on-street parking as well as many empty parking lots. While admittedly, more study is required to determine the level of parking utilization at peak times, at present we have determined that the amount of parking (including “unorganized” or “informal” parking) is generally adequate.

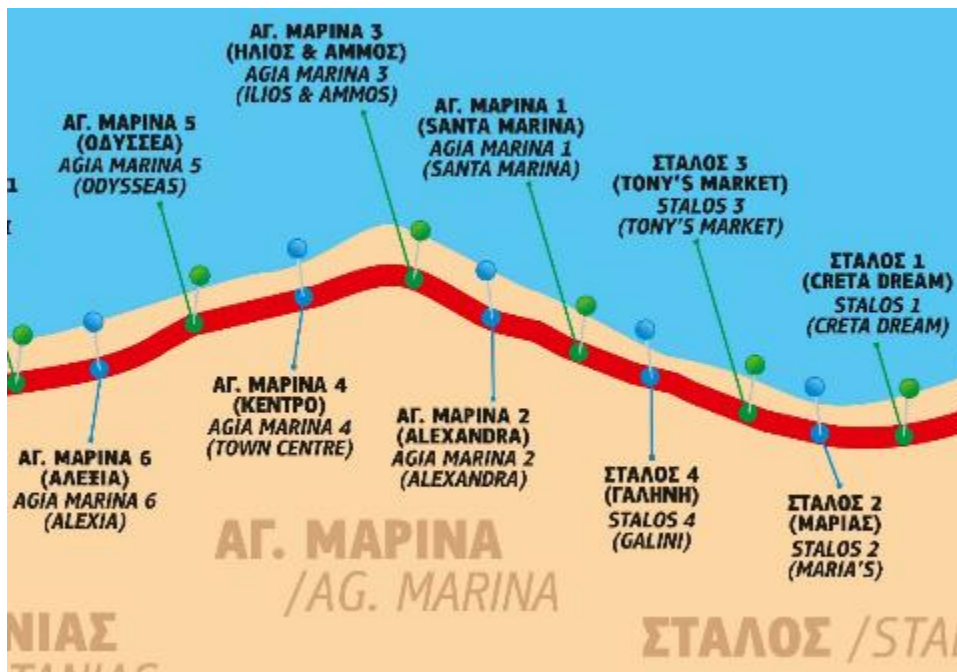
Transit Service and Infrastructure

Transit between our study area and central Chania is provided by public bus service operated by KTEL, a public company locally controlled by the Region of Crete, and nationally by the Ministry of Transport for the State of Greece. According to their website, the company is locally headquartered in Chania and operates a modern fleet of buses built in 2005 – 2009 (KTEL Public Bus Services, n.d.). There is one route that traverses the study area on its way from Chania to Kolympari (Figure 38). Within our study area, there are 10 bus stops, four in Stalos (Creta Dream, Maria’s, Tony’s Market, and Galini) and six in Agia Marina (Santa Marina, Alexandra, Ilios & Ammos, Town Centre, Odysseas, and Alexia; Figure 39). Of these, only five stops (Creta Dream, Maria’s, Tony’s Market, Santa Marina, and Ilios & Ammos) have bus shelters, all of which are located along the south side of the street. There are no bus shelters on the north side of the street. The remaining bus stops have

little to no facilities (such as shelters, covered waiting areas, benches, trash cans, signage, timetables, or bus information; Figure 40).

Figure 38. (Top) KTEL map showing the Chania-Kolympare bus route with the study area stops highlighted in gray

Figure 39. (Bottom) Inset view of the ten stops in the study area



Source: <http://e-ktel.com>

Figure 40. Observed study area bus stop facilities

Photo credit: Annelies van Vonno

The Chania-Kolympari bus route operates from about 7:00 until 23:00 with headways approximately every 20 minutes. Timetables from both January and May indicate that the bus schedule stays relatively consistent over the course of the year. KTEL's website states that it prides itself on serving communities in both winter and summer. Bus tickets are €1.8 and can be purchased either on the bus or from local markets adjacent to the bus stops. Where to purchase the tickets, however, is not clear from the little information provided at the bus stop.

From the Maria's bus stop in Stalos, it takes approximately 15 minutes to ride the bus into Chania. Anecdotal evidence from conversations with local workers who commute to and from Chania every day suggest that the total commute time (including wait time and travel time) is 30-45 minutes, suggesting that this is a fairly manageable commute for workers who may live in Chania and commute to the study area for work, or vice versa. While riding the bus, we observed that buses both into and out of Chania are quite crowded, even during off-peak hours. Conversations with local bus commuters suggest that it is often difficult to find a seat during the busiest times.

While most people we observed waiting for and riding the bus appeared to be tourists, the existing bus service provides a clear opportunity to reduce traffic and parking demand by enabling more

local residents and workers to take transit instead of driving. Given that the bus is fairly crowded even in the shoulder season, there may be enough demand to support additional bus frequency in the busy summer months to serve both tourists and locals.

HOUSING AND LAND USES

Current Vacant and Open Land

The following maps were created using data from on-the-ground observations and Google Earth imagery (Figure 41). Land within the study area in the villages of Stalos and Agia Marina is categorized in three ways: 1) Parking lots, 2) Undeveloped land, and 3) Land used for agriculture. Parking lots include lots used by hotels, retail, and residential units within the study area. Undeveloped land is characterized as vacant plots with no existing uses, as well as unfinished buildings/structures. Land used for agriculture are mainly used for cultivation of olives, wine grapes, and other regional crops, with some used for small numbers of farm animals, such as goats, roosters, and sheep.

We categorized the majority of open land in the study area as agricultural use; it is concentrated towards the southern border of Stalos and Agia Marina. We categorized the undeveloped land adjacent to the Old National Road as vacant or unfinished buildings. Unfinished buildings are concentrated in Stalos and the eastern portion of Agia Marina. We saw few unfinished structures in the Agia Marina area. Along the Old National Road, there are sections of fully developed plots on either side of the road in both Stalos and Agia Marina. However, both villages have sections where there is a concentration of undeveloped land along the Old National Road, including eastern Stalos and central Agia Marina. Additionally, plot sizes are more regular closer to the Old National Road, but take on more organic shapes and are less defined toward the south and into the hilly topography. Larger surface parking lots are concentrated in central Agia Marina, some of which are adjacent to undeveloped land as well.

Figure 41. Current vacant and open land in the study area



Source: Google Earth and on-the-ground observations

Real Estate Market and Construction Development Data

The following section includes data and existing condition findings for the study area related to current property listings, vacant land listings, and rental listings as of June 1, 2019.

Properties for Purchase in Study Area

The for-purchase housing stock in the Agia Marina and Stalos Villages located within the study area is limited. A broad, web-based search surfaced only three active listings for residential properties for sale in the area (Figure 42). These active listings ranged in price from €265,000 to €720,000 with an average price per M² of €1,120.5. All three of the properties are located in Agia Marina. In the Chania Prefecture as a whole, there are 378 active property listings ranging from €65,000 to €4,000,000.

Figure 42. Active listings of properties for sale as of June 1, 2019 based on an online property search across a number of property search platforms and websites



Source: Data pulled from multiple property and land listing websites

Vacant Land for Purchase in Study Area

Within the study area, we found 16 active listings for land for sale (Figure 43). Listing prices range from €80,000 to €7,900,000. On average, the closer the lot to the waterfront, the more expensive the plot of land. The available lots were anywhere from 340 to 10,000 M² in size. The vacant lots available for purchase in Stalos were less expensive than those in Agia Marina. In the Chania Prefecture as a whole, there are 392 active listings for purchase of vacant land ranging from €12,000 to €8,000,000 across a range of sizes. The average price per M² in the study area is €210.46.

Figure 43. Active listings of for-sale land as of June 1, 2019 based on an online property search across a number of property search platforms and websites



Source: Data pulled from multiple property and land listing websites

Properties for Rent in Study Area

The study area has minimal units available for rent (Figure 44). A web-based search found only one villa for rent on the south side of the VOAK.

We searched for information on “seasonal rentals,” which are units that have rental agreements that cannot exceed a six-month term. The search resulted in 10 available seasonal rentals in Agia Marina and Stalos. These rentals range from €1,817 to €17,882 per month. In the Chania Prefecture as a whole, there are 96 active property rentals. The properties in the entire region range from €259 to €5,800 per month. Overall, the study area is more expensive and has only a small amount of available rentals when compared to Chania as a whole.

Figure 44. Sign marketing rooms for rent sign in Stalos, Chania



Photo credit: Brit Vigil

Land Use

According to information provided by a mechanical engineer for the Municipality of Chania, the land uses of the entire study area are subject to the limitations set forth in the Regional Development Master Plan of Crete. Inside the boundaries of settlements with populations up to 2,000 people, the following uses are temporarily permitted by Article 16 during the transitional period in which the Master Plan is in its final proposal stage:

- Residences
- Social welfare
- Education
 - Kindergartens, Secondary, Special Education
- Small sports facilities (A1, A2, B1, D, E1)
- Religious sites
- Cultural facilities (600 M² of total building area per stadium)
- Local-level governance

- Primary health services without treatment
- Trade and provision of personal services
 - Only retail stores up to 150 M²
- Offices up to 300 M²
- Restaurants up to M²
- Refreshments up to 150 M²
- Tourist accommodations up to 100 beds
- Parking of cars up to 3.5 tons of common use, motorcycles, and mopeds
- Fuel and power stations
- Laundries, car washes
- Car repair services
- Warehouses less than 300 M² of total surface area
- Professional Workshops
- Agricultural holdings
 - Only forestry, livestock, fisheries, and other agricultural holdings and warehouses are allowed
- Public transport facilities
- Recycling corners and small green points
- Temporary reception and accommodation facilities for migrants, up to 100 people

SHORT-TERM RENTALS

Existing Conditions: Airbnb Units in Nea Kydonia

We collected data about local short-term rental units from the website Inside Airbnb (InsideAirbnb.com), an independent source that analyzes publicly available information about Airbnb listings. Available data includes the name of the Airbnb host, number of listings, whether the rental was partial- or whole-home, estimated income per month, estimated occupancy rates, and the availability of each rental per year (see Appendix A for how Inside Airbnb defines availability). This resource was useful for understanding the general composition of Airbnb rentals in the study area and may be further analyzed in the future by the tourist organizations or the municipality of Chania.

Inside Airbnb also provides aggregated open data that we queried and analyzed to estimate the number of Airbnb rentals in the Nea Kydonia area (defined as the postal codes 730 14 and 731 00). We found 1,711 total Airbnb rentals (the total number of rooms or homes for rent) from our query on these two zip codes. Although this area is larger than the study area (Agia Marina and Stalos), the impact of short-term rentals needs to be understood at the regional level. Total Airbnb rentals and the percentage of these that are whole-home listings are provided in Table 3 below. A large majority (88%) of the available short-term rentals in the Nea Kydonia area are whole-home rentals; these units are therefore unavailable as homes for local residents (Figure 45). These results indicate that Airbnbs may be exacerbating the local housing shortage – a problem that is being seen in the entire Nea Kydonia region and in tourist areas around the world.

While short-term rentals such as those rented through Airbnb can provide benefits to an area such as providing additional income for hosts, generating tax revenue, and filling a market gap, there are drawbacks as well. When people list whole homes as is often seen in the Nea Kydonia region, these rentals take potential housing stock away from locals and when the housing process is commercialized through hosts operating multiple listings, Airbnb's home sharing purpose of living like a local by living with a local is undermined. As Table 3 below shows, the majority of Airbnb rentals in the Nea Kydonia region are whole home rentals. These 1,514 whole-home rentals are being operated by 819 individual hosts, meaning that several hosts have more than one property listed on Airbnb.

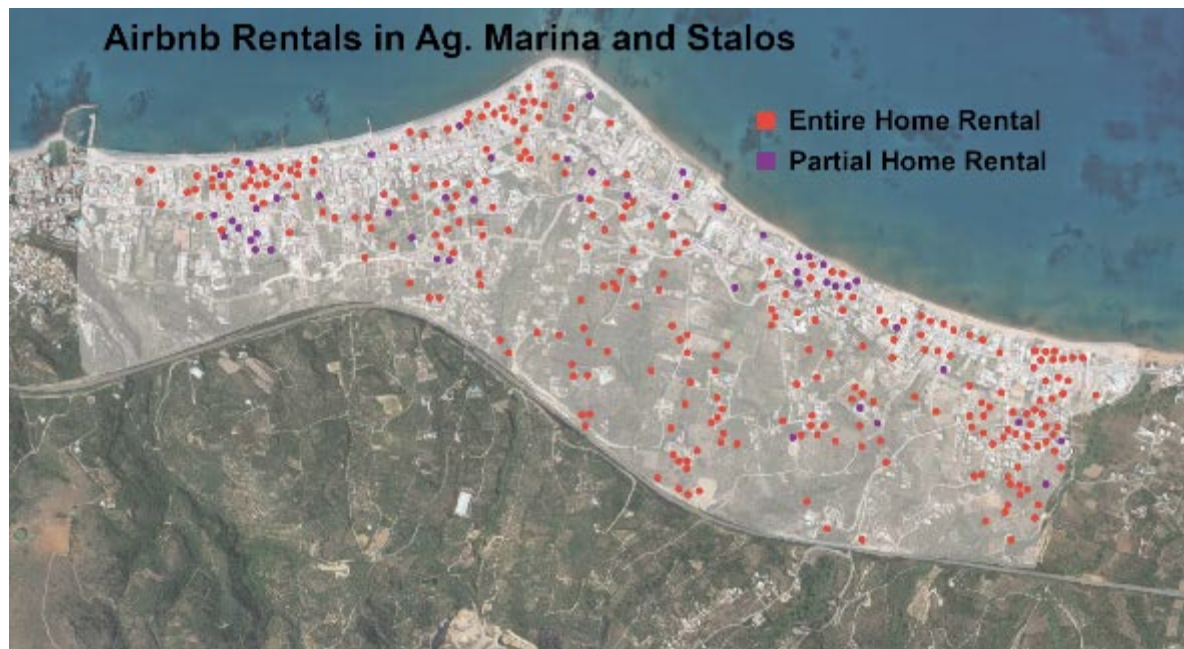
A host refers to the operator of an Airbnb rental unit. A host may be the owner of the home or it may be a separate entity manages the rental unit, such as a travel agent or third-party property rental management company. When hosts operate more than one Airbnb rental, the profits from renting short-term units is not spread among individual hosts but consolidated among fewer people resulting in less monetary benefits for some. This method of renting is less about "living like a local by living with a local" and more about turning short-term rentals into a corporate venture used to make large profits by some hosts. This, in addition to the renting of whole homes rather than partial homes (a situation in which the unit can be used as a long-term home while making profit), can exacerbate the commercialization of Airbnb rentals.

Table 3. Whole-Home Airbnb Listings

Existing Conditions		
	Nea Kydonia (730 14, 731 00)	Agia Marina/Stalos
Total Airbnb Rentals	1,711	327
Whole Listing	1,514 (88%)	278 (85%)
Individual Hosts	910	---
Whole Listing	819 (75%)	---

Source: InsideAirbnb.com

Figure 45. Airbnb listings in the study area (2019)



Source: InsideAirbnb.com

Airbnb Units Available for Rent

On June 6, 2019, we conducted an Airbnb search to check availability for short-term rentals during peak times (June to August) in the study area. Rentals for groups of two, four, six and ten were searched for during each time period selected. There were consistently large numbers of Airbnbs available to groups of 2 or 4 guests across all dates selected, and except for June 21-23 and July 19-21 (both Friday to Sunday stays) there are approximately 20-30 rentals available for groups of 6+ guests. Availability seems to correlate with what days of the week are selected, but overall the search showed that, while not overly abundant, there are short-term Airbnb rentals available in Agia Marina and Stalos even during the peak of the tourist season. For additional detail about our data analysis, see Appendix A.

Future research comparing the occupancy rate of hotels in the area for the same time period would be useful to understanding whether a decrease in the number of available short-term rentals in the

area would have a significant impact on tourism and the economy. Carrying capacity of the area for tourists has been identified as an issue by the Municipality of Chania. With this many available units, policies that encourage short-term rentals to be used as long-term rentals could alleviate pressure by encouraging units to be returned to the local housing market.

ENVIRONMENTAL SUSTAINABILITY

Existing Environmental Conditions

Chania has noted that environmental sustainability is a key focus within the study area. As a coastal community, Chania is much more likely to experience the effects of human-caused global climate change, including rising sea levels. Chania's administration and the General Urban Plan note that both coastal erosion from unprecedented precipitation events and extended periods of drought are immediate threats to the region (Daskalakis et al., 2014).

Chania and Crete are home to a wide variety of unique flora and fauna at risk for displacement and destruction as the region experiences increased tourism and climate change. Preserving the natural environment while fortifying the region against the effects of a changing climate must be at the forefront of the minds of the administration, developers, residents, and tourists.

The study area's coastal climate facilitates the growth of many lush, colorful, and resilient plant species. Not only do these plants help capture particulate matter in the air and thus increase air quality, they also shield the area from harmful solar radiation and mitigate the urban heat island effect. While especially crucial in the summer months when Chania averages 12 hours of sunlight per day, rich urban flora has also shown to improve the wellbeing of nearby pedestrians and invites people to slow down and linger within areas that may otherwise feel hostile to visitors and locals alike. In addition, rich plant life can be a crucial piece of stormwater management infrastructure as it intercepts rainfall and increases the ability of soil to store water. Plant life can also disperse precipitation over a longer period and reduce the velocity of water when it falls, which can improve the effectiveness of green infrastructure enhancements.

Environmental Challenges and Opportunities in Nea Kydonia

Waste Collection and Separation

Upon observation of the study area, our team noted that there are few public waste receptacles. Public recycling receptacles are almost non-existent, which may force people to use regular trash cans for recyclable items. Chania boasts a highly regarded municipal waste separation plant that other Greek island municipalities look to as a template for waste management solutions (Environmental XPRT, n.d.). Early separation of plastics, glass and paper in our study area may increase the overall positive environmental impact of Chania's waste management.

Plastic Usage

Much of the garbage along Chania's beaches is plastic. Although during our team's business survey we found several stores charging for plastic bags, the majority made no mention of the policy before they placed our purchases in plastic bags. Plastic bags, along with other single-use plastic waste, makes up most beach debris. In a 2015 study, researchers trawled five coastal areas in the eastern Mediterranean and found that 60% of the marine litter detected was in the Saronic Gulf bordering greater Athens. Ninety-five percent of that trash was plastic, much of it single-use items like grocery bags or water and soft drink bottles (Gatopoulos & Tongas, 2018).

EU plans call for all plastic packaging to be recycled by 2030 and wants member states to reduce single-use plastic consumption. The EU guideline calls for consumers to use no more than 40 plastic

bags annually by 2025. However, Greeks currently average 296 bags per year (Gatopoulos & Tongas, 2018; Figure 46).

Figure 46. Single-use plastic consumption in Greece is higher than the EU guidelines



Source: alphatv.gr

Energy Production and Use

The majority of Chania's power comes from the Greek Public Power Corporation (PPC), which operates three diesel-powered thermal plants on Crete. During the team's observation of the study area, we noticed that many homes and businesses utilize photo-voltaic (PV) technology in the form of private solar panels and solar water heaters, which reduce non-renewable power consumption. We also observed some private wind turbines. PPC has committed to environmental sustainability and resilience by increasing investments in renewable energy sources such as wind and solar, and reducing carbon emissions from existing energy sources such as the diesel-powered thermal plants. PPC also is committed to the environmental policies and goals of the European Union and Ministry of Environment, Energy & Climate Change (Public Power Corporation, n.d.). Chania's abundance of sunshine and wind are key opportunities of the area and have the potential to facilitate 100% renewable energy usage in the future.

A 2017 study indicated that large offshore wind farms in the Chania region could offset a significant portion of the existing load carried by the region's current diesel-powered thermal plants. Although the report noted there is not sufficient demand from regional consumers for offshore wind farms, the eventual completion of the Crete-Attica "Great Interconnection" in the coming years means Crete could potentially become a net energy exporter to other areas of Greece. Additionally, the project will render the diesel-powered thermal plants obsolete and unnecessary, which could help to reduce Crete's CO₂ emissions. There would also be a corresponding lowering of energy costs to all Greek citizens and consumers.

Water Management

Despite unprecedented rain events in early 2019, persistent drought conditions have been plaguing Chania in recent years and much of the island is at risk of desertification. A 2007 conference comprised of 28 research institutes and universities from around the world organized by the Agricultural University of Athens meeting in Heraklion, Crete concluded that over 55% of Cretan land is at high risk of desertification. This drastic environmental shift would lead to dire consequences for Greece's economy and people. The island's warm climate and low rainfall, along with human-made problems like overgrazing and water diversions, are the main reasons for this desertification. It is estimated that 1.5 million sheep and goats graze on Crete, far more than the island can reasonably support. Overgrazing has also led to damage to forest renewal, which further leads to increased erosion. Moreover, water diversions for tourists, such as the illegal diversion of agricultural water for hotel pools and facilities, have gone unchecked for years. Increased water requirements in urban and tourist areas are currently met through boring new wells. In periods of low rainfall, however, these result in a fall in the water table, salination of coastal areas and drying-out of wetlands, threatening local ecosystems with destruction (Daniels, 2007).

Blue Flag Beaches

The iconic Blue Flag is one of the world's most recognized voluntary eco-labels awarded to beaches, marinas, and sustainable boating tourism operators. In order to qualify for the Blue Flag, a series of stringent environmental, educational, safety, and accessibility criteria must be met and maintained (see the Blue Flag Global website for more information: <https://www.blueflag.global>). Central to the ideals of the Blue Flag program is the aim of connecting the public with their surroundings and encouraging them to learn more about their environment. As such, environmental education activities must be offered and promoted in addition to a permanent display of information relevant to the site in terms of biodiversity, ecosystems and environmental phenomena.

There are two Blue Flag beaches in the study area, Stalos Beach and Agia Marina Beach (Figure 47). Stalos Beach is sandy and well-organized and lies in an built-up area of Kato Stalos, next to Kalamaki Beach to the east. It is 2.000m long, and its width extends 40m. Agia Marina's beach is a sandy, excellently organized beach to the west of Stalos Beach. It lies in the built-up area of Agia Marina village and is 3.000m long and 45m wide. These beaches are heavily visited, full of popular beach bars and hotels near the coastal zone.

Figure 47. Blue Flag Beach sampling site

Photo credit: Alex Hemmer

Nearby natural species of concern are the sea pines and baby palms. There is also a rare, self-sown and endangered species, Lilly of the Sea (*Pancratium Maritimum*), well known for its blossoms: large, white with delicate appearance and intense scent. The sand dunes, rare in this developed area, on which this remarkable species grows are surrounded by a fence, so that Lilly of the Sea can be protected. Every year environmental education is carried out, including clean ups of the beach and the bottom of the sea, lectures about the biology of the sea turtle *Caretta Caretta*, publication of small posters and cards concerning the environment, and leaflets on recycling are distributed (Stalos Greece-Beach, n.d.).

Channels

We conducted several stormwater infrastructure surveys within the study area that resulted in two key findings. First, there is significant erosion along the beach from inadequate stormwater facilities. Additionally, there is an accumulation of garbage and debris on the beach. The existing water channels that flow from the hillside to the beach are often haphazardly constructed and poorly maintained (Figure 48). There is no clear ownership of the channels, and many were built at a time when the development process was undefined or unenforced.

Figure 48. Water channels studied shown in blue



Source: Alex Hemmer through site observation and Google Earth satellite images

Determining responsibility of maintenance for the various channels that open directly to the beaches is an important first step in improving their condition. For the larger channels there is an opportunity to turn them into valuable green spaces. Currently they only function to move water runoff as quickly as possible to the sea, resulting in significant erosion during precipitation events and carrying trash and silt onto the beaches (Figure 49). This downstream effect degrades the tourist experience and reduces the value of the beaches. The waste may also affect aquatic life.

Figure 49. Observed beach conditions showing significant erosion and debris due to runoff from channels



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Photo credits: Alex Hemmer

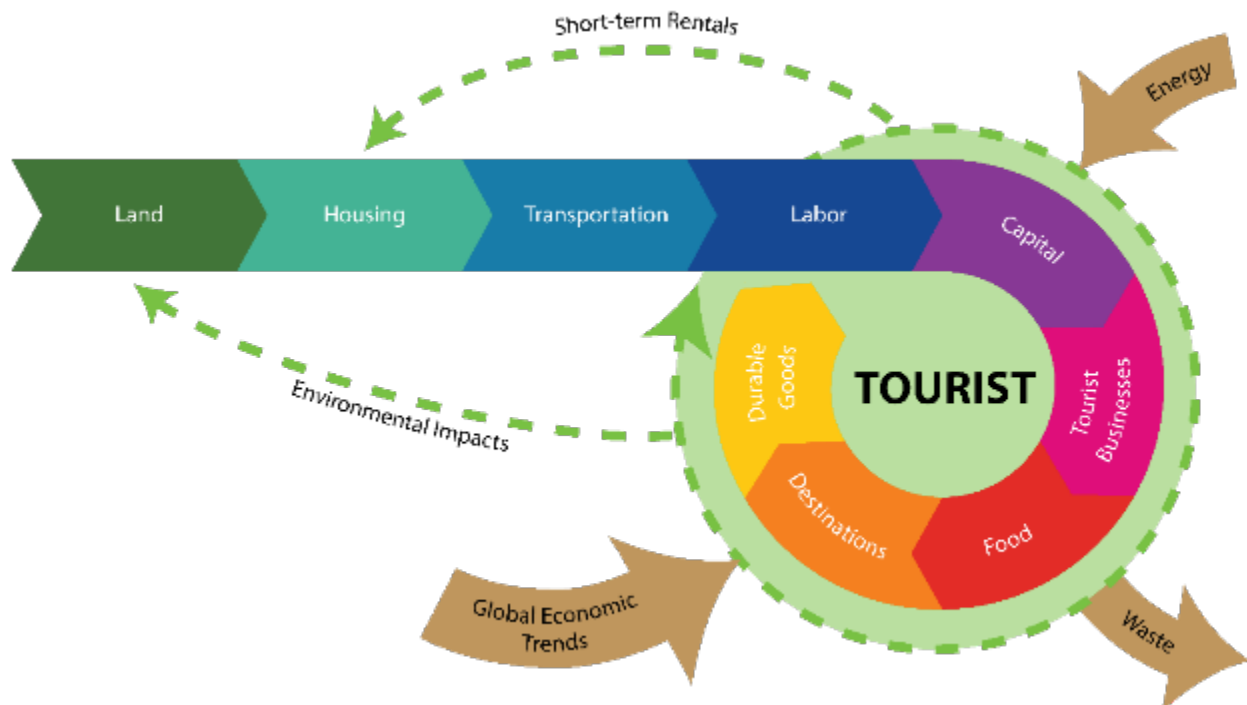
PROPOSALS FOR ACHIEVING SUSTAINABLE TOURISM

OVERVIEW

Isolated View of the Tourism Industry

The General Urban Plan states the importance of tourism to Chania and prioritizes updating the tourism infrastructure in our study area (Daskalakis et al., 2014). While looking at the tourism industry in isolation is helpful for understanding the inputs and outputs that impact the industry as well as its cyclical nature, the place-based nature of tourism means it must be understood in context. The industry draws from as well as impacts the local economy, and it has a complex relationship with other factors such as housing, land, transportation and the environment, as diagrammed in Figure 50 below.

Figure 50. Diagram of the isolated view of tourism industry



Graphic Credit: Kenna Davis

A Holistic Approach to Sustainable Tourism in the Chania Region

Our team focused on four inter-connected elements that shape the context of the tourism industry in the Chania region: 1) the economy, 2) transportation, 3) land development, and 4) the environment (Figure 51). These four areas are the basis for the guiding principles that frame our proposals, which are discussed in the following sections of the report.

Figure 51. The four interconnected elements of sustainable tourism



Graphic Credit: Kenna Davis

Goals and Principles for Achieving Sustainable Tourism

Our team developed the following goals and principles using this holistic view of the tourism industry for the study area. Each of the four goals contain principles that support our proposed projects and policies for the study area.



Harmony with Nature:

- Educating visitors, entrepreneurs, and residents on sustainability
- Encouraging sustainable businesses practices
- Cleaning the existing storm water infrastructure



Economic Resilience:

- Reprioritizing future land uses from hotels and tourist shops to housing, civic space, and green space
- Extending the tourist season (supporting local residents and attracting domestic tourists)
- Bringing back the explorers: mindful travel, nightlife, individual experiences



Enhanced Connectivity and Mobility

- Supporting the car-lite tourist and resident:
 - More frequent transit
 - More and safer pleasant pedestrian facilities
 - Improved access to New National Road



Community Livability:

- Civic spaces, plaza/gathering spaces and recreation for locals
- Prioritizing infrastructure for ALL people (walking, biking, people with disabilities)
- Year-round activation for residents
- Improved communication, programs, and partnerships between the government, residents, and business owners

SUSTAINABLE TOURISM ELEMENT 1: THE ECONOMY

Goals for a Sustainable Tourism Economy

Based on the information gathered on the existing composition, characteristics, and opportunities of the tourism economy in the study area, we identified the following goals as guiding principles for achieving a sustainable and balanced local economy:



Economic Resilience:

- Diversify economic offerings to improve community services, increase entrepreneurial opportunities, and reduce vulnerability to volatile industries.
- Extend the economic season beyond peak summer visitation to reduce pressure on tourist-facing businesses.



Community Livability:

- Balance tourist needs with local needs to increase social investment and the preservation of culture within the community.
- Incentivize the development of community services to maintain a year-round population.



Harmony with Nature:

- Encourage more mindful and sustainable forms of travel within the study area.
- Employ sustainable business practices and development strategies within the tourism industry.

Proposed Economic Strategies

To achieve the goals of sustainable economic development for the study area, we propose the following four strategies, each of which is elaborated upon below:

Strategy 1: Establish a single management entity: The Experience Nea Kydonia Alliance (ENKA)

Strategy 2: Involve the local public in the tourism planning process

Strategy 3: Create a brand that supports mindful tourism practices

Strategy 4: Incentivize sustainability through economic diversification

Strategy 1: Establish a Single Management Entity: The Experience Nea Kydonia Alliance

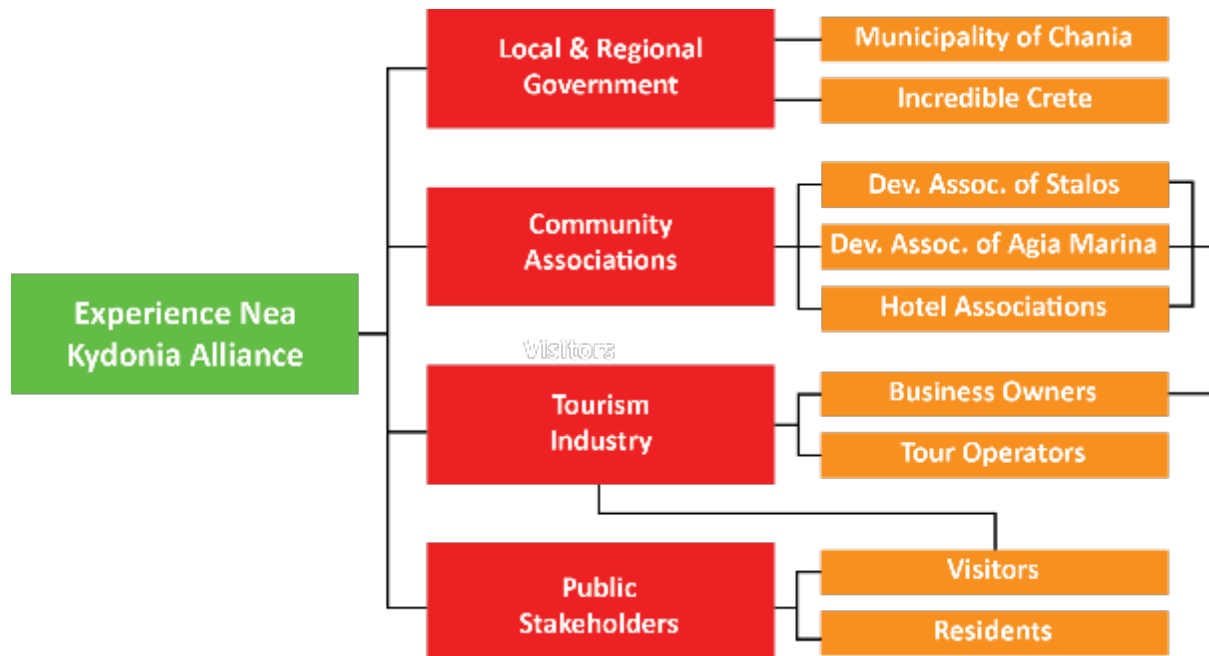
A consistent theme throughout the research on the existing conditions of the tourism economy in the study area was a gap in collaboration and communication between local leaders and stakeholders. Competing goals, inconsistent funding, and a lack of capacity constrain the ability of separate groups to take meaningful actions.

This initial strategy proposes the creation of a single entity that would oversee the management of sustainable community development through tourism in Nea Kydonia: The Experience Nea Kydonia Alliance (ENKA).

Structure and Governance

ENKA would facilitate partnerships with municipal officials, business owners, tourism professionals, and other community members under the direction of an overseeing body (Figure 52). This organization could be treated as an extension of the Municipality of Chania's existing tourism program, with city staff as leadership. Alternatively, ENKA could be organized as an independent group that is coordinated by either a volunteer or hired staff.

Figure 52. Experience Nea Kydonia Alliance participating stakeholders



Funding

Through ENKA, funding can be obtained for initiatives through the creation of tax districts, alliance dues, grants and donations, and public dollars. A collaborative environment would allow for the sharing of resources across municipal and village boundaries.

Functions of ENKA

- **Collaboration:** Connecting stakeholders, municipal groups, and local community members.
- **Data Collection:** Conducting visitor and local surveys, understanding the area's demographics and market, tracking carrying capacity indicators
- **Public Engagement:** Including locals in the tourism planning process through robust public input, empowering locals as a vital part of the tourist ecosystem (marketing to locals, ambassador programs)
- **Branding and Marketing:** Promoting sustainable tourism that is rooted in the community
- **Programs and Policies:** Supporting alternative tourism, sustainable businesses, and community events
- **Education:** Conducting awareness campaigns for sustainable tourism practices
- **Investment:** Making improvements to the public realm that benefit the community and the economy.

Strategy 2: Involve the Local Public in the Tourism Planning Process

Before efforts are made to attract more people to the area, it would be helpful to hear from the residents and tourists about what improvements they want to see. It is important for these stakeholders to feel their voice was heard when planning development in the area in order to generate local support for changes.

We recommend that the city of Chania reach out to local groups such as the Stalos Business Improvement Association and the Stalos Hotel Association, along with other stakeholders in the Agia Marina area. While the current Agia Marina Business Association is disbanded, the former members may still be willing to participate in the project. These groups may be able to provide assistance with distributing the surveys to neighbors and customers at their hotels and shops.

Case Study: Lycabettus Hill, Athens

A recent project done in Athens at the Lycabettus Hill is an example of how to gather feedback from multiple stakeholders on an important location (Sasson, 2018). The Lycabettus Hill is a site that many locals and tourists frequent in order to see spectacular views of the city. Foot traffic to the area increased and people trying to cross a busy street near the base of the hill had to try to avoid cars. People began creating their own trails which damaged the vegetation on the hill. The need to redevelop the area became apparent.

Before they made changes, the city planning department conducted an extensive survey throughout the city for several weeks. The survey offered diagrams and asked questions to gauge what the most important items were for each group of stakeholders.

The city also met with other stakeholders such as environmental groups and traffic controllers. The environmental group let the city know that they needed to be careful of a bird that nested on the hill. Had the city not included the group, it may have delayed their project by months, if not years. By involving as many people as possible, the City could integrate a wide range of requests into their plans for the area.

Strategy 3: Create a Brand that Supports Mindful Tourism Practices

Mass tourism is not always a bad thing. However, mass tourism may perpetuate non-sustainable activities such as littering and irresponsible disposal of waste, erosion of trails and historical sites, disruption of native species, introduction of non-native species, and wear of the infrastructure. On a social level, mass tourism can degrade the preservation of history, culture, and local pride in a destination. Shifting from a mass-tourism model to a sustainable, place-based tourism model would require changes in both the composition of travelers and the composition of the economy in Nea Kydonia. This strategy will focus on branding and marketing actions proposed to communicate a vision of sustainability to both potential visitors and the local community. The next strategy will propose the physical and business-based changes that should be undertaken to support this sustainable tourism model.

Profile of the Mindful Traveler

The importance of place is an integral part of the development of sustainable tourism. For local residents, a robust sense of place can foster community pride, social investment, and resilience against economic and tourism-related pressures. For tourists that prioritize sustainability, it is often an interest in the place itself, rather than the amenities available, that drive them to visit.

The proposed audience for a branding and marketing campaign is this type of sustainable tourist, known as the Mindful Traveler. The Mindful Traveler is someone who wants to experience a place

like a local. They are curious about culture, heritage, and the characteristics that make a place unique. They seek experiences that allow them to explore connections to the land through cuisine and agriculture. They are concerned with how their presence might impact the place and aim to minimize their footprint while traveling. The Mindful Traveler is someone that wants to take the path less traveled to get to the destination and seeks adventure as a form of relaxation.

Brand Inspiration

The following imagery aligns the characteristics of Nea Kydonia with the preferences of a Mindful Traveler. This brand inspiration offers alternatives to the “sun, sea, and sand” imagery with which the study area is heavily associated, and instead highlights Nea Kydonia’s rural, environmental, and cultural assets.

The major branding themes that emerge are *authenticity* and *connection to land*. Authenticity refers to the guarantee that visitors are having real experiences, seeing the true Nea Kydonia, and forming genuine relationships with the people they meet. Connection to land shines through fresh local ingredients, traditional cuisine, farm visits and farmers markets, natural ecosystems, and experiencing native wildlife.

Ultimately, this branding shift hopes to cultivate an experience where travelers feel like they are not just guests but family, and a place is not just a vacation destination, but a place that feels like home (Figure 53).

Figure 53. Matrix of images representing mindful travel





Sources for Left Column: (1) Visit West Crete; (2) Jennifer Steffel Johnson; (3) Crete Travel; (4) Cretico Blog

Sources for Right Column: (1) Kritshotel; (2) Greece Is; (3) Jennifer Steffel Johnson; (4) Jennifer Steffel Johnson

Considerations for the Promotion of Mindful Travel

Mindful travel offers a sustainable alternative to the current model of mass tourism and is a response to the gaps we identified in the Existing Conditions section, including economic diversification and business serving year-round residents. A mindful travel concept allows mass tourism to still have a space within the community but aims to redistribute the pressures of tourism in a more sustainable manner.

Despite the benefits of promoting mindful travel, several considerations exist that should be kept in mind when implementing a marketing plan. First, a compositional shift of the current economy would be necessary to support this new type of traveler, which is elaborated on in the following strategy recommendation. Second, amenities and experiences that serve the Mindful Traveler can also fall victim to becoming “mainstream” and over-popularized. Thus, key components of mindful travel are an existing community that is resilient against the pressures of tourism growth; a diversity of experiences for travelers and residents alike; and proactive management from within the tourism industry.

Table 4 describes a selection of characteristics of the Mindful Traveler brand audience and explores each the associated considerations and outcomes:

Table 4. Mindful Traveler Brand Characteristics, Considerations and Outcomes

Characteristic of Mindful Traveler (MT) Brand	Considerations	Outcomes
Living Like a Local	- MTs are independent and self-sufficient - MTs seek non-traditional forms of accommodation (like AirBnb) and supporting services.	- More seamless integration of tourism into the community - Increased customer base for services that would benefit both visitors and locals
Learning about Culture/Heritage	- The unique experiences of a destination are often more important than the amenities for the MT. - MTs come with existing respect for cultural norms. - Cultural and heritage-based amenities run the risk of becoming over-popularized and inauthentic.	- A less dominating mass tourism industry leaves room for the celebration of culture and history through smaller-scale experiences. - A more robust sense of place within the community makes cultural assets more resilient against “overtourism.”
Connecting to the Land	- MTs seek out local cuisine not only for taste but based on where it came from and who made it. - Both the products and the process are important to the MT. - Small-scale culinary or agricultural operations may feel pressured to increase their capacity to support an increased interest.	- Opportunity for cuisine and agritourism based opportunities (explored in the following sections of this report).
Travelling Sustainably	- MTs often aim to reduce their footprint when traveling by choosing low-impact methods of transportation and lodging that promotes environmentally friendly practices. - Traveling decisions are more reflective of principles than they are of cost, amenities, etc.	- The current composition of businesses, lodging options, and transportation options would shift towards offerings that promote a shared goal of sustainability, such as eco-lodges or increased public and multi-modal transportation options.

Characteristic of Mindful Traveler (MT) Brand	Considerations	Outcomes
Taking the Path Less Traveled	- For MTs, the journey is equally as important as the destination, especially if it provides a “behind the scenes” glimpse at an area.	- Opportunity for tourism promotion to expand beyond the destination to include the unique routes and experiences a traveler can experience along the way that may be lesser known to the conventional traveler.
Relaxing Through Adventure	- Relaxation for an MT can be an active experience that manifests in the form of getting outside and connecting with nature.	- Opportunities to expand relaxation opportunities from the beach to the surrounding natural environment.

Strategy 4: Incentivize Sustainability through Economic Diversification

Sustainable tourism promotes place-based tourism that encourages small business entrepreneurship, benefits for locals, and economic resilience in a fickle industry. Small, locally run businesses make sure that funds are staying in the community, and also create jobs. Residents in the community should not feel like an outsider in their own Village. While tourism has created a number of jobs in Nea Kydonia, tourism relies on many factors that are outside the control of business owners (e.g., when the global economy is strong, the tourism economy in Chania is strong; when the global economy is weak, the tourism economy in Chania is weak). Making sure that the local economy is diverse helps to ensure that Nea Kydonia can weather a financial decline.

Alternative Tourism

Many mindful travelers are interested in alternative tourism or “alt tourism.” Alternative tourism includes ventures and locations that divert from traditional sightseeing and focus on minimizing the environmental impact one has when they travel. These ventures can include agro-tourism which can include tours and assistance with working farms, or eco-tourism where visitors actively contribute to sustainability and conservational efforts of a region.

Alternative tourism can help reduce the overall strain created by tourists on the environment in Chania and on Crete. In the 2008 report from the United Nations Environment Programme (UNEP) entitled *Climate Change Adaptation and Mitigation in the Tourism Sector: Frameworks, Tools and Practices*, it is noted that the Mediterranean is specifically at risk for extensive warmer summers, water scarcity, land and marine biodiversity loss, and an increase in disease outbreaks due to climate change. Furthermore, the report predicts that if a “business as usual” carbon emissions model based on anticipated growth in the tourism sector is continued, by 2035 CO₂ emissions from the tourism sector will increase 152% due to an increase in aviation activity and passenger miles traveled (2008).

While adapting the large resorts and hotels in the area to partake in sustainable practices make take decades (UNEP, 2008), promoting and expanding alternative and sustainable tourism opportunities in the region for individual tourists may be the ideal path forward to mitigate the growing impact of tourism emissions. ENKA can reach out to potential sites they identify that could host an activity or an individual who can guide mindful tourists. However, growth in this sector must also consider the impacts that tourists in this area can have and balance the classic mass tourism experiences with these new markets. EU funding from the Sustainable Tourism Programme may be available to Chania to implement effective strategies.

In general, it is recommended that Chania take a proactive approach to alternative tourism opportunities. Comprehensive land use and zoning regulations surrounding alt-tourism destinations, as well as greater advertisement on existing alt-tourism ventures will help to boost effectiveness and awareness. Below are several case studies that focus on sustainable tourism development in rural towns. Chania must decide which strategies and procedure to implement based on financial and resource constraints.

Case Study: Sumatra, Indonesia (Thompson & Christophersen, 2008)

The village of Buki Lawag in North Sumatra became an active ecotourism destination after the construction of an orangutan rehabilitation center. Since its completion, the center experienced rapid increases in tourist activity, and averaged more than 8000 visitors over the weekends in 1997. The rapid increase in eco-tourists resulted in the over-use of trail systems in the area, noise, and unsustainable development activities that reduced the forest area surrounding the center. Orangutans were no longer able to be successfully re-introduced into the area, and eventually the center was closed.

Lessons learned from this case are that comprehensive land use and zoning regulations, as well as a concrete outline of local responsibilities for development and conservation, are needed to make any alternative tourism truly effective. While the center in Sumatra was highly successful commercially, the original purpose of the center was overshadowed by the desire of tourists and developers to find accommodations closer to the area. Effective public transportation or shuttle service may have prevented the decline of the region as well by limiting the number of visitors per day and reducing the need for private automobiles to these destinations.

Key Ideas:

- Ensure Land Use and Zoning regulations protect alt-tourism destinations
- Provide effective public transportation or shuttles to alt-tourism destinations

Case Study: State of Indiana, U.S.A. (Indiana State Department of Agriculture, n.d)

The U.S. state of Indiana recognized the benefits of agro-tourism as a means to entice local farmers to stay in the agriculture market while supplementing their annual income. In order to promote agro-tourism, the state enacted legislation that limits the liability that may arise from the "inherent risks of agritourism activities," protecting agro-tourism providers from legal retaliation should a participant injure themselves. Indiana also developed a framework to inform local municipalities on best practices in expanding and implementing agro-tourism opportunities. This framework includes having farmers, planners, interested citizens and elected officials work together to make agro-tourism development a part of comprehensive planning efforts, including develop plans and implementation tools such as zoning and permitting. Indiana also lays out strategies for increasing participation from the agricultural community including: engaging local farmers early in the planning process, holding focus groups and meetings at times and location convenient for farmers, establishing an agricultural advisory committee, identifying key farm leaders, and advising farmers on how to most effectively engage in the planning process.

Indiana identifies the need to preserve the rural character of agro-tourism locations and recommends comprehensive zoning ordinances as the primary implementation tool to achieve this goal. It is further recommended that in order to receive a permit for agro-tourism activities, the operation must be part of an existing and working farm, be directly supportive of the agricultural use of the property, and not significantly impact the agricultural viability or rural character of neighboring properties.

Key Ideas:

- Involve farmers and agro-tourism providers early in planning processes
- Implement comprehensive zoning and permitting regulations
- Educate and advise agro-tourism operators
- Provide legal protections for agro-tourism operators

Case Study: Italy (italyexplained.com, n.d)

In an effort to revitalize rural areas and keep farmers on their land following the mass exodus to the cities that began after World War II, Italy passed a law establishing government incentives for agro-tourism in 1985. The law grants financial assistance to those who convert part of their property into an agro-tourism venture, and regulates the required amount of food that must come from the farm for guests and how many days a year a property may host guests.

Key Ideas:

- Provide government support for agro-tourism ventures
- Establish agro-tourism operator regulations

Case Study: Caribbean Turtle Tourism (Nahill, 2012)

In several Caribbean nations and U.S. states including the Dominican Republic and Florida, conservational and volunteer tourism centered around the protection of sea turtles has found great success. As Chania's beaches are nesting grounds for the loggerhead sea turtle, similar tourism efforts may find success in the area. However, tourism for turtles must be strictly regulated and controlled to avoid harm to the turtles themselves. An analysis by Bill Nahill of the turtle conservation organization SWOT (2012) details the best practices for encouraging turtle tourism, which includes: strategic partnerships with conservation entities, advertisement to individual and adventure tourists instead of mass tourism markets, and setting strong and enforceable guidelines for tourists visiting turtle areas. The municipality can further assist conservation efforts by setting up restrictive zones that limit tourist access, and being more actively involved in efforts.

Key Ideas:

- Form strategic partnerships with regional and international conservation entities
- Advertise to appropriate audiences
- Set strong guidelines
- Actively engage in conservation efforts

Sustainable Businesses Practices

Chania has the potential to mitigate and adapt to changing climate conditions through zoning and policy development specifically targeted at environmental sustainability. Below are several case studies from locations around the globe that have implemented such strategies. Chania must determine which policies would be the most successful given resource and financial constraints. Chania must also engage the resorts and hotels in the area to educate them on the dangers of climate change to their business and encourage active participation in adaptation and mitigation programs.

Case Study: Tobago and Fiji (UNEP, 2008)

The islands of Tobago and Fiji, located in the Caribbean and South Pacific Ocean, respectively, recognized the danger of water shortages for accommodation providers (hotels, resorts, B&B's) due to extended drought conditions. At the resort level, small-scale infrastructure improvements such as rainwater collectors, increased storage tank capacity, and conversion of toilets to utilize saltwater were implemented, in addition to revising landscaping practices and limiting the construction of pools. At a higher level, sustainability planning, water source management, and using recycled water for irrigation are examples of sustainable practices in these resort areas.

In the case of Tobago and Fiji, individual hotels and tour operators took the lead on the development of sustainable procedures and in many cases self-financed these improvements. In the study area, Chania could encourage similar improvements possibly through reductions of local fees or taxes for each piece of green infrastructure or conservation equipment constructed.

Key Ideas:

- Limit construction of pools
- Increase storage capacity of freshwater
- Convert toilets to use saltwater
- Use recycled water for irrigation

Case Study: Fiji (UNEP, 2008)

In addition to water shortages, Fiji also faced threats from shoreline erosion. To combat this, resorts are now built at a minimum of 2.6 meters above mean sea level, and 30 meters away from the high tide mark. This policy came about from the structural damage caused by increasing storm events in the South Pacific. While Chania does not experience the same recurring destructive storm events as Fiji, the flooding in February of 2019 proves that the region is not immune to the effects of climate change and that calamitous events could occur in the near future.

While existing resorts would most likely be unable to move any infrastructure away from their current locations, increased setbacks for new developments would assist in the prevention of coastal erosion and allow larger parcels of beach to be dedicated to public consumption and conservation.

Key Ideas:

- Require greater setbacks from the beachfront in future development

SUSTAINABLE TOURISM ELEMENT 2: TRANSPORTATION

Goals for Connectivity and Access

The following section provides infrastructure, policy and program recommendations for improved connectivity and access within the study area and beyond. The team developed six goals for improving connectivity and access through the area, developed from an analysis of the existing conditions and discussions with the Municipality and local business owners.



Proposed Transportation Strategies

To achieve the access and connectivity goals for the study area, we propose the following four strategies, each of which is elaborated upon below:

Strategy 1: Improve regional connectivity

Strategy 2: Improve the pedestrian environment along the Old National Road

Strategy 3: Manage parking

Strategy 4: Increase transit use

Strategy 1: Improve Regional Connectivity

One of the main complaints regarding the study area is traffic congestion on the Old National Road. Traffic pollution and noise is a concern for business owners along the Old National Road because it reduces the likelihood of restaurant patrons willing to sit outdoors near the road and creates an undesirable atmosphere for strolling and shopping. Reducing through-traffic between Chania and areas west of the study area will create a less noisy environment for sidewalk cafes and lower risks to pedestrians.

To understand local congestion, connectivity must be reviewed at a regional scale. Per the existing conditions analysis, the two main arteries in Nea Kydonia are the New National Road (VOAK) to the south and the Old National Road to the north, with few connections between them. The General Urban Plan designated the roadways shown in red as main highways (Daskalakis et al., 2014). The nearest expressway entrance is southwest of the study area. The next closest is 6.7 km to the west (Figure 54).

Figure 54. Map of existing regional connections



Graphic Credit: Shelley McMullen

Inefficient access to the expressway adds to local congestion to the Old National Road. Three alternatives are proposed for improving access to the New National Road. Feasibility studies for each of these alternatives should be performed to determine the most efficient solution.

Alternative Regional Connection 1

The simplest option is to provide a connection (shown in pink in Figure 55) between the two central main roads in Kato Stalos (shown in red). This simple and least expensive option would provide an alternate route for locals to avoid the Old National Road. The major drawback of this option is that it is a longer route for regional traffic and would do little to decrease through-traffic.

Figure 55. Alternative regional connection 1*Graphic Credit: Shelley McMullen*

Alternative Regional Connection 2

A second option is to provide a frontage road along the New National Road from the center of the study area to the exit to the east (shown in lavender in Figure 56). The benefits of this option provide a direct alternative route for local residents of the area to the New National Road. This option would be more costly than Alternative 1 and would require a significant length of property acquisition adjacent to the expressway. Deeper study into the topography and existing properties would be required determine the feasibility due to the steep grades in the area.

Figure 55. Alternative regional connection 2*Graphic Credit: Shelley McMullen*

Alternative Regional Connection 3

A third option would be a direct entrance or exit to the Old National Road in the Stalos Area (proposed location shown as the orange circle in Figure 57). While potentially the most expensive option and requiring the most coordination with the national agency responsible for the New National Road, this alternative provides a direct connection to the expressway for local residents and would encourage a faster route for traffic traveling to and from Chania. This option also emphasizes that regional strategies must coordinate with local treatments for a cohesive approach to improving connectivity throughout Nea Kydonia.

Figure 56. Alternative regional connection 3

Graphic Credit: Shelley McMullen

Strategy 2: Improve the Pedestrian Environment along the Old National Road

The stretch of the Old National Road through the study area is approximately 3.7 km. It serves as the main spine for pedestrians and vehicles in the Village but is centered around vehicle travel. Altering the design to consider people over cars will create a better environment for local residents, business owners, and tourists. Several treatments are recommended to encourage pedestrian activity and safety.

Lower and Enforce the Speed Limit

A policy change to slow traffic to 40 km per hour through the study area would increase safety for pedestrians and reduce traffic noise along the Old National Road. The current default speed limit for urban areas is 50 mph. Vehicles appear to travel at much higher speeds through the area. The following graphic illustrates that lower speed limits save lives. At the current speed limit of 50 km/hr, statistically speaking, only half of pedestrians survive if struck by a vehicle (Figure 58).

Figure 57. Pedestrian survival rates versus vehicle speed



Source: Bike Hub <https://bikehub.ca/>

In addition to a reduction in speed, limits should be posted and enforced with fines to encourage compliance. Slower speeds may also decrease congestion by encouraging through-traffic to take alternate routes.

Improve Pedestrian Crossings

There are only two signalized crossings along the nearly 4 km length of the Old National Road in the study area. Figure 59 illustrates the only existing signalized crossings in gray. Pedestrian crossings should be provided near each existing transit stop. This provides safe crossings for transit users and also provides a very walkable average distance of approximately 0.4 km between crossings. The proposed crosswalk locations are shown in yellow in Figure 59.

Figure 58. Crosswalk locations along the Old National Road

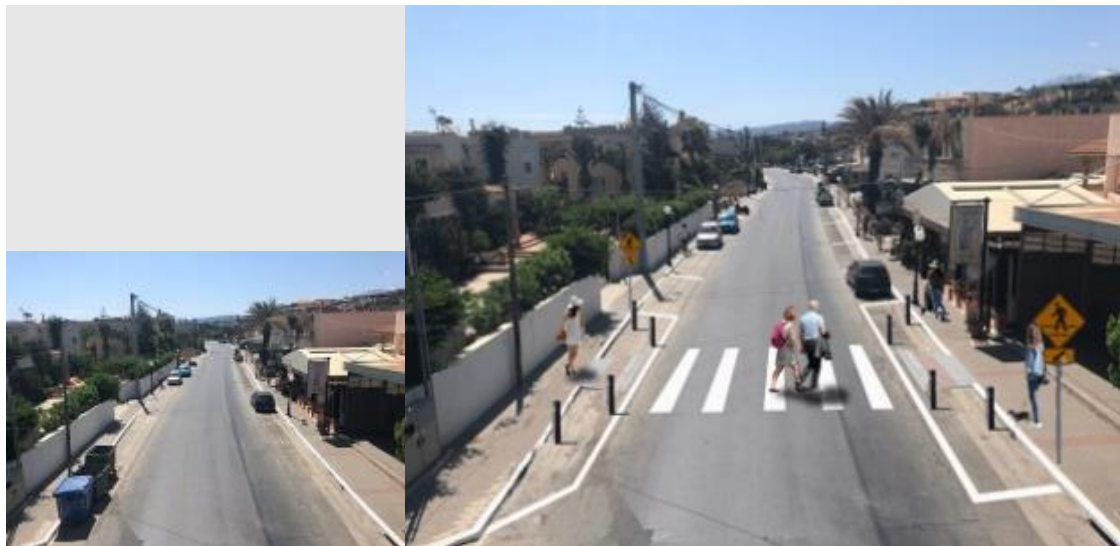


Graphic Credit: Shelley McMullen

Figure 61 is a rendering of a crossing improvement without requiring a signal. This illustrates infrastructure that is easier to implement than formal signalized crossings. Bollards and curb extensions provide better sight lines for pedestrians and signs warn vehicles to yield to pedestrians.

Figure 59. (Left) Existing Old National Road

Figure 60. (Right) Proposed crossing treatments at transit stops



Graphic Credit: Shelley McMullen

Additional traffic calming and pedestrian safety solutions include rapid flashing beacons that warn traffic of pedestrians using the crosswalk, raised crosswalks that increase visibility of pedestrians to vehicles in the crosswalk and force vehicles to slow their speed, and permanent curb extensions that reduce crossing distance and increase visibility of vehicles for pedestrians. Examples of each are shown in Figures 62-64 below.

Figure 61. Rapid flashing beacon



Figure 62. Raised crosswalk



Figure 63. Curb extension



Source: National Association of City Transportation Officials <https://nacto.org/publication/urban-street-design-guide/intersection-design-elements/>

Crossing treatment options vary in expense and feasibility for retrofitting to existing roadways. Least expensive and short-term alternatives include pavement markings and crosswalk warning signs. Mid-term improvements include the installation of bollards and handicap accessible curb

ramps. Long-term and more costly improvements include permanent curb extensions, raised intersections and rapid flashing beacons.

Widen Insufficient Walkways

The next infrastructure recommendation is to address areas of narrow walkways in the study area. Obstacles such as streetlamps and utility poles add to the problem, forcing pedestrians into the street. This is a particularly difficult hardship for families with strollers and people who require the use of a wheelchair. An inexpensive short-term solution would be to install small bollards and delineate pedestrian areas with paint within the roadway where narrow conditions exist. The rendering in Figure 66 shows an example of a widened walkway that does not require changes to the curb.

Figure 64. (Left) Existing sidewalk on Old National Road with obstacles

Figure 65. (Right) Proposed widening



Alan Berry, Kenna Davis, Emily Gluckin, Alex Hemmer, Shelley McMullen, Katherine Stefani, Amber Tucker, Annelies Van Vonno, Brittany Vigil (students); Carrie Makarewicz Ph.D., Korkut Onaran Ph.D., Jennifer Steffel Johnson, Ph.D. (instructors)

Graphic Credit: Shelley McMullen

Long-term improvements include widening of narrow sidewalks, relocating utility poles out of walkways and installing accessible curb ramps at every corner and driveway.

Enforce Sidewalk Encroachment Violations

A policy recommendation to increase the pedestrian walkway is to enforce sidewalk encroachment violations by adjacent property owners that result from lack of landscape maintenance, merchandise or signs on the walkway. Figure 67 shows photos of several locations in the study area where walkways are impeded by obstacles.

Figure 66. Sidewalk encroachment examples along Old National Road



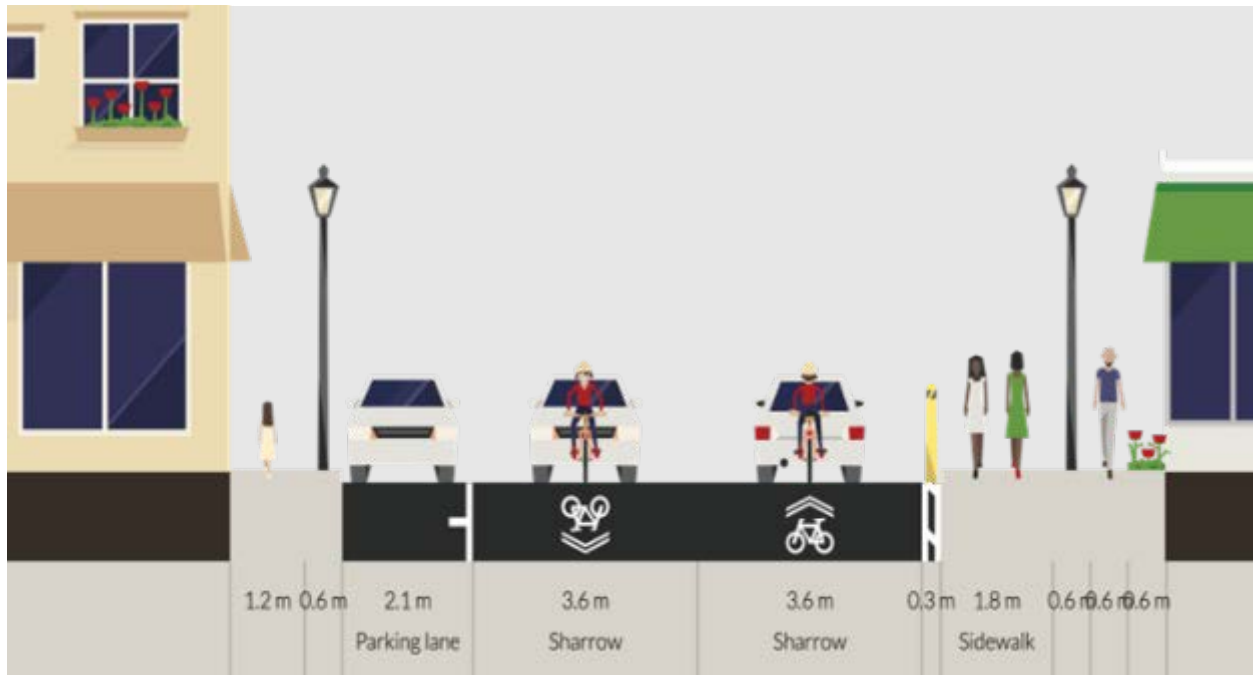
Photo credit: Shelley McMullen

Enforcement through fines would encourage compliance by adjacent property owners and provide a funding stream for enforcement labor, infrastructure improvements or ENKA.

Future Vision: Old National Road

The Old National Road in Stalos has typical width of approximately 15 meters between buildings. The cross-section in Figure 68 below illustrates the potential for adequate walkways without compromising road width. Parking along the north side of the street could be eliminated and bollards and pavement markings installed to delineate pedestrian walkways where sidewalks are too narrow.

Figure 67. Proposed future cross-section of Old National Road



Source: Representation of Old National Road created with Streetmix.net

Future Vision: Bicycle Infrastructure

In addition to providing delineation for pedestrians, pavement markings of “sharrows” can be used to indicate that vehicles and bicycles are to share lanes. This could encourage more use of bicycles along the Old National Road and slow vehicle speeds. Sharrows are shown in the cross section above.

We also recommend installation of bicycle racks at businesses and near public beach access along the Old National Road. Bicycle racks will increase the use of bicycles for visits to local businesses and the beach.

Future paths within the proposed greenway along the existing drainageways (detailed below in this report) may also provide additional north/south routes for bicycles. Current north/south routes are steep and may be difficult for many cyclists. The proposed paths in the greenway would likely be at a shallower grade than many of the existing roads.

Bicycle infrastructure not only encourages a more sustainable method of mobility, it could also provide an enjoyable ride along the coast for mindful tourists.

Strategy 3: Manage Parking

Parking supply and demand issues are common in cities throughout the world. However, effective parking management strategies have tremendous potential to help address some of the issues the study area is experiencing. Formalizing the parking rules and regulations in the study area is crucial to addressing the issues with curbside parking. Implementing our recommendations, outlined below, will require both policy implementation as well as physical changes to existing infrastructure.

First and foremost, the municipality must establish parking policy and regulations for the study area. This basic policy should include prohibiting parking in key locations, such as:

- Areas adjacent to bus stops
- Access points such as building entrances, alleys, and private driveways
- Loading zones for commercial vehicles such as delivery vehicles, trucks, taxis and other commercial passenger vehicles

Determining appropriate locations for parking prohibitions and restrictions will require working with business owners and local residents to determine the level of need and the most appropriate locations for these “No Parking” areas. The municipality should also consider whether to implement parking time limits, and if so, for how long and where.

After the city has decided what regulations are appropriate, changes to the existing infrastructure will be required to implement and communicate these changes. This will require painting physical parking spaces on the street, as well as indicating where parking is not allowed or where parking is restricted to specific user groups through painting the street and curbs. The rendering below shows what the Old National Road could look at if this recommendation were implemented. As demonstrated in Figure 69 below, individual parking spaces have been painted to indicate where parking is allowed, and curbs have been painted red to indicate areas where parking is prohibited.

Figure 68. Rendering depicting potential changes to the Old National Road



Photo credit: Annelies van Vonno; Graphic Credit: Shelley McMullen

The next step is to install signage to communicate regulations to residents, visitors from other areas in Crete, and tourists. A variety of signs should be used for different regulations, such as “No Parking,” “No Stopping or Standing,” “Loading Zone Only,” “Buses Only,” etc. Signs should include arrows to specify the direction to which the parking regulation applies. Given the high number of tourists in the area, consideration should be given to sign language and cross-cultural legibility. The City may want to consider bilingual signs. Figures 70-72 include examples of parking regulation signs found in Chania, as well as other communities in Greece.

Figure 69. Examples of parking regulation signs from Athens and Chania



Photo credit: Annelies van Vonno

Figure 70. (Left) Signs indicating handicap accessible parking in Chania

Figure 71. (Right) Signs indicating a hotel loading zone in Heraklion



Photo credit: Annelies van Vonno

The final step to implementing these new parking regulations is enforcement. This is crucial to ensuring that residents, visitors, and tourists comply with the new regulations. This is typically done by issuing parking violations and fines. These fines can then be used to fund further streetscaping and public realm improvements.

Strategy 4: Increase Transit Use

Transit has tremendous potential to help meet the goal of promoting the use of sustainable transportation options while also increasing mobility and regional connectivity and decreasing traffic congestion. While existing public transit options exist, they do not seem to be widely used by residents and employees. The existing transit system must be improved in order to attract more residents to use it.

To encourage more people to use transit, we have three recommendations for improvements. First, we propose increasing the frequency of the bus route during the busy summer months. This will make taking the bus quicker, more convenient, and will help to reduce the observed overcrowding problems. Next, the City should partner with local businesses to provide employee incentives to take transit and to educate both locals and tourists about the benefits of taking public transit.

Finally, bus stops should be improved in several ways. Currently, only 5 of the 10 bus stops in the study area have bus shelters, with all of these being located on the south side of the street. Most of the bus stops have little to no infrastructure or informational signage, making waiting for the bus an unpleasant and confusing experience.

Bus stops should include detailed information about bus routes and times, as well as information about the local area. Further, we recommend following the example of other cities around the world that have improved their bus stops through incorporating unique local materials and public art. The example images below show how bus stops can be creative and beautiful as well as functional. Improved bus stops make riding the bus more enjoyable, giving passengers a beautiful and enticing place to wait for their ride. Bus stops also provide an opportunity to educate people about the local history and culture of the community, as well as the local environment and sustainability practices (Figure 73).

Figure 72. Artistic bus stop designs:

(top row, left to right) Phoenix, Arizona, USA; Orlando, Florida, USA; North Adams, Massachusetts, USA. (bottom row, left to right) Arlington, Virginia, USA; West Hartford, Connecticut, USA; and Lexington, Kentucky, USA.



Sources: (top row from left) Photo from scotsdalepublicart.org; Image posted on Waymarking.com; Image posted on Waymarking.com. (bottom row from left) Photo from arlingtonpublicart.org; Photo from donnaflischer.wordpress.com; Photo from inhabitat.com.

SUSTAINABLE TOURISM ELEMENT 3: LAND DEVELOPMENT

Goals for Sustainable Land Development

The following goals apply to the sustainable land development alternatives that were conceptualized for the study area. These goals were created using the existing conditions analyses, stakeholder interviews, and intercept interviews with local residents in the study area.



Economic Resilience:

- Create new housing stock to provide for locals needs and increase year-round living within the study area.
- Develop a set of short-term rental policies to limit and control how the rental housing market affects local residents and provides the housing stock needed for the community.



Community Livability:

- Create gathering, recreational, and civic spaces for both local residents, Chania visitors, and tourists alike.
- Create year-round activation to provide for off-peak activity and services to locals.



Harmony with Nature:

- Create parks and open spaces that can be used by both locals and tourists that balance all the natural offerings of the area.
- Develop sustainable storm water practices to protect the natural water systems and stop erosion of the runoff water onto beaches and other public spaces.

Proposed Land Development Strategies

To achieve the goals of sustainable land development for the study area, we propose the following five strategies, each of which is elaborated upon below. These suggestions were developed through web-based research, interviews with important stakeholders, and investigation into the current conditions in the area.

Strategy 1: Involve ENKA in Land Development Policies and Efforts

Strategy 2: Develop additional infill housing

Strategy 3: Invest in public/open space

Strategy 4: Use green infrastructure for social and environmental improvements

Strategy 5: Institute appropriate short-term rental policies

Strategy 1: Involve ENKA in Land Development Policies and Efforts

For the Nea Kydonia area to stay resilient to economic, environmental and cultural shifts, the communities of Stalos and Agia Marina and the City of Chania need to establish processes for how to sustainably develop vacant land in the area. To establish and foster collaboration between the City of Chania, local residents, and business owners, the newly formed ENKA (Experience Nea Kydonia Alliance) would act as a Community Improvement District (CID) to further the area's goals of enhancing community livability, relieving housing market pressures in the Chania region, and creating year-round livability and economic activity in Nea Kydonia.

The creation of a Nea Kydonia tax district would fund development projects such as infill housing, public/open space, and green infrastructure, as well as foster public-private partnerships with the City and developers, businesses, and residents. ENKA would play a role in establishing policies on how to obtain and maintain public lands for these purposes, as well as finding other funding sources to further the organization's goals. Other potential tools for ENKA to use are community land banks/trusts, an affordable housing fund to which resorts must contribute per hotel room, and EU programs that promote affordable housing.

Next steps for ENKA include conducting analyses of vacant/open spaces and market research to establish potential sites for infill housing, public open space, and green infrastructure. Additionally, ENKA should conduct public outreach to identify further gaps and needs in the area, and to gather community input on potential sites, funding sources, and actual design of these spaces.

Strategy 2: Develop Additional Infill Housing

Although there are pockets of residential development in the study area, due to the saturation of Airbnbs and other short-term rentals, there is a lack of long-term rental units for use by local residents. Additionally, the housing shortage in the Chania city-center is exacerbating the demand for housing in nearby areas. In order for the Nea Kydonia area to maintain existing housing stock for residents and foster growth of the year-round economy, infill housing needs to be developed in the area.

There is a decent amount of vacant lands throughout the study area that could be better utilized through the development of low-density, multi-family residences. These residences could enable Greek households to rent an affordably priced unit in Stalos and/or Agia Marina, as well as establish a year-round community beyond the tourist accommodations that currently occupy the study area. Figure 40 shows the existing vacant lands in the area. ENKA would be responsible for furthering this research on available and underutilized lands, as well as working and engaging with the City of Chania, stakeholders, and the community to create methods to obtain and develop this land for local housing.

Strategy 3: Invest in Public/Open Space

In order to create a more year-round community, enhance the area's livability, and create more stable economic resiliency there needs to be an investment in public and open space in Stalos and

Agia Marina. Through existing conditions research and analysis of the study area, it became clear that the study area is lacking places for the community to gather. This includes, plazas, parks, and civic facilities such as libraries, post offices, community centers, children's learning centers and museums, etc. The General Urban Plan for the Nea Kydonia area explains that this area was developed in the 1980s and 1990s without any formal planning and for specific touristic uses (Daskalakis et al., 2014). Some of the only existing civic uses are the Folklore Museum and a few churches in Agia Marina, one church in Kato Stalos and one in Pano Stalos. By incorporating these services and/or amenities, the Stalos and Agia Marina communities could find a place in which to convene, unite, relax, and spend quality time with one another.

Public/open space would be obtained and maintained by ENKA, who would establish policies and methods to secure and develop lands in Stalos and Agia Marina. Figure 40 (above) outlines the vacant and underutilized lands in the study area. Along with identifying sites for infill housing, ENKA would also need to conduct a site analysis of where potential public spaces could be developed. ENKA would also be in charge of facilitating public engagement and involvement with these processes, as well as securing funding sources to obtain and maintain these sites.

Strategy 4: Use Green Infrastructure for Social and Environmental Improvements

Green infrastructure provides critical ecosystem goods and services to urban areas. Green infrastructure has the capacity to mitigate flood risk in urban areas if applied at a regional level. As more people move into the study area, it is often those people least able to respond to disaster, such as floods, who are the most vulnerable. A consequence of the expanding urban area has been the rampant interruption of natural flooding processes because of vegetation removal, widespread paving, reduction of natural water storage capacity, and the diversion or disruption of flow paths (Lennon et al., 2014). The negative effects of these consequences have the capacity to affect tourism as well.

A transformative approach to flood risk management requires moving beyond a focus of defense or accommodation and calls for a reassessment of the built and non-built components of urban environments. As a design philosophy, the transformative approach involves biomimicry and working *with* water rather than avoiding it. No longer can the urban environment be treated separate from natural systems; it needs to be seen as a watershed at the village level, and within a larger watershed at the regional level.

Going further, a transformation approach requires full collaboration in interdisciplinary partnerships. It is essential that both traditional participants in flood risk management (e.g., engineers, architects, urban designers, emergency planners and landscape architects) and non-traditional participants (e.g., ecologists, recreation and transport planners, business owners) work together towards an evolutionary response. The result of that collaboration has emerged as the discipline known as "green infrastructure" (Lennon et al., 2014).

The United States Environmental Protection Agency (U.S. EPA) defines green infrastructure as small-scale green systems designed to be urban stormwater management infrastructure (Green, 2013). Another definition sees green infrastructure as "an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions. . . and provides a wide array of benefits for people and wildlife" (Benedict & McMahon, 2006). Further, "these benefits derive from the multiple and overlapping functions provided across different systems—hydrology,

transportation, energy, economy, and so on—that can intersect in green infrastructure” (Rouse & Bunster-Ossa, 2013). Green infrastructure has the capacity to benefit not just temporary stormwater management, but also to provide recreational and ecological uses.

The varying components of green infrastructure can work together to create an integrated landscape, in which ecology, public health, infrastructure, and recreation merge. The urban landscape functions of stormwater management and air and water pollutant removal can occur alongside the benefits of functional, recreational, and ecological uses. Professionals involved in these issues need to apply multidisciplinary and interdisciplinary approaches in their projects. For instance, landscaping companies or maintenance crews that work with the hotels in the study area should work with environmental planning firms to design the water flow from their properties to ensure the hotels run-off does not flow untreated into the sea.

A criticism of green infrastructure planning is that in urban areas decision makers often focus on open space improvements that will not interfere with other more productive land uses, although these other uses need green infrastructure elements to negate their environmental effects. Another consideration is that green infrastructure that is only focused on stormwater absorption leads to unevenly distributed benefits of environmental services. A more comprehensive focus on green infrastructure in which stormwater absorption, local climate regulation, carbon storage, air pollution removal, and recreational potential are all weighed equally leads to a better distribution of environmental service benefits.

Case Study : Shepherd Creek Cincinnati, Ohio, United States

Three floods in rapid succession in Cincinnati, Ohio around the turn of the 21st century led to calls from the public for an engineered solution to both the quantity and quality of runoff water. The city's existing stormwater infrastructure was outdated and consisted of combined sewer outflows, which during significant rain events discharged sewage into the Ohio River watershed. The U.S. Army Corps of Engineers suggested diverting water using a 16-mile, 30-foot wide tunnel at an estimated cost of \$800M.

A local team sought an alternative to this centralized and expensive defensive engineering. The small-scale, local solution tested by the study team was a distributed system focused on citizen buy-in and removing incoming runoff before it reached existing stormwater infrastructure through the use of rain barrels and rain gardens (Figure 74). Specifically, "the project goal was to understand whether voluntary incentives were effective at distributing stormwater management throughout a small suburban catchment, and whether the number and placement of rain gardens and barrels were sufficient to alter the hydrology, water quality, and aquatic biology of the catchment" (Mayer et al., 2012). Property owner participation was invited through two auction events held in 2007 and 2008. A total of 83 rain gardens and 176 rain barrels were installed onto more than 30% of the 350 eligible residential properties in the Shepherd Creek catchment.

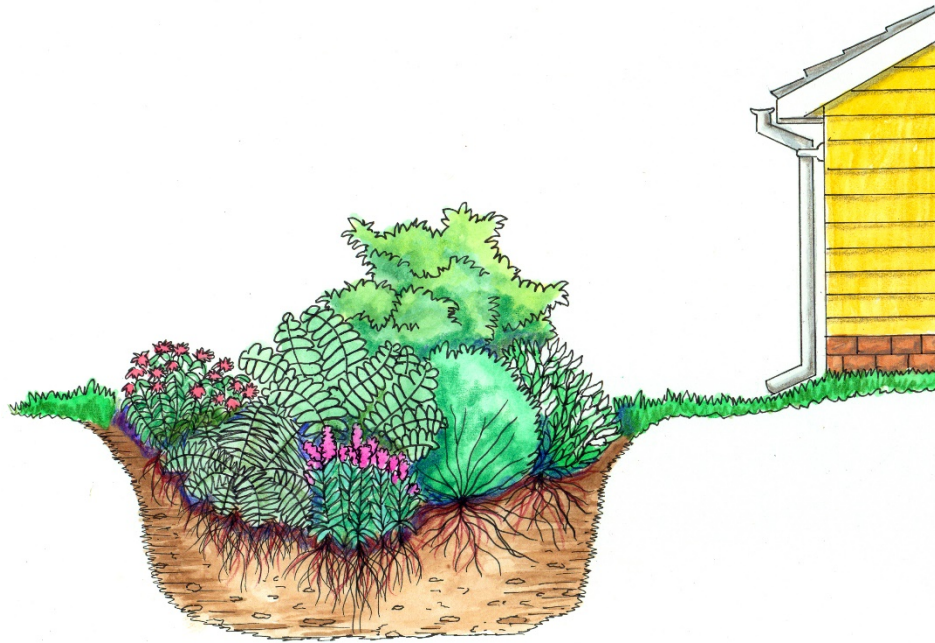
Reviewing the outcomes of this effort, the team found that "These practices were relatively easy to implement, aesthetically pleasing, and effective both in the disconnection of impervious area that is otherwise directly connected to sewers and in the detention of stormwater runoff" (Mayer et al., 2012). The end result was a small but significant reduction in runoff water quantity. Water quality also improved in the study area, but this effect was limited by the larger amount of water coming off road surfaces into existing stormwater infrastructure.

The efficacy of small-scale distributed systems is limited on the local level, but a larger watershed-level program could benefit from greater catchment and diversion from existing stormwater infrastructure. The practice of using voluntary economic incentives to encourage private citizens to install rain gardens and rain barrels was effective in diverting and distributing the stormwater runoff throughout a small catchment area.

Key Ideas:

- Small-scale (parcel-level) distributed stormwater management systems are effective, but may require incentives for home/landowners to install them
- Decentralized stormwater management can be a cost-effective component of a larger stormwater management system
- Voluntary stormwater management incentives can be effective
- The overall impact of small-scale/parcel-level programs are limited without larger efforts by the governing body at the watershed level

Figure 73. Rain garden diagram



Source: <https://landscapeforlife.org/water/create-a-rain-garden>

Case Study: Portland, Oregon, United States

Before 1990, the city of Portland averaged around 100 combined sewer overflows annually. In response, the city is constructing large tunnels to catch and redirect combined sewage overflows for treatment. In combination with the high-cost deep tunnel project, in 1991 the city began implementing a 20-year Combined Sewer Overflow Abatement Plan, which has focused on a green infrastructure approach to alleviate the stormwater burden on the combined sewers and reduce combined sewer outflow impacts on urban watersheds. Portland is using decentralized solutions such as green streets, green roofs, rain gardens, swales, planters, and disconnected downspouts to keep as much stormwater as possible out of the sewer system, slow urban runoff, and enhance local biodiversity (Hoyer, Dickhaut, Kronawitter, & Weber, 2011). In 2002, the City received a \$2.6 million grant from the U.S. EPA that has funded over 25 innovative public and private projects throughout the city to serve as demonstration projects showing sustainable stormwater management solutions. The City monitors and calculates the amount of stormwater managed by each type of facility and implements public decentralized measures when appropriate. The City also encourages private owners to manage stormwater on their own properties by providing information and financial support.

After the 20-year combined sewer outflow abatement program, the City of Portland now averages only four overflows each winter and one every third summer. A reduction of over 2.1 billion gallons of stormwater was achieved through the numerous small-scale green infrastructure measures. Decentralized stormwater initiatives provided over 56,000 downspout disconnections and 2,800 infiltration sumps and sedimentation manholes, which have helped reactivate the local hydrological cycle. The program has been a success and is seen as an exemplar for decentralized small-scale green infrastructure implementation (Hoyer et al., 2011).

Key Ideas:

- Small-scale distributed stormwater management systems are effective
- Decentralized stormwater management can be cost effective
- Funding from the national government can aid projects that are cost-prohibitive at the local level

Green Infrastructure Policy Proposals for Nea Kydonia

Cities around the world have embraced green infrastructure in a myriad of ways. From small-scale local projects such as downspout disconnects and rain gardens, to large regional initiatives such as blue and greenway systems, green infrastructure is the nexus in which ecology, public health, infrastructure, and recreation merge. In the Nea Kydonia area, there are opportunities to redefine the role of stormwater management infrastructure to provide environmental and recreational benefits.

Many of the smaller channels in the study area are full of trash and poorly maintained (Figure 75). Reducing upstream stormwater discharge with rain barrel disconnects and rain gardens will slow the downstream flow. This will also slow the travel of debris and trash through the channels, preventing

it from reaching the coast. Stormwater infrastructure improvements can be an opportunity to increase garbage collection in the study area (Figure 76).

Figure 74. Many of the channels in the study area are full of trash and poorly maintained



Photo credit: Alex Hemmer

Figure 75. *A possible solution for garbage exiting stormwater outflows from Australia*



Photo credit: Alex Hemmer

As capital funds become available to rehabilitate the existing deteriorated infrastructure, efforts should be made to implement best practices, such as dispersed upstream stormwater management (similar to the Shepherd Creek case study, described above).

Implementing green infrastructure elements into the redesign of the larger public channels could reduce the speed of flowing water, allowing infiltration into groundwater, reduced silt and trash movement to the beaches, and the addition of valuable green space in the study area. These larger channels could also be redesigned to act as attractive green corridors that help facilitate vertical movement from the beach into the hillside residences, rental villas, and hotels. The crossing points of these greenways under the Old National Road could also be transformed into gateways for the public to access the beaches without having to cross the road. These could incorporate green landscaping design as well as public art works, such as murals or sculpture, that would make the area attractive to both residents and tourists.

Erosion at popular beach entrances in Kato Stalos makes them unattractive to users. Debris and trash accumulate along the beach because of the stormwater outflows (Figure 77). Increasing stormwater absorption upstream through small-scale distributed systems (such as those mentioned in the Shepherd Creek case study) could allow the creation of more attractive beach access points and a better user experience. Specifically, the channel managers, nearby landowners, hoteliers, and the Municipality of Chania could identify places where damage from erosion could be remediated with the reintroduction of native plants such as the Cretan Date Palm (*Phoenix theophrasti*; Figure 78). These plants would also provide the added benefit of providing shade for beachgoers.

Figure 76. Beachfront erosion*Photo credit: Alex Hemmer**Figure 77. Cretan Date Palm (Phoenix theophrasti)**Source: Wikipedia.org*

Strategy 5: Institute Appropriate Short-term Rental Policies

During the team's initial meeting with the Municipality of Chania in June of 2019, short-term rentals were identified as source of pressure on local long-term housing availability and affordability. The goal of this section is to provide tools for the municipality to craft regulations that will address the specific issues stemming from short-term rentals.

Current Greek national policy requires that Airbnb rentals register online with the Independent Authority of Public Revenue and after 90 days of operation are subject to taxation. The Greek

government recently announced that it is looking to give municipalities more authority to address short-term rental issues at the local level (GTP Editing Team, 2019). If/when this happens, these recommendations will help Chania be prepared to develop and implement policy as soon as possible.

As mentioned before, there are both benefits and drawbacks of Airbnb rentals. Therefore, it is recommended that additional research, perhaps in partnership with a local university, be conducted to get a more comprehensive understanding of the existing conditions and opinions on the subject in the local area, identify the underlying issues, and create regulations specific to the Chania region. Further, we strongly recommend that any regulations for Airbnbs and other short-term rentals be developed with the continual engagement of stakeholders such as the Experience Nea Kydonia Alliance.

The approach for this project was to identify issues that stem from short-term rentals in other places and compile a variety of regulations used to address them, thereby giving Chania a range of policy options to consider and tailor to the specific needs of the region. Table 5 below details common issues with short-term rentals, corresponding options for regulation, a global example of the regulation, and the sources at which further information can be found.

Table 5. Short-Term Rental Issues and Solutions

Issue	Potential Solution	Global Example	Source
Whole home rentals may impact long-term housing availability	Require permission from Planning Department before a home listing can be operational	<i>Ireland:</i> Planning permission is required to rent a home owner's primary residence for more than 90 cumulative days a year. Permission is also required if a home owner wishes to rent their secondary residence in a rent pressure zone (areas experiencing the highest increase in rent prices and lack of affordable housing) as a short-term rental.	Ireland's Department of Housing, Planning and Local Government website
	Distinguish between whole-house rental and room rental regulations	<i>Amsterdam:</i> Municipality must be notified of whole-house rentals, but owners of homes who rent out a room are subject to the rules of B&Bs. There is no night limit for this type of rental. Other conditions apply: maximum of 40% of	Municipality of Amsterdam Bed & Breakfast webpage

Issue	Potential Solution	Global Example	Source
		the total area of the home, 4 people maximum, no independent entrance or facilities (kitchen, toilet, etc.) or the space is considered independent and subject to different regulations.	
		<i>Ireland:</i> Home sharing (renting a room or rooms in a principal residence) is allowed on an unrestricted basis and is not subject to the same planning requirements as whole-home rentals.	Ireland's Department of Housing, Planning and Local Government website
	Restrict the number of nights a whole home may be rented per year	<i>Amsterdam:</i> As of January 1, 2019, short-term rentals can only be rented for 30 days per year and you must report to the Municipality.	Municipality of Amsterdam website
		<i>Venice, Florida:</i> Short-term rentals can only be rented for less than 30 days three times per calendar year.	Gottlieb, 2013
		<i>Ireland:</i> Short-term rentals (entire homes/apartments and part of a home/apartment) may only be rented for a maximum of 14 days at a time for no more than 90 cumulative days per year in “rent pressure zones” (areas experiencing the highest increase in rent prices and lack of affordable housing).	Ireland's Department of Housing, Planning and Local Government website
	Hosts must be the main occupant of the house and live there	<i>Amsterdam:</i> Home owner renting the unit must be the main occupant of the home and also live there (and are therefore registered in the Municipal Personal Records Database	Municipality of Amsterdam Bed & Breakfast webpage

Issue	Potential Solution	Global Example	Source
		(BRP) of the municipality of Amsterdam).	
		<i>Santa Monica, California:</i> A home owner may rent their home for 30 consecutive days or less while primary resident lives on-site. The property is considered a vacation rental if a person rents the property for 30 consecutive days or less and the primary owner is not present; this use is prohibited.	City of Santa Monica Planning and Community Development website
	Restrict the number of properties a host may rent	<i>San Francisco, California:</i> Hosts may only rent out the primary residence in which they live a <u>minimum</u> of 275 nights per year.	City of San Francisco Business Portal - Short-Term Residential Rental webpage
Changes in character and loss of cohesion in Villages	Acknowledge impacts of short-term rentals and craft regulations that attempt to mitigate these impacts	<i>Venice, Florida:</i> City specifically states the intent of their regulations is to “prevent the use of single-family residence for transient purposes in order to preserve the residential character of single-family Villages.”	Gottlieb, 2013
	Occupancy limits restricting the number of people not associated with the established community	<i>Palms, South Carolina:</i> Requires a limit of two people per bed, plus an additional two people per night.	Gottlieb, 2013
		<i>Sonoma County, California:</i> County bases occupancy limits on the load capacity of a property’s septic system.	Gottlieb, 2013
		<i>Amsterdam:</i> Maximum of 4 guests per rental.	Municipality of Amsterdam Bed & Breakfast webpage
	Educate guests about appropriate and acceptable behavior in the Village	<i>St. Helena, California:</i> House policies must be signed by renters before occupation of the space. Minimum	Gottlieb, 2013

Issue	Potential Solution	Global Example	Source
		requirements: 1. Quiet hours from 10 pm to 7 am, 2. No excessive noise, 3. No overnight street parking, 4. No group gathers over twice the size of the number of quests.	
Reduced quality of life for residents (noise, trash, parking, reduce sense of security/safety)	Promotion of voluntary projects/outreach to strengthen relations with neighbors	<i>Palm Springs, California:</i> City has a Vacation Rental/Event House Outreach Program intended to improve communications with neighbors and city via nonemergency call center for complaints.	Gottlieb, 2013
		<i>Amsterdam:</i> Hosts must inform neighbors that they are renting their space and leave a phone number so that the host of someone representing them can intervene with any situation.	Municipality of Amsterdam Bed & Breakfast webpage
Municipalities may miss opportunity to generate fiscal revenue	Transient lodging taxes (TLT), accommodation taxes like those that hotels are required to pay	<i>Santa Monica, California:</i> 14% transient occupancy tax on the total amount paid for the rental of a home-share.	City of Santa Monica Planning and Community Development website
		<i>Denver, Colorado:</i> Implemented a 10.75% lodging tax on Airbnb hosts.	Nieuwland & van Melik, 2018
	Require registration and/or license with fees being collected from the beginning	<i>Santa Monica, California:</i> Anyone operating a Home-Share (renting part of a home for 30 consecutive days or less while at least one permanent resident is on-site for the duration of the stay) requires a business license. The host will then be responsible for paying Business License Tax: \$75	City of Santa Monica Planning and Community Development website

Issue	Potential Solution	Global Example	Source
		for the first \$60,000, 0.3% for every \$1,000 after.	
	Fine hosts for not abiding by the regulations set in place	<i>Amsterdam:</i> €6,000 fine for not reporting a rental; may be as high as €20,500 per property if not in compliance with other policies for rental properties.	Municipality of Amsterdam Bed & Breakfast webpage
		<i>Santa Monica, California:</i> Anyone found to be operating a vacation rental (home rented for 30 consecutive days or less without the presence of a primary resident on-site for the duration of the stay) is subject to a fine of up to \$500 per day and may face criminal prosecution if they do not stop operations.	City of Santa Monica Planning and Community Development website
		<i>Ireland:</i> "Breaches of planning code can incur fines from €5,000 to €1 million and/or 6 months to 2 years in prison. If the person continues the offense after conviction, they are guilty of a further offence for each day it continues and this carries a maximum fine of €1.500."	Ireland's Department of Housing, Planning and Local Government website
Short-term rental policies are hollow without enforcement	Levying taxes on short-term rentals generates revenue for operations and administrative costs	<i>Texas:</i> State's hotel occupancy tax applies to any building that offers overnight accommodations, and the "municipal hotel occupancy tax allows cities, towns, and villages to collect an extra nine percent tax on short-term rentals."	Gottlieb, 2013
		<i>San Francisco, California:</i> City treasurer stated transient	Gottlieb, 2013

Issue	Potential Solution	Global Example	Source
		occupancy tax applies to Airbnb units.	
Creation of regulation that is not tailored to the needs of the area	Creation of a short-term rental committee that engages a wide variety of stakeholder to advise on the creation of short-term rentals	<i>Denver, Colorado:</i> Created a Short-Term Rental Advisory Committee that worked in tandem with Denver's City Council to contribute to the draft of rental regulations.	Niewland & van Melik, 2018

EXAMPLE PROJECTS

In this section, the study team proposes two potential development projects in the study area. These example projects are the result of thoughtful consideration after the completion of our study area analysis. Specifically, these suggestions have come about through web-based research, interviews with important stakeholders, and investigation into the current make-up of the area. The alternatives listed in this section include opportunities to: create and maintain community public and open spaces; utilize existing infrastructure for green infrastructure; and upgrade a channel in the study area for better water management and recreational activities.

EXAMPLE PROJECT: STALOS VACANT LOT DEVELOPMENT

Proposed Development Site

The proposed development site is located south of the Old National Road in the Village of Stalos (Figure 80). This site is adjacent to an existing water channel and allows beach access and public right of way to Pano Stalos. This existing vacant lot is currently listed for sale at a price of €720,000 (the equivalent of €360 per square meter; Figure 81).

Figure 78. Proposed vacant lot development site



Source: Google Earth

Figure 79. Selected vacant lot for sale



Source: Google Maps

The team recognized the development value of this site not only due to its strategic location next to the a water channel and across from public beach access, but also because it is right in the heart of Kato Stalos, thus allowing for connectivity to the residential area to the south as well as to the touristic businesses along the Old National Road. The proposed development plan adds much-needed community and gathering space for the local residents, as well as creates a place for all visitors to experience a different cultural offering than just the typical focus on the beach.

Figure 80. Existing conditions of vacant land*Photo credit: Brit Vigil*

Proposed Site Plan

The proposed site plan includes building a small library and community center that will face the Old National Road. This allows for maximum visibility and access along this main corridor. Behind the library we propose an outdoor plaza/gathering space. This flexible space allows locals to decide how they want to use this area, whether it be for festivals, farmer's markets, or cultural events. The majority of the existing lot is overgrown with plants. This site plan maintains part of the existing greenery and installs public amenities such as benches, bathrooms, and walking paths so that this

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green space can be accessed and enjoyed by the public. A children's playground could also be installed to provide additional activity for all members of the family.

Figure 81. Proposed site plan



EXAMPLE PROJECT: STALOS GREENWAY DEVELOPMENT

Proposed Development Site

The proposed development site selected by the team for greenway development is located south of the Old National Road in the Village of Stalos (Figure 84). (This site is adjacent to the Stalos Vacant Lot Development Project mentioned above.) This is the largest volume channel in the study area and therefore represents the best opportunity to make the largest impact.

Figure 82. Proposed location for green infrastructure improvements



Source: Google Earth

The proposal calls for the implementation of green infrastructure improvements to the channel. The aims of this proposal are to improve flood control by increasing water retention, improving wildlife habitats, and improving recreation quality for tourists and locals.

The first step in our proposal is the removal of the large existing concrete channel (Figure 85). Concrete channelization was a popular solution to erosion in the past but has proven to be problematic. The channelization speeds and heats water as it flows onto the beach, increasing the erosion that occurs downstream and damaging the coastal environment. Additionally, the concrete channels are both unattractive and inaccessible for visitors and residents alike.

Figure 83. Existing upstream concrete channel

Photo credit: Alex Hemmer

Naturalizing the existing channel could provide significantly more ecosystem functions, such as wildlife habitat, natural water cleaning, carbon sequestration, and nutrient recycling. If adequately designed, green corridors such as the one proposed here could improve urban ventilation, which allows for cooler air from outside to penetrate the more densely built areas, thereby reducing the urban heat island effect. Urban green areas can also have positive effects for human health and climate change adaptation. The capacity of vegetation to retain water is an important flood prevention feature that can reduce peak discharges. Ecological connections, such as connecting coastal to inland areas in our example, are also recognized as a way to limit the negative effects of environmental fragmentation (Figures 86 and 87).

Figure 84. Water channel in Los Angeles, California similar to Stalos channels



Source: <http://lariver.org/>

Figure 85. Proposed green infrastructure improvements in Los Angeles example



Source: <http://lariver.org/>

Along with stream improvements, the project proposal includes educational and recreational considerations. The new naturalized channel could have several nature trails that connect the beach to the Old National Road. These would provide attractive areas for people to travel, as opposed to the eroded and trash-filled access points that currently exist. Additionally, these nature trails would be great opportunities for the creation of educational signage that describes the flora of the

ecosystem. The greening of the channel will provide environmental and recreational connections and benefits to everyone in the Nea Kydonia area.

EXAMPLE PROJECT: RE-IMAGINING THE AGIA MARINA FOOTBALL PITCH

The municipal football pitch and adjoining lots in Agia Marina (Figure 88) present an excellent opportunity for public gathering space. The study area desperately lacks these public spaces to gather and linger, and the location of the field in the center of our study area presents a unique means to give locals and tourists alike a chance to learn, explore, and rest while providing simplified connections to and from the beach through to the Old National Road. Based on satellite images, the approximate area of the site is more than 10,000 square meters.

Figure 86. Proposed football pitch development site



Source: Google Earth

The size of the pitch and adjoining lots allow for a variety of potential uses, and based on existing characteristics, our team divided the site into three distinct sections (Figures 89 and 90). However, should this site be developed, community input and involvement in the project is crucial in determining what this proposed site should actually contain.

*Figure 87. (Left) Proposed site boundaries**Figure 88. (Right) Site division based on existing characteristics*

Football Pitch

The northern-most section of the proposed site comprises of the municipal football pitch, and a small section of beach on the northern edge of the pitch (Figure 91).

The pitch is currently owned and maintained by the Municipality of Chania, and functions as site of public recreation as well as event space for local matches. Recognizing the need for local space and the pitch's use by local football teams, our team proposes to maintain the field in its current location with several upgraded facilities including new chain link fencing, new goal nets, and more permanent seating. These physical enhancements would make for a more inviting and attractive space.

We also propose to add large shade trees such as palm trees to the northern edge of the pitch along the beach (Figure 92). This area is one of the few open stretches of beach in the study area that is not covered with privatized sunbeds. We have observed locals and tourists crowding up amongst the small bushes currently lining the pitch to seek shelter from the sun. Coupled with restrictions on sunbeds in this area, large shade trees would make this stretch of beach much more enjoyable for locals, in addition to shielding players from the sun during matches.

Figure 89. Existing pitch conditions*Figure 90. Potential pitch elements*

Plaza Space

As displayed in Figure 93, the second potential use for this site is the “plaza space.” Currently this space consists of the parking lot for the adjoining football pitch, a building that appears to house equipment, and a concrete basketball court. Similar to the Stalos Vacant Lot Development project described above, this space has the potential to be transformed into the public plaza for various public events such as farmers’ markets, farm-to-table culinary events, and other public gatherings. This section of the site can incorporate educational and environmentally friendly elements (Figure 94). For example, permeable pavers can be used to enhance the aesthetics of the plaza while contributing to stormwater management. In addition, a large public art piece could be placed within this section of the site, giving the project a center point while providing an opportunity to educate visitors on local conservation and environmental concerns. An example of this art piece could be a large sculpture of a loggerhead sea turtle with signage displaying their conservation status and immediate danger. This section of the site, while intended for large open areas and plaza space, would also include formal seating such as benches or tables for public use.

Figure 91. Existing plaza space conditions

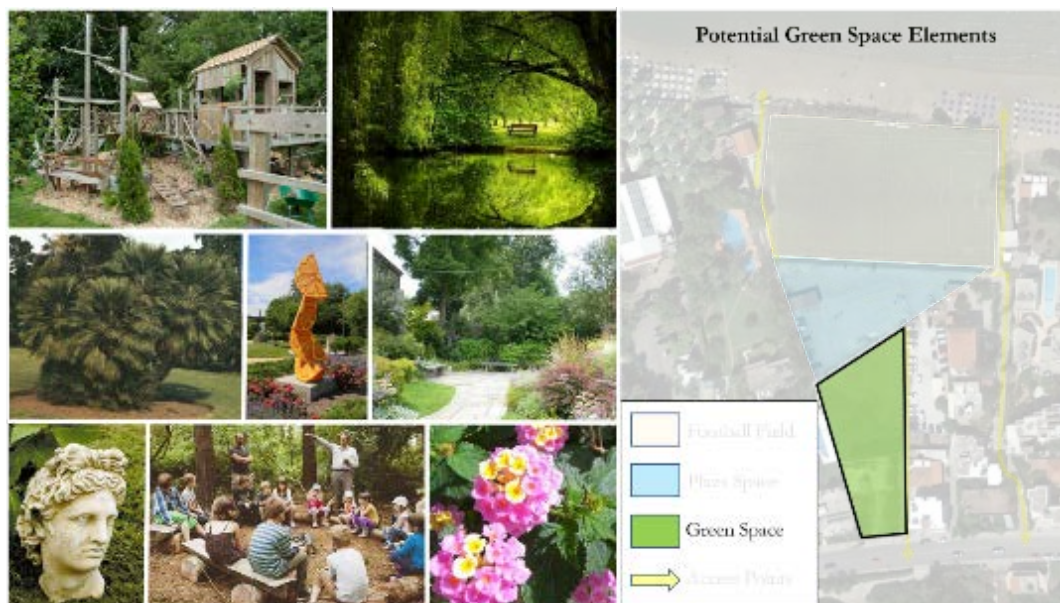


Figure 92. Potential plaza elements

Green Space

The third section of this site consists of a nearby parcel of land connecting the existing parking lot to the Old National Road (Figure 95). Currently, this lot sits abandoned, and the large overgrown yard in this parcel provides an excellent opportunity for green space and/or a public park. In addition, utilization of this space would open an easily navigable pedestrian-friendly path through from the Old National Road to the plaza and continuing on to the beach. Potential elements of this space could include a plastics-free public playground, permeable pathways for stormwater mitigation and aesthetics, abundant seating and tables for picnics and relaxation, and abundant native plant life (Figure 96). This section of the site could also include public art from local artists and signage containing information on the materials used in the construction of the park, information on sustainability efforts in Chania, or general information on the plant and animal life in the region.

Foliage in this area should consist of drought-resistant trees and shrubs native to the region, such as the Mediterranean Palm tree, a species that can prevent desertification and erosion. Community gardens could also be a possibility in this space depending on local interest and water availability in the area.

Figure 93. Existing green space conditions*Figure 94. Potential green space elements*

Access Points

Finally, this project includes activating the existing pathways to and from the area and opening up a new channel through the park. The existing pathways are unmarked, difficult to navigate, and in the case of the southern access point, entirely automobile-focused (Figure 97). There is currently no access through the abandoned lot (proposed “green space”) as the space is locked with a gate and overgrown with thick weeds. Enhancing these pathways and access points to the site would not only

create an inviting gateway for pedestrians but increase the safety of those passing through to the beach. Potential elements of this site can include colorful wayfinding alternatives such as painted lines on the concrete, and invitational elements such as string lights at night and interesting pathways with natural foliage (Figure 98).

Figure 95. Existing access point conditions



Figure 96. Potential access point elements

Implementation

Phase 1 would consist of activating the existing access points. Adding clear signage and lighting, and cleaning the paths is the least expensive measure proposed in this project, and would begin to draw people through the space, allowing them to see its potential and become accustomed to using this space as a primary thoroughfare.

Phase 2 would include initial construction of the plaza space. As this space is already unobstructed by trees or other material, the most expensive element of this section may be the permeable pavers, as well as commissioning of public art if payment for such a piece would be required. Community events and farmers' markets begin to take place as construction continues, which will allow greater opportunities for public input for phase 3. Procurement by the City of the southern parcel would also need to take place in either phase 2 or 3.

Phase 3 would entail demolition of the abandoned building on the southern parcel and construction of the park and associated amenities. This is likely to be the most expensive effort in this project as it includes commissioning designers, acquiring plant life, flattening the land, demolishing the existing building, and producing informational signage.

Throughout these proposed phases, public input is required to ensure satisfaction with the project and future use. The football pitch, while proposed to be kept intact in this example, could easily be incorporated into the plaza space, or redeveloped into a green space depending on public wishes.

This example presents only one of an infinite number of possibilities for this space, and the proposed Experience Nea Kydonia Alliance may be able to facilitate the information-gathering effort required to plan this space in accordance with local wants and needs. Furthermore, ENKA may be able to raise funds for the project beyond what the municipality may be able to invest, yielding expedited construction and higher-quality design.

CONCLUSION

The focus of the course was sustainable tourism planning: the study and practice of reducing the environmental impacts of the tourism industry on the earth and human settlements, while achieving the benefits of tourism for the place, its residents, and the visitors.

The City of Chania suggested Stalos and Agia Marina as the site for a case study on sustainable tourism planning. The City and the Stalos business association recognize the area is vulnerable to environmental degradation, exhausted carrying capacity, climate change, competition from other sites, and the ability of business owners to continue to meet the demanding nature of the intense tourism season.

Since the 1980s, Stalos and Agia Marina have developed primarily for the mass tourism market. The majority of land uses are residential (homes and apartments, including short-term rental units), tourist uses (e.g., travel agents and souvenir shops), restaurants, supermarkets, and retail. Public access to the beach is limited due to the highly developed beachfront, and most access occurs through private property.

While the area continues to experience a steady flow of visitors throughout the tourism season, there are a number of vacant buildings and many of the store fronts and other buildings along the Old National Road are in need of repairs or upgrades. Likewise, the street and stormwater infrastructure are also in need of upgrades and repairs. At the same time, existing and new housing units are being redeveloped and rented as exclusive villas or short-term rentals, leaving little available housing stock for local residents.

A HOLISTIC APPROACH TO SUSTAINABLE TOURISM IN THE CHANIA REGION

Our team's proposals to support a sustainable tourism industry and improve the livability of the community within our study area focused on four inter-connected elements: 1) the economy, 2) transportation, 3) land development, and 4) the environment (Figure 98).

Figure 98. The four interconnected elements of sustainable tourism.



Graphic Credit: Kenna Davis



ECONOMIC RESILIENCE

Mass tourism is not entirely problematic, however it frequently perpetuates unsustainable activities such as thoughtless disposal of waste, erosion of trails and historical sites, disruption of native species and introduction of non-native species, and overuse of infrastructure. Socially, mass tourism can degrade the preservation of history, culture, and local pride in a destination.

Several economic indicators suggest that Nea Kydonia may be at risk of reaching its carrying capacity for tourism under the current model. The singular type of mass tourism and a condensed number of visitors in a small time period create an oversaturation of tourism in the area. Further, the existing beach and resort tourism model conflicts with the development of a sense of place and local identity. Finally, a visible lack of investment in the public realm is starting to affect both residents' and tourists' experience of the area, and gaps in social amenities and community services suggest that the balance between tourist needs and local needs is off-center.

Further, dependence on a singular tourism industry makes the economy within the study area overly dependent on a short peak season in which profits must be maximized for the success of the businesses and the livelihood of the owners and workers. The constant concentration of activity over a few months damages the environment and is exhausting for the business owners who must work around the clock during the season in order to earn their annual revenues in seven to eight months.

Solving these complex problems requires collaboration and communication between local leaders and stakeholders. However, the current presence of disconnected groups results in competing or unclear goals, inconsistent funding, and a lack of capacity to take meaningful action. Creation of a single entity to oversee the management of sustainable community development through tourism in Nea Kydonia, which we propose calling the Experience Nea Kydonia Alliance (ENKA), would facilitate partnerships with municipal officials, business owners, tourism professionals, and other community members.

This partnership can enable Nea Kydonia to begin shifting away from mass tourism to a more sustainable, mindful tourism that emphasizes the importance of place. Key components of mindful travel are an existing community that is resilient against the pressures of tourism growth; a diversity of experiences for travelers and residents alike; and proactive management from within the tourism industry. For local residents, a robust sense of place can foster community pride, social investment, and resilience against economic and tourism-related pressures. For tourists who prioritize sustainability, it is often an interest in the place itself, rather than the amenities available, that drive them to visit. Shifting from a mass-tourism model to a place-based, mindful tourism model will require branding and marketing changes to attract new visitors, as well as physical and business-level changes to the composition of the economy in Nea Kydonia.

Sustainable tourism promotes place-based travel that encourages small business entrepreneurship, benefits for locals, and economic resilience in a fickle industry. Small, locally run businesses make sure that funds are staying in the community, and also create jobs. While tourism has created a number of jobs in Nea Kydonia, tourism relies on many factors that are outside the control of

business owners, such as the strength of the global economy. Making sure that the local economy is diverse helps to ensure that Nea Kydonia can weather a financial decline and it ensures that the needs of residents in the local and surrounding community are met.



CONNECTIVITY AND ACCESS

The two main arteries in Nea Kydonia are the New National Road (VOAK) to the south and the Old National Road to the north, with few connections between them. Due to its proximity to the Mediterranean Sea, tourist amenities are adjacent to the Old National Road. However, the pollution and noise generated by traffic congestion on the Old National Road creates an undesirable atmosphere for strolling and shopping, which impacts the businesses adjacent to the Old National Road. Inefficient access to the VOAK adds to local congestion to the Old National Road, and solving this problem requires a regional-level solution.

The stretch of the Old National Road through the study area is approximately 3.7 km and includes only two signalized pedestrian crossings. Altering the design of the road and streetscape to prioritize people over cars will create a better environment for local residents, business owners, and tourists. Specifically, traffic speeds should be reduced through the area. Pedestrian crossings should be added at each existing transit stop, and should include painted crosswalks with bollards, curb extensions, and signals wherever possible. Narrow and obstructed sidewalks should be improved to ensure safety and accessibility with treatments ranging from paint and bollards on the roadway to widening the sidewalks, installing accessible curb ramps at every corner, and relocating utilities.

While there is not a shortage of parking in the study area, the lack of a parking plan or regulation has led many businesses and residents to take parking regulation into their own hands. Instead, the municipality should establish and enforce parking rules, including prohibiting parking in key locations, such as areas adjacent to bus stops; access points such as building entrances, alleys, and private driveways; and loading zones for commercial vehicles. Implementing these regulations will require infrastructure changes, such as painting physical parking spaces on the street and using curb painting and signage to indicate where parking is restricted.

Finally, transit has tremendous potential to help meet the area's connectivity and access goals, including sustainable transportation methods, increasing regional connectivity, decreasing traffic congestion, and easing demand for parking. Transit between our study area and central Chania is provided by the KTEL public bus service. However, our observation indicates the bus does not seem to be as widely used by residents and employees as tourists. To encourage more people to use transit, we have three recommendations for improvements. First, we propose increasing the frequency of the bus route during the busy summer months. This will make taking the bus quicker, more convenient, and will help to reduce the observed overcrowding problems. Next, the City should partner with local businesses to provide employee incentives to take transit and to educate both locals and tourists about the benefits of taking public transit. Finally, bus stops should be improved with bus shelters, benches, and informational signage.



COMMUNITY LIVABILITY

There is a lack of housing suitable for year-round, permanent residency in the study area. The for-purchase housing stock is very limited in the Agia Marina and Stalos Villages, and even fewer units are available for long-term rent. Moreover, the Nea Kydonia region has over 1,500 whole-home short-term rental units. While short-term rentals can provide additional income for property owners, in this area, many Airbnb units are corporate-owned. Together, these factors significantly limit the ability for this region to support a year-round, robust community that would be supported in part by year-round residents. Regulating short-term rentals and expanding permanent housing opportunities for local residents are essential for meeting the goal of community livability.

Additionally, the monocultural tourism market also leads to gaps in the businesses and services required to sustain a more permanent community. As it stands, the needs of tourists are seemingly given priority over the needs of residents. Many business owners close their hotels, restaurants or grocery stores in the tourism “off-season”—from October through April— which requires that locals go into Chania to buy goods and services. Residents report that the area becomes a “ghost town” during that time.

Even during the tourism season, however, the area offers few services for local residents and tourists. Only one bank appears to service the area, and there is no library, post office, packaging/shipping services, building supply, or social services in the study area. Other residential and business-serving goods and services also may be missing, such as a full-service hardware store and various medical specialties. The addition of permanent housing opportunities should expand the year-round population to make operation of these essential businesses and services feasible.

Further, there is currently a lack of public social space in the study area, both for informal gathering and for organized community events. We recommend utilizing the parcels of vacant and under-used land to create much-needed year-round community and gathering space for the local residents. These places can also enable visitors to experience different cultural offerings, rather than just the typical focus on the beach.



ENVIRONMENTAL SUSTAINABILITY

The environmental sustainability of the study area is fundamental to its long-term economic and community success. Chania’s abundance of sunshine and wind are key opportunities and have the potential to facilitate 100% renewable energy usage in the future. Many homes and businesses already utilize photo-voltaic (PV) technology in the form of private solar panels and solar water heaters, as well as private wind turbines. However, the area is currently facing both large- and small-scale environmental challenges. As a coastal community, Nea Kydonia is likely to directly experience the impacts of human-caused climate change, which heightens the urgency of implementing green infrastructure and environmentally sound practices.

Despite unprecedented rain events in early 2019, persistent drought conditions have been plaguing Chania in recent years and much of the island is at risk of desertification. Overgrazing by sheep on the island has also damaged forest renewal, which further leads to increased erosion. Moreover, water diversions for tourists, such as the illegal diversion of agricultural water for hotel pools and facilities, have gone unchecked for years. As urban uses continue to expand, vegetation removal, paving, reduction of natural water storage capacity, and the diversion or disruption of flow paths lead to the interruption of natural flooding processes. Further, there are few public waste receptacles in the study area, and public recycling receptacles are almost non-existent. This adds to the amount of trash found in the area's waterways and on the beach.

Together, these factors are producing immediate impacts on the study area. There is significant erosion and an accumulation of garbage and debris on the beach from inadequate stormwater facilities. Erosion and garbage at popular beach entrances in Kato Stalos makes them unattractive to users. Reducing upstream stormwater discharge with rain barrel disconnects and rain gardens will reduce the downstream flow of water and debris. Further, upstream stormwater absorption can be increased through small-scale distributed systems, such as the reintroduction of native plants such as the Cretan Date Palm (*Phoenix theophrasti*).

The existing water channels that flow from the hillside directly onto the beach are often haphazardly constructed and poorly maintained. Determining responsibility of maintenance for these channels is an important first step in improving their condition. Implementing green infrastructure elements into the redesign of the larger public channels could reduce the speed of flowing water, allowing infiltration into groundwater, reduced silt and trash movement to the beaches, and the addition of valuable green space in the study area. The larger channels could also be redesigned to serve as attractive green corridors that help facilitate movement from the beach into the hillside residences, rental villas, and hotels.

SUMMARY

Our study offers both an organizational structure, ENKA, and a set of recommendations for the organization to tackle over the short and long terms, including example projects on specific sites. With an interwoven focus on economic resilience, improved connectivity and access, community livability and more sustainable environmental practices the study area can be competitive, regenerative, attractive to tourists and livable for locals for generations to come.

APPENDIX A

AVAILABLE AIRBNB RENTAL SITES

Regarding the availability of each Airbnb rental site, Inside Airbnb states “The Airbnb calendar for a listing does not differentiate between a booked night vs. an unavailable night, therefore these bookings have been counted as ‘unavailable’. This serves to understate the Availability metric because popular listings will be ‘booked’ rather than being ‘black out’ by a host.”

To explore the number of Airbnb units available for rent in the study area, we randomly selected dates from the June, July, and August months of 2019 to include weekends, weekdays, and varying lengths of stay. For all 32 searches conducted, only one resulted in “no available rentals” (specifically, 10+ guests between July 24 and July 30).

Table 6. *Airbnb Rental Availability – Summer 2019*

	Dates Searched							
	18/6-21/6				21/6-23/6			
# of Guests*	2+	4+	6+	10+	2+	4+	6+	10+
# of Rentals**	81	56	19	5	51	29	4	1
	21/6-27/6				18/7-23/7			
# of Guests*	2+	4+	6+	10+	2+	4+	6+	10+
# of Rentals**	102	76	35	9	84	61	23	4
	19/7-21/7				22/7-28/7			
# of Guests*	2+	4+	6+	10+	2+	4+	6+	10+
# of Rentals**	47	29	7	1	98	69	31	9
	24/7-30/7				6/8-11/8			
# of Guests*	2+	4+	6+	10+	2+	4+	6+	10+
# of Rentals**	41	25	5	0	98	78	39	8

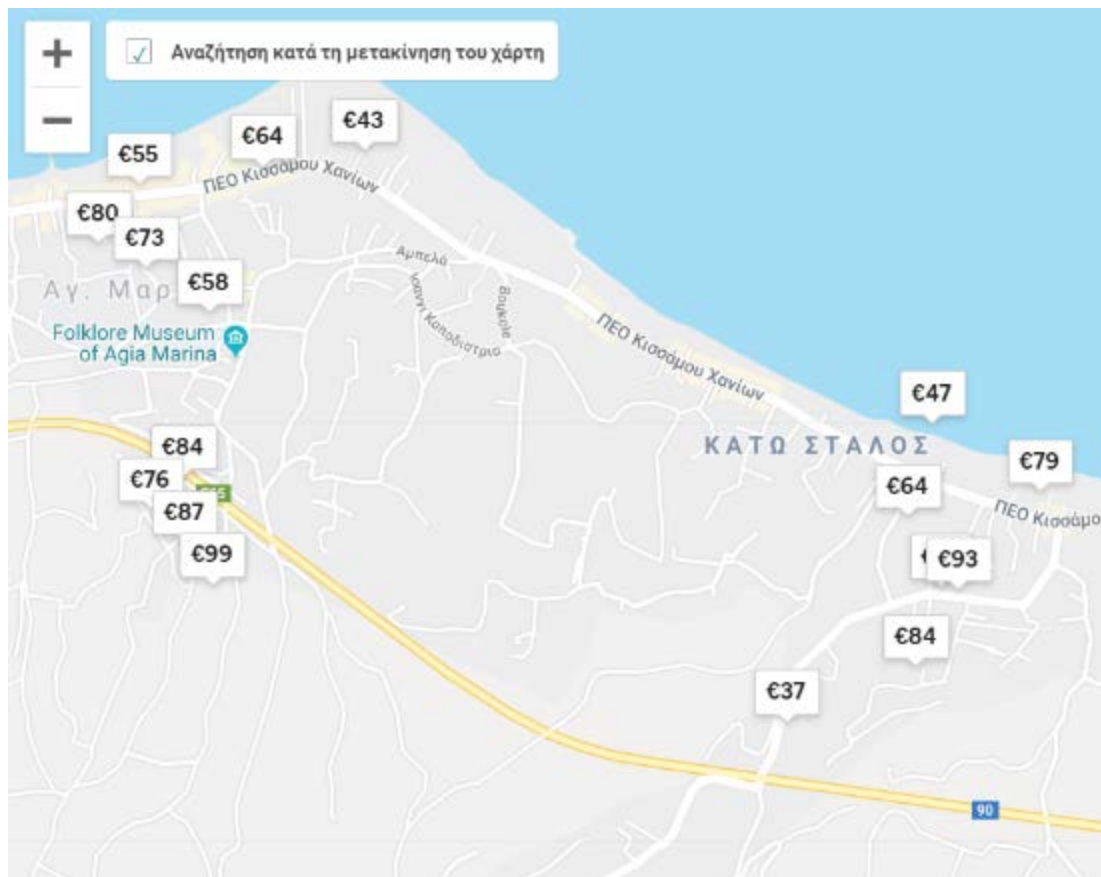
Source: *Airbnb.com*

* Adults and children (2-12) were both counted as regular guests, so there is no differentiation. Infants (0-2) were listed separately in the guest count but yielded the same results, therefore that variation was not included in the final results.

** Number of rentals is a rough estimate that may be slightly higher than the reality of Airbnbs in the study area due to the search map of Airbnb; couldn't draw border and a small section south of the New National Road was included in the search. However, the number of Airbnbs in the other side was 0-5 depending on the search.

The intent of this search was to find available units within the study area of Agia Marina and Stalos. The area we searched on Airbnb is represented in Figure 99 below. Due to the nature of the map tool, drawing a desired boundary was not possible. Therefore, available rental numbers may be slightly inaccurate. For more accurate information, we recommend further study of this issue through the data on Inside Airbnb, a more detailed search using the Airbnb website, or possibly a survey of local Airbnb hosts.

Figure 979. Airbnb search area



Source: Airbnb.com (6/6/19)

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