

THE BEACH HOUSE JURY NARRATIVE: ARCHITECTURE

The BEACH House has a universal appeal for a small family with the desire to live sustainably, without sacrificing comfort. Team Daytona Beach believes that sustainability, at its core, is about meeting the needs of today while, at the same time, not sacrificing the needs of tomorrow. This concept is the foundation of the forever home, allowing the homeowner the freedom to grow and stay in their home as long as they wish.

A NEW BEGINNING FOR AN OLD CITY

Daytona Beach, the “World’s Most Famous Beach,” is best known for its wide, white-sand beaches. These hard-packed sand beaches hosted car races in the 1920s which led to the foundation of NASCAR. Today the hard-packed beaches allow the unique experience of driving to your favorite surf spot. Nestled just north of Cape Canaveral on Florida’s east coast, the city boasts year-round mild weather with easy access to the Atlantic Ocean, the Intracoastal river, and natural springs. Thousands of visitors come to Daytona Beach each year to enjoy the beautiful beaches, partake in the Daytona 500 experience, or cruise on historic A1A during Bike Week.

Daytona Beach’s primarily tourism driven economy was greatly affected by the economic recession of the 2010’s. An already aged infrastructure and the failing economy lead to the historic ocean and riverfront areas of the city becoming dilapidated. However, the economic lull provided an opportunity for investors and city leaders to revitalize the city. Daytona Beach and the surrounding areas are in the midst of a master plan to

breathe new life into the area. Daytona International Speedway has completed a \$400 million re-imaging of the speedway and has 1.4 million square feet of retail and entertainment center, Daytona One, under construction just north of the track. A multi-million dollar rejuvenation of the historic waterfront areas including Beach Street and the Main Street Pier is underway that includes adding entertainment venues and rehabilitating classic hotels. The city also has plans to gentrify housing sections near the river and ocean, and an expansive 6900 home senior-living development, Latitude Margaritaville is in the construction phase. The city's revitalization is perfectly timed to coincide with the upcoming boom in housing for America's aging population.

As the Baby-Boomer generation ages, the need for senior-friendly living arrangement increases. It is expected that the population of persons over the age of 65 years will grow by nearly 30 million in the next 20 years, resulting in one out of three households being led by a person in this age group. Nursing homes and other traditional senior-living arrangements are less sought after as in-home care gains popularity. These trends create a demand for single-family homes that are affordable and accessible. Like many coastal Florida cities, Daytona Beach is a retirement destination. Florida has seen a 2.1 percent increase in persons 65 years-of-age and older between 2010 and 2014, giving a total of 4 million persons in this age bracket. Baby Boomers and Generation X are more likely to care about sustainability and green living than past generations. As the need for senior housing increases, there should be a conscious effort to meet the green demands of the aging population. The goal of The BEACH House is to provide an

energy-efficient and sustainable housing option for current and future seniors.



Figure 1: Welcome sign at Daytona Beach's beach access ramp for vehicles



Figure 2: Signage along Daytona Beach's beachside boardwalk



Figure 3: Artist Rendering of Latitudes Margaritaville¹

DESIGNING THE BEACH HOUSE

Team Daytona Beach was inspired by the rehabilitation of their home city. The team wanted to design a house that exemplified the sustainability of new construction with the distinct style of old Florida. The team wanted to design a home that met the needs of the growing senior demographic, but that also appealed to the city's current homeowners. Team Daytona Beach wanted to design The BEACH House.

BEACH is an acronym for Building Efficient, Affordable, and Comfortable Homes. This acronym was used throughout the design process to guide the team's decisions. Efficient, affordable, and comfortable, these attributes were chosen because they meet the needs and desires of the target market in Daytona Beach. The architecture has a directly impact each of these features. For this reason, Team Daytona Beach chose architectural features from several classic Florida styles to make the perfect blend of efficiency, affordability, and comfort.

Key West, Florida is known for its rich architectural history and over 3000 homes built by expert craftsmen in the 1800s that have withstood numerous storms and hurricanes for over a century. Many of the homes in Old Town Key West have a conservative and simple architectural styles, blending Colonial revival with the Conch House vernacular. These beautiful homes have truly withstood the test time, which is the ultimate task of sustainability. Team Daytona Beach took inspiration from these impressive structures, not only for the architectural style

of the house, but for every aspect of the design of The BEACH House.

Team Daytona Beach was particularly influenced by the iconic Hemmingway House. The home is known for its high, arched windows and spindly, cast-iron porch rails. The team took these features and broke them down to their most basic elements, high arches and thin lines. These basic elements were used to create the modern take on this classic style that inspired The BEACH House.



Figure 4: Hemmingway House in Key West, FL



Figure 5: Front Exterior of The BEACH House

EFFICIENCY

The team focused on using passive energy-saving techniques to simplify the homeowner's interaction with the house. Window placement, cathedral ceilings, and wall construction all reduce the energy consumption of The BEACH House, without any input from the homeowner. The parallel plumbing and zoned HVAC systems also reduce energy and water consumption. They are also easy to maintain by homeowner, and are familiar to neighborhood repairmen.

The BEACH House has an all-electric power system. This simplifies the electrical system, making it easier to maintain and repair. The house is a grid-tied and is capable of being fully powered by its 9.3 kW photovoltaic solar array. If there is a period of high power demand, or utility power outage, the house is equipped with a lithium-ion energy storage system. This system is used to offset demand that the solar array cannot meet, during the day and through the night, and it can act as an emergency back-up.

The BEACH House has an automated ventilation and humidification system that works with the HVAC unit in the main living area to provide ultimate control of the interior, thermal environment. While Florida may be humid, Colorado can be very dry. Mini-split HVAC units do not have a way to humidify air, so Team Daytona Beach developed a humidification. The humidifier is coupled with the north-facing clerestory windows. The system sense the indoor and outdoor temperature and humidity. If the indoor conditions are not within the set, desired

range, the system will turn on. If the house needs humidity, the humidifier provide water micro-droplets. If the house is too hot, the clerestory windows open to vent out the hot air that collects in the cathedral ceiling and to let fresh air in. When the windows open, the HAVC in the main living area turns off to save energy.

Team Daytona Beach expects that the energy and water efficient technologies incorporated into the house, along with renewable energy power system will earn The BEACH House a Florida Green Build Coalition certification.






AFFORDABILITY

In 2015, the United States Consensus evaluated that the poverty level in Daytona Beach had reached a low of 35.8%, that is 22.3% lower than the national average of 13.5%.²³ The United States Consensus also stated that the average home was said to be 2,687 square-feet. That's more than a 1,000 square-foot increase since 1973, when the average home was 1,660 square-feet. Why are we creating homes that do not accommodate those with lower income? Rather than creating unaffordable, large housing, why don't we create a more efficient affordable, and comfortable home that even today's college students, can afford when they finish college.

The BEACH House uses standard, site-built construction practices along with tricks from the prefabricated home industry to keep the construction cost low. All systems in the house were designed with affordability in mind. The PV system is over-sized for the house's needs, reducing the pay-back period of the investment. The estimated cost of The BEACH House is just under \$139,000.

Table 1: Comparison of Similar Dwelling in Daytona Beach Area

	Attributes	Estimated Cost
	2 Bed 1.5 Bath 1030 sq. ft	\$259,000
	3 Bed 2 Bath 1092 sq. ft	\$185,000
	2 Bed 1 Bath 950 sq. ft.	\$139,000

COMFORT

Team Daytona Beach recognized that nearly 20% of Americans have a disability. When creating The BEACH House, Team

Daytona Beach understood the importance of creating a home that can transition with its owner. The BEACH House encompasses a unique aging-in-place design, termed a *forever* home. The forever home design is able to become fully ADA compliant with minor cosmetic changes, such as raising toe kick heights on cabinets. All doorways and walkways have a clear opening of 36-inches. Door transitions from the interior of the home to expansive outdoor living area are kept within acceptable ranges. The tiled bathroom shower has a no-step entry and has a 5-foot turn around space for easy maneuvering.

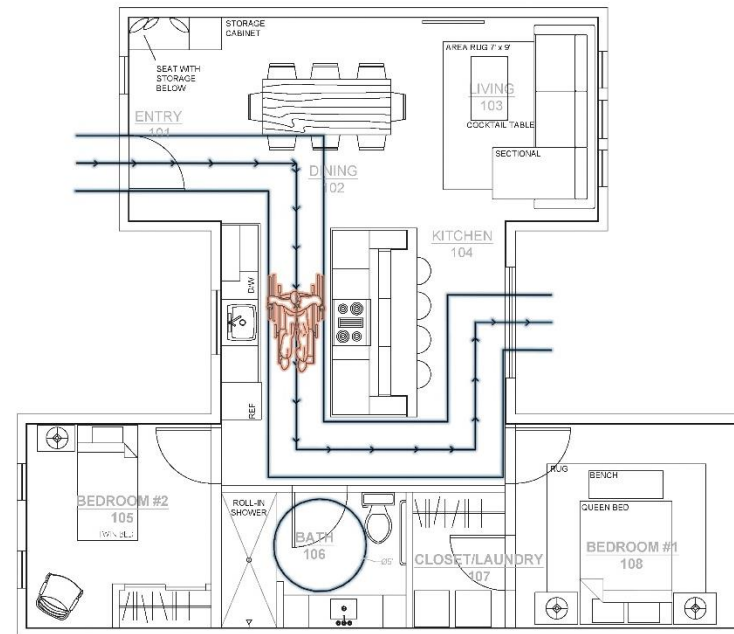


Figure 6: ADA Compliant Main Walkway through The BEACH House

THE MODERN FLORIDA CRACKER

The floorplan of The BEACH House was developed by updating the vernacular architecture of the Florida Cracker. Florida Cracker houses are distinguished by the large porch overhangs, high ceilings, and a central breezeway. These features were incorporated to keep the interiors cool before HVAC or electricity was available.⁴

Many cracker style houses had square or “L” shaped floorplans, due to the limitations of construction methods of the time. Team Daytona Beach wanted to update this floorplan, without complicating the modularity of the home. The “H” shaped floorplan with its north and south porches gives The BEACH House an overall square footprint that gives the feel of a cracker style while also providing more interest to the space. The “H” shape also provides natural breaks between modules for easy transportation.

The floorplan of The BEACH House divides the home into a public and private space. The public space features an open floor plan and includes the foyer, dining room, living room, and kitchen. The public space opens up the large, partially-covered south deck. A large French door and several windows bring Florida’s beautiful landscapes into the home, by blurring the lines between the indoor and outdoor living spaces. The private portion of the home is on the west side of the house and consists of master bedroom, guest bedroom, and bathroom. The master bedroom is tucked away in the south-west leg of the “H”, giving additional privacy. The master bedroom also opens onto a semi-

private deck off the south of the home. All interior walls are insulated with cellulose batting to dampen noise levels, and create a more private setting in the small home. These areas can be seen in Figure 7 below.

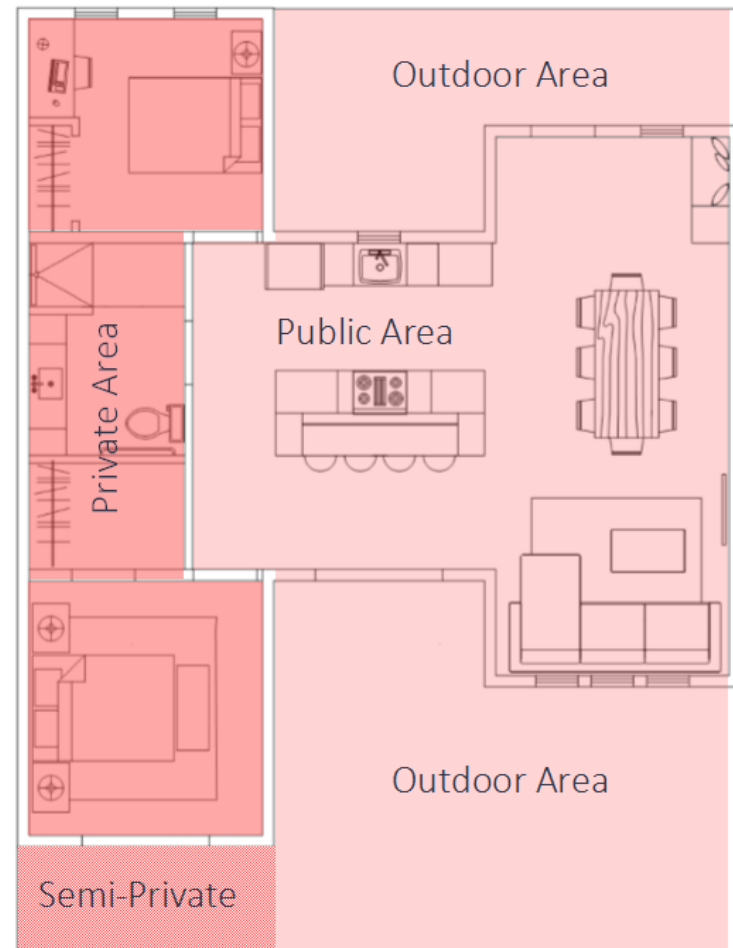


Figure 7: Public and private Spaces of The BEACH House

LOCAL AND SUSTAINABLE MATERIAL SELECTION

Care was taken to select sustainable sourced, recycled, and local materials. Florida's hot and humid climate can render traditional construction material inappropriate due to corrosion or pest infestation. Southern Yellow pine was used predominantly in the structure due to its excellent structural properties and proximity of farms to the job site. The engineered lumber used for the beams in the house came from Weyerhaeuser, a lumber manufacturer known for its sustainable practices.

The BEACH House used local materials available on or near the site for construction when available. The hardwood floor of the house is river-recovered heartpine. This sought-after building material is a relic from the lumber industry that thrived in Florida at the beginning of the twentieth century. It was rescued from the bottom of the Suwannee River. In addition to this, the flooring is made of "shorts", or the left over portions of the long planks typically used hardwood flooring.

The custom cabinets in the bathroom, kitchen, and foyer are specified by Omega Full Access Cabinetry. Omega is a certified brand in the Kitchen Cabinet Manufacturers Association (KCMA) Environmental Stewardship Program⁵. This program recognizes companies that demonstrate an ongoing commitment to sustainability including the use of environmentally responsible materials in cabinetry, as well as minimized environmental

impacts realized through recycling wastes and using low emission coatings.

¹ <http://www.buffettnews.com/2017/02/16/26587/>

² Berry, Joshua. "The Florida Cracker Vernacular Architectural Aesthetic." *Academia.edu*, www.academia.edu/912010/The_Florida_Cracker_Vernacular_Architectural_Aesthetic.

³ "Daytona Beach, FL." *Data USA*, datausa.io/profile/geo/daytona-beach-fl/.

⁴ "Daytona Beach, Florida (FL) Poverty Rate Data Information about Poor and Low Income Residents." Daytona Beach, Florida

(FL) Poverty Rate Data - Information about Poor and Low Income Residents Living in This City, City-Data, www.city-data.com/poverty/poverty-Daytona-Beach-Florida.html.

⁵ <https://www.kcma.org/certifications/environmental-stewardship>
<http://www.omegacabinetry.com/style-design/learn-about-cabinetry/cabinet-construction/full-access-cabinets>