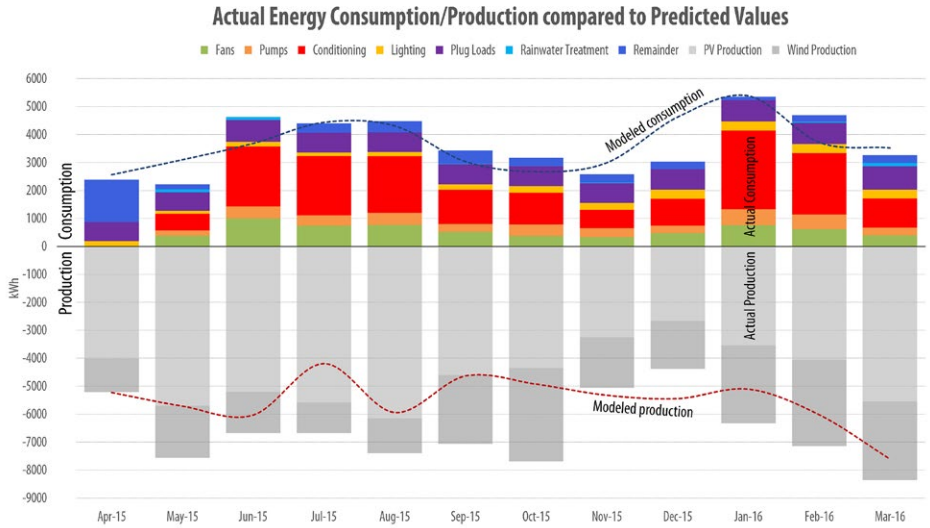
Chesapeake Bay Foundation Brock Environmental Center

Virginia Beach, Virginia

Category: Commercial

A model for true sustainability, transcending LEED Platinum, the Center is the first in the Delaware/Maryland/Virginia region to earn Living Building certification, achieving net-zero energy, water, and waste.



Site Chesapeake Bay Foundation's (CBF) newest environmental center houses their expanding Hampton Road's ecological education, advocacy, restoration and community programs. It is located on and preserves the last undeveloped 122-acre parcel at Pleasure House Point in Virginia Beach. The design showcases technologies that contribute to its net-positive energy goal while simultaneously expressing the spirit of the unique site. Resiliency principles informed the design, siting the building 200 feet minimum from the shore while resting atop pylons 14 feet above sea level anticipating sea-level rise and hurricanes.

Program The facility includes offices for CBF staff and their partners, an 80-seat conference room, meeting rooms, and exhibit display areas. Outdoor spaces allow for a reduction in built area while connecting occupants to the site. A prominent outdoor classroom hosts thousands of K-12 students each year. The design sought to create a landmark that transcends notions of "doing less harm" towards a reality where architecture can create a positive, regenerative impact on both the environment and society.

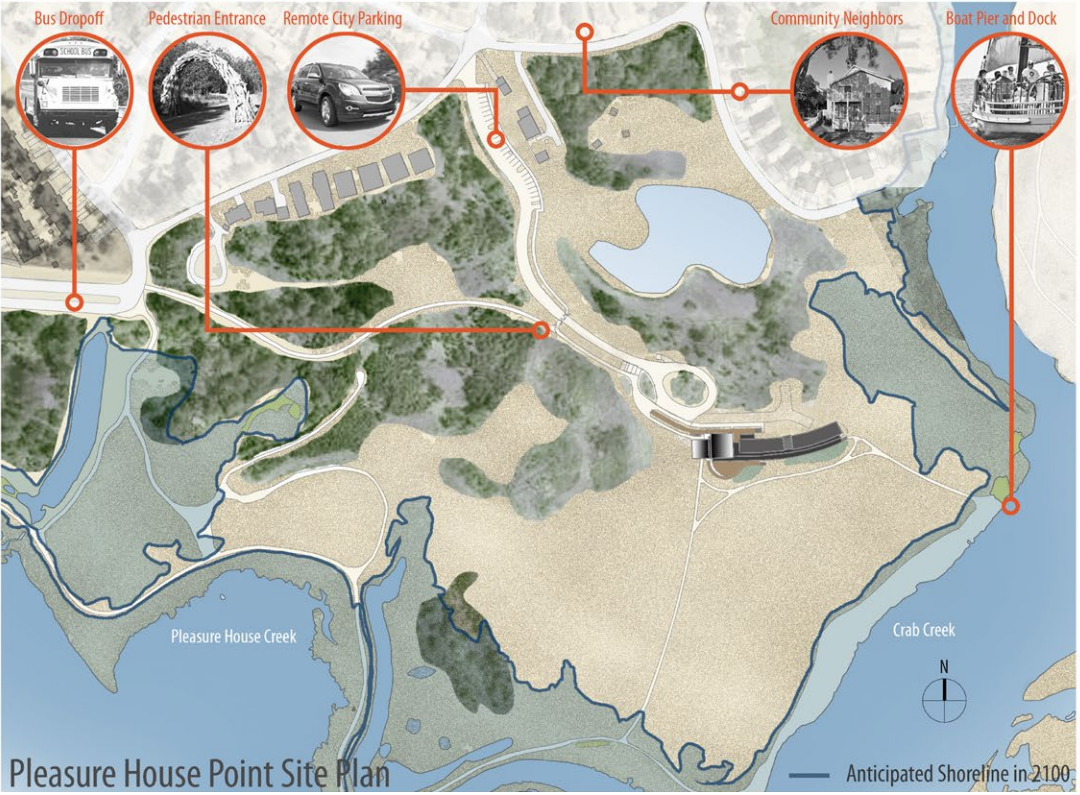
Solution The Brock Center celebrates the client's mission and unique setting, creating a design of its place, while simultaneously showcasing technologies that contribute to net-zero energy, water, and waste. The curved building form responds to the nearby shoreline, maximizes daylight, and embraces passive solar principles. Prominent, curving roofs recall forms of the site's wind-swept live oaks, the wings of a gull, and the protective shell of an oyster, while also enabling rainwater collection. The material palette references the colors and textures of the setting; zinc shingles recall fish scales, cypress cladding accentuates the site's natural vegetation and horizontality, and bright metals mimic the glistening waters of the Bay.

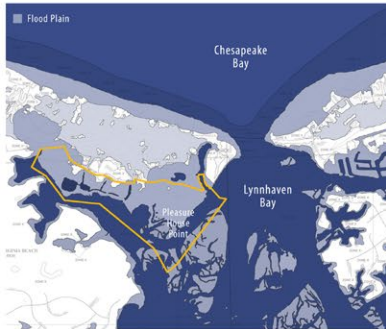
The Center's form and orientation maximize opportunities for daylighting and natural ventilation. The daylit interior resulted in a 97% reduction in lighting energy. The long floor plate is interrupted by a "dog trot", an open-air pass-through that recalls regional, vernacular precedents. The building form intensifies breezes, promoting natural ventilation and reducing horizontal stratification. During the center's first operating year, its two wind turbines and 45 kW photovoltaic array produced 83% more energy than the center consumed. The Center is truly net-zero water, the first in the US to receive a commercial permit for drinking rainwater treated to federal standards

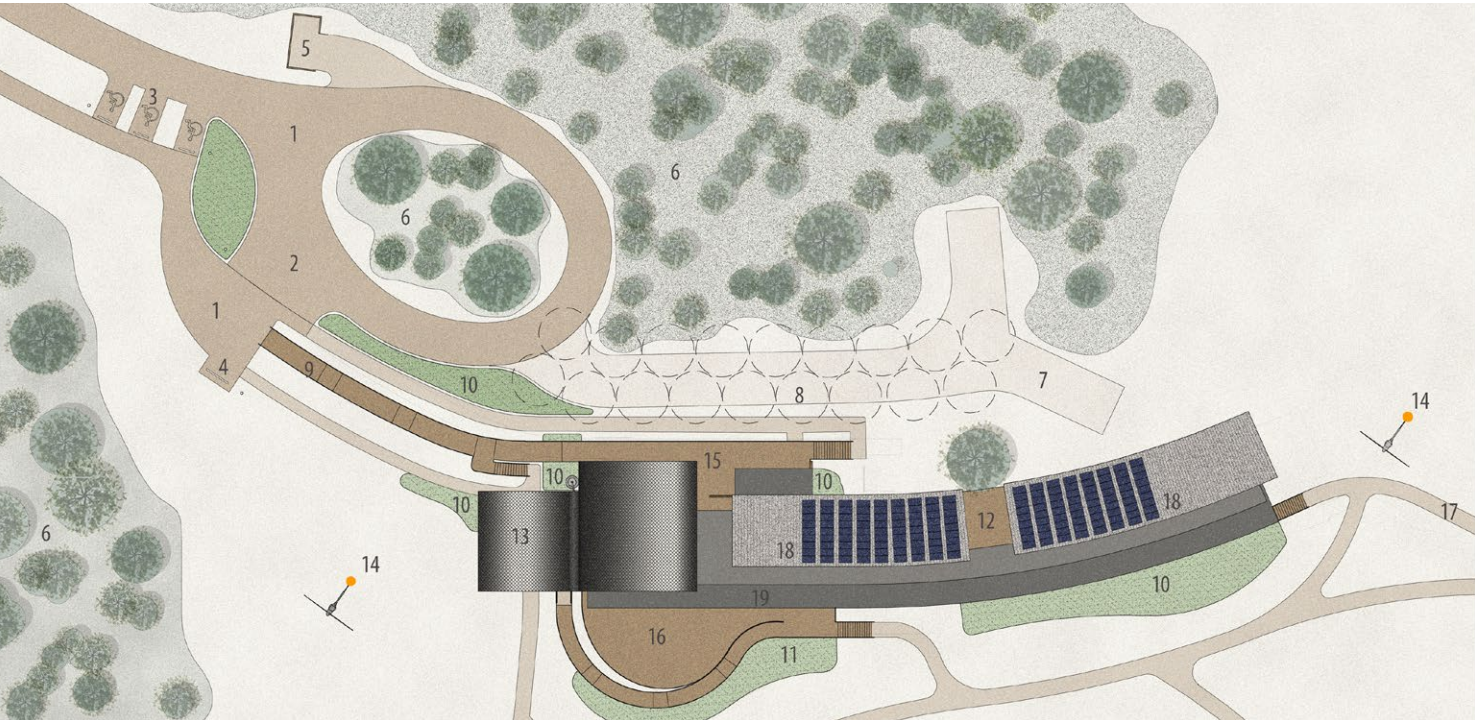
View of the center from the southwest. The Center's low profile and curving forms integrate with its sensitive site.

The exterior palette of zinc shingles, sinker-cypress, and galvanized steel reflect the color and forms of the site.

View from the north showing entry ramp, outdoor education pavilion, and large conference room, whose form recalls the wings of a gull.

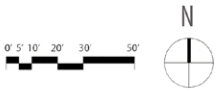




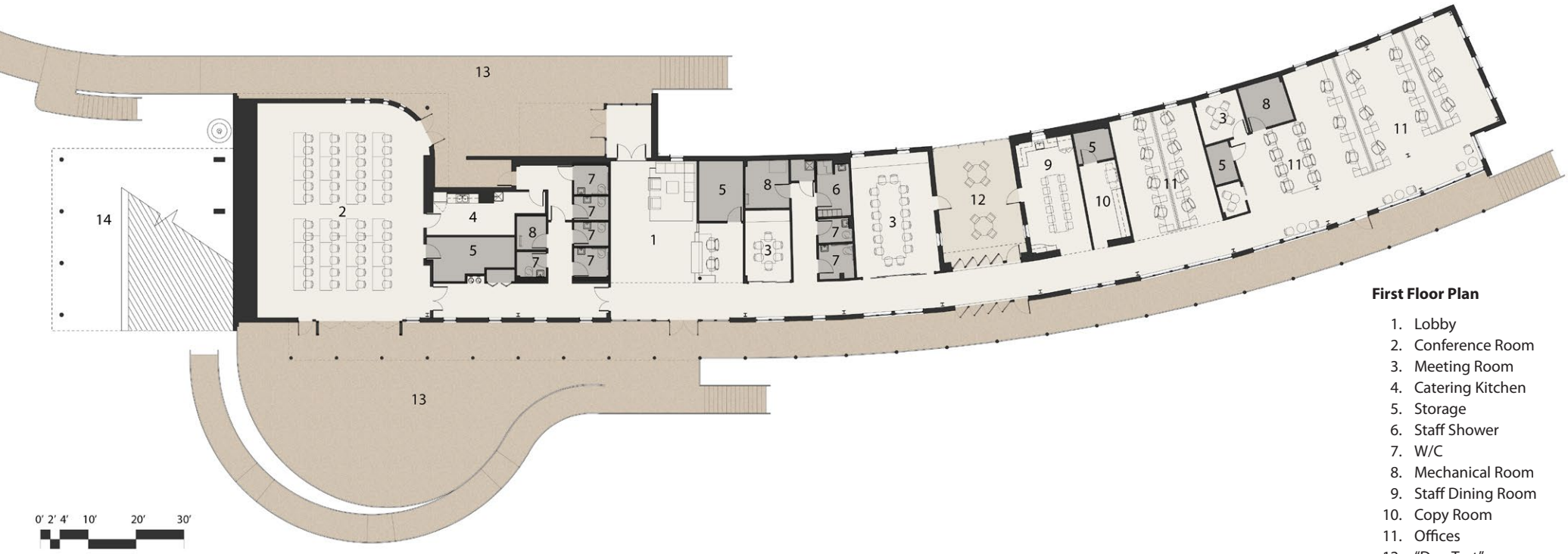


Site Plan

1. Permeable Pavers
2. Drop Off
3. ADA Parking
4. Bicycle Racks
5. Dumpster
6. Remnant Maritime Forest
7. Stablized Sand Fire Lane
8. Geothermal Well Field
9. Entry Ramp
10. Rain Garden
11. Greywater Infiltration Garden
12. Dog Trot
13. Education Pavilion
14. Wind Turbine
15. North Deck
16. South Deck
17. Path to Dock
18. Photovoltaic Array
19. Covered Porch

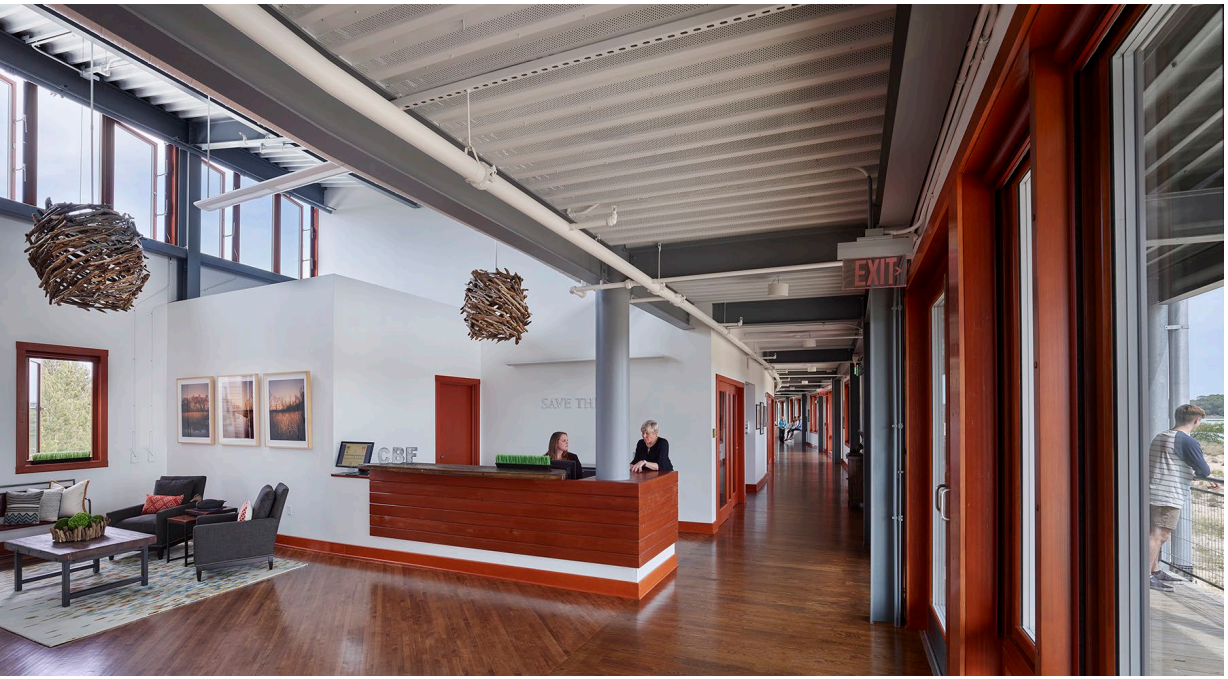


Aerial View of the Site and Vicinity & Site Plans. The building siting anticipates sea level rise, modeling the shoreline predicted by the end of this century.



First Floor Plan

1. Lobby
2. Conference Room
3. Meeting Room
4. Catering Kitchen
5. Storage
6. Staff Shower
7. W/C
8. Mechanical Room
9. Staff Dining Room
10. Copy Room
11. Offices
12. "Dog Trot"
13. Deck/Porch
14. Education Pavilion



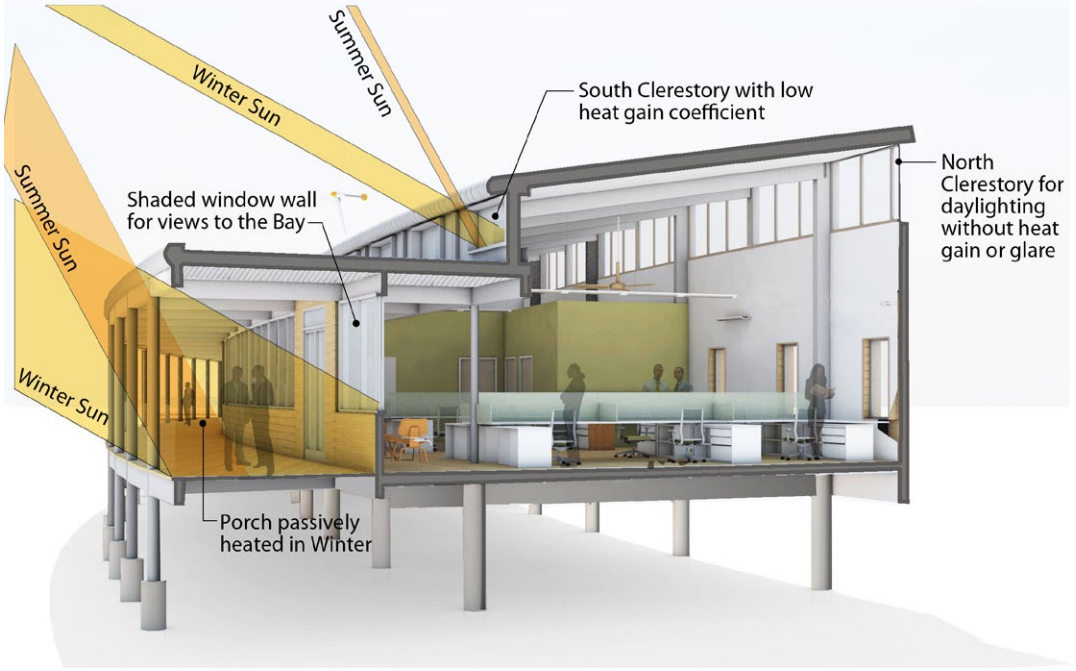
View of lobby looking east.

The Dog-Trot – an open-air pass-through.

View of open office showing daylighting, natural ventilation, and view of the marshes and shore beyond.

Exterior of the conference room, whose form was inspired by biophilic principles.

Natural Ventilation Approach



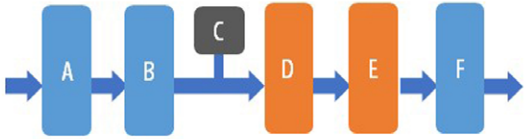
Daylighting/External Shading Approach

View of the South Porch and building sections that illustrate natural ventilation and external sun-shading approaches.

View from the dock looking to the northwest.

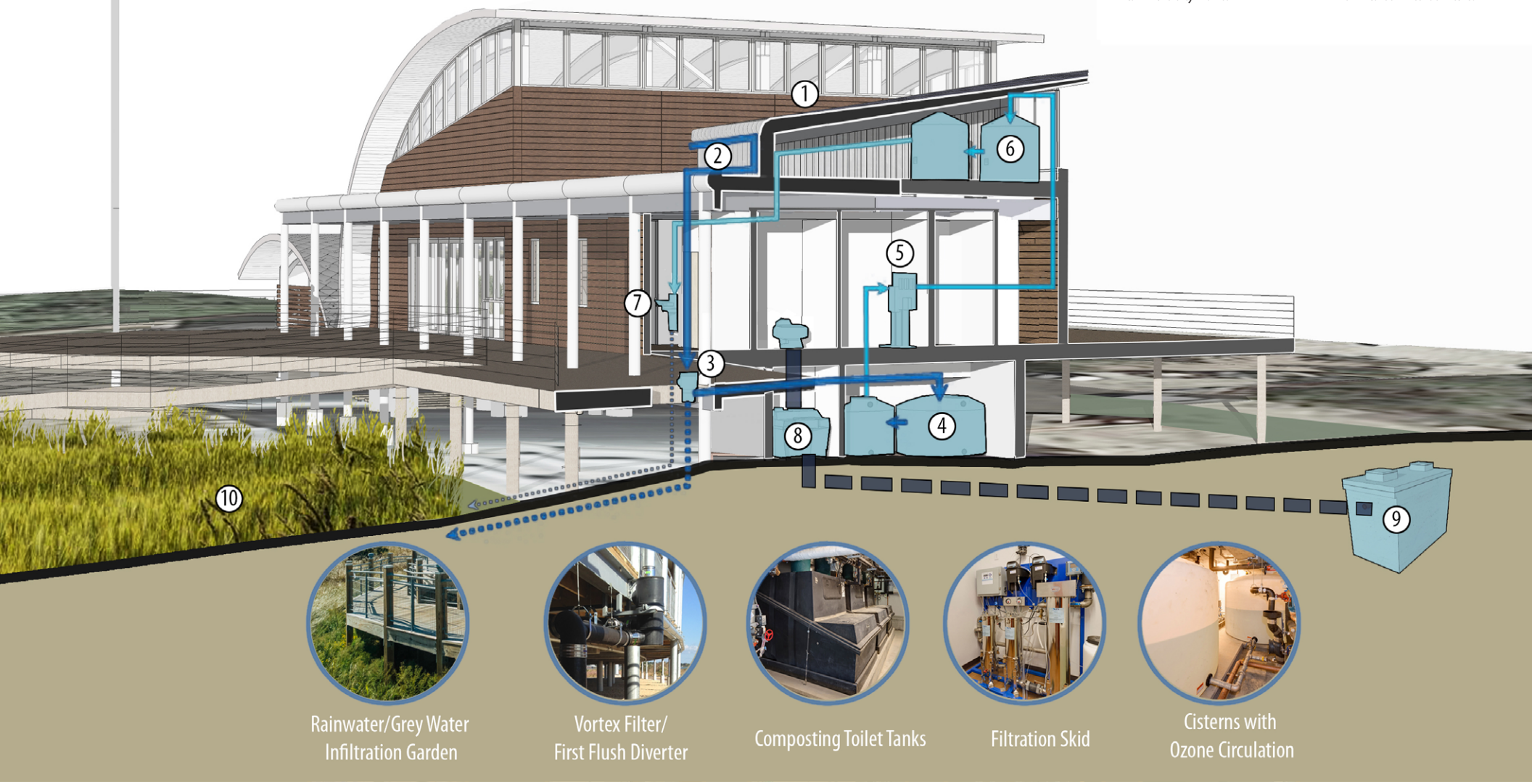
1. Rooftop Catchment Area
2. Gutter and Downspout
3. Vortex Filter/First Flush Diverter
4. Two 1650 Gallon Cisterns with Ozone Circulation
5. Filtration Skid (See Filtration Skid Detail Inset)
6. Pressure Tanks
7. Drinking Fountains/Sink/Shower
8. Composting Toilets and Tanks
9. Leachate Holding Tank
10. Rainwater/Grey Water Infiltration Garden

FILTRATION SKID DETAIL



KEY

A. Pre-filter
B. 4-log charged membrane filter
C. Turbidity monitor
D. UV disinfectant
E. Chlorine injector
F. Carbon filter at fixtures



Rainwater/Grey Water Infiltration Garden

Vortex Filter/ First Flush Diverter

Composting Toilet Tanks

Filtration Skid

Cisterns with Ozone Circulation

The Center is truly net-zero water - 100% of the water consumed onsite comes from captured and treated rainwater.