***The Ocean Still: Lagrimas de Santa Monica***

**Project Description**

The twin springs that inspired Santa Monica’s name were fabled to be the tears of a saint. At a time of growing thirst in California, *The Ocean Still* augments this sacred source of water by transforming seawater into freshwater, using only the energy of the sun. A large, transparent enclosure—a solar still perched on the old breakwater—makes a surface for collecting the saint’s pure tears once again. This simple, pre-modern technology concentrates sunlight, distills saltwater, and condenses freshwater on a glass shell. The entire *Breakwater* structure, including the passive solar still and its complex of pools, celebrates water’s many forms as well as the residue of desalination. The process provides generously, quenching the thirst of the 40,000 daily visitors to the Santa Monica Pier and *The Ocean Still*.

Built atop the foundations of the historic breakwater, the new water infrastructure extends the reach of the Santa Monica Pier into the Pacific, enlarging and expanding the community’s cherished, enduring symbol. Fusing urban needs and pleasure, the expandedbreakwater complex (with new footprint of six hundred meters by forty meters), recalls the history of the Santa Monica Pier as municipal sewage utility and its vital role in urban metabolism. Now, as before, the processes that make city life possible are tied to entertainment and destination: water production as spectacle. Still functioning as a breakwater, the solar still and the pools intercept the Pacific’s waves, harnessing this force. For a moment, the ocean is still.

While providing a renewable source of drinking water for the city’s many residents and visitors, the site also becomes an experience of water’s atmospheres: the cold Pacific Ocean; the heat and humidity of condensation; the fluctuations of salinity. Understanding the variety of densities, colors, temperatures and textures of Earth’s water is essential to the transformative experience of *The Ocean Still*. Each element of the site’s design is necessary for the production of freshwater, and yet each activates a different part of the sensory experience of this hydrological process.

The *Still’s* axisis aligned due west. At dusk, especially during equinox, the *Still* refracts sunlight, creating an optical spectacle. The multiplied, kaleidoscopic sunsets welcome those arriving to the *Still* by boat, and entertain sunbathers and sunset-gazers at the Pier. Inside the forty meter by seventy meter *Still*, solar radiant heat is absorbed and concentrated. The seawater evaporates. As it condenses on the *Still’s* seven meter high glass shell, a collection channel diverts the pure distillate into a cistern inside the breakwater. The angled glass walls face due south, absorbing maximum solar heat and exploiting the flow of prevailing westerly and south westerly winds. Beyond the spectacular optical effect, the *Still’s* design creates a large temperature differential between evaporating water and condensing glass surface, providing for efficient production of freshwater.

When not producing water, the *Still* is open to the public. The *Still’s* visitor’s hours are determined by weather and season, changing throughout the year and balancing the need for production with public access. During summer peak production season, from April to August, the *Still* only opens on warm, cloudy days and early in the morning, before the intensity of the sun creates a high temperature, high water vapor density inside the *Still*. High ambient temperature with low solar radiation and wind speed (1,800 btu per square foot per day and less than one mile per hour, respectively), create conditions of low output. This winter period between October and February would produce a small quantity of water (less than two liters per square meter per day), and is instead turned over to the *Still’s* production of delight. Inside the *Still* during winter, visitors can explore the heated ground atop the ocean, guided by dark gravel paths of varying texture and size. Enveloped in the foggy, humid air of evaporation and condensation, suspended between sea and sky, the glass sauna isolates and warms the body in an ethereal chamber.

The breakwater pool complex is open year-round, feeding ocean water into the still and slowly releasing the brine by-product back into the ocean. Height-specific, gravity-driven conduits guide seawater, distillate, and brine through the complex; separate by virtue of their salinity.

Designed so only the tallest waves breach the walls, the *Warming Pool* uses wave action to fill a shallow pond with seawater. Held at this subtle depth, the water rises in temperature before being pumped into the *Still*, increasing the efficiency of the desalination process. The shallowness of this pool makes it ideal for children, families, and intrepid marine fauna. Throughout the year, the warmth is a welcome relief from the chillier Pacific waters.

Because of the *Still’s* higher elevation, the concentrated saline brine that results from desalination exits from a low point into the *Brine Pool*—a long, deep swimming pool that induces the body to float. Swimmers churn the brine water with their movements, maintaining the water at a consistent density. The *Brine Pool’s* walls reach at least three feet above sea level, and this high edge keeps the brine separate from the ocean. A swimmer’s horizon is interrupted; the view framing only the sky above.

Once the brine waters approach the pool’s capacity they enter weep holes within the *Amphitheater Ledge* and flow onto the *Mixing Beach.* Here, short walls allow for waves to crash and stir the concentrate, brine mixing with seawater. This slow reclamation of diluted brine back to the Pacific prevents the dead zones associated with industrial desalination. The shallow slope of sand and gravel at the *Mixing Beach* creates a protected habitat for marine fauna, and an idyllic floating coast for California sunbathers.

The freshwater, meanwhile, continues on to the Pier itself. Collection at the *Still* delivers a pint of waterto each of the 40,000 daily visitors to the Pier, with enough remaining for those visiting the *Breakwater*. In the act of drinking, one has a sense of the water’s origin from the salty Pacific. But in visiting *The Ocean Still*, a meaningful connection is made. The atmospheres of the hydrologic cycle become tangible, and the alchemical power of the desalination process is linked to human experience. The sustainability of the project relies on fostering connection to all aspects of the transformation: products and byproducts are celebrated, none are vilified nor ignored.

By using recognizable processes *The Ocean Still* demystifies the endeavor of extracting freshwater from the ocean, without understating the inherent challenges. Large amounts of solar energy and extensive infrastructure are necessary to produce enough water to sustain a growing population. *The Ocean Still* encourages hope in simple technologies that will not readily become obsolete; drought and thirst cannot be easily solved at the push of a button. Thoughtful interventions in our lives and landscapes, beyond providing solutions, have the capacity to engage the desires and delights of the senses.

***The Ocean Still: Lagrimas de Santa Monica***

**Environmental Impact Statement**

Temporary adverse impacts to air quality, visual resources, and water quality associated with construction of the *Ocean Still* are expected. These impacts are minimized by using the existing breakwater infrastructure (116,600 cu m of material) and sourcing additional salvaged material (161,700 cu m) to create the pools. The *Still* itself sits partially on the breakwater, extending into the ocean on caissons. It is composed of prefabricated glass units that can easily be replaced if damaged during storm events.

During the operational stage of the *Ocean Still*, adverse impacts are expected to be minimal and insignificant. The project is limited to the existing footprint of the breakwater, so additional impacts to the marine floor are not expected. The existing breakwater is raised, which will create a more sheltered shoreline. The *Ocean Still* is expected to become a new tourist destination, drawings thousands of new visitors to the Pier and to the pools, and employing a small workforce. Thus, beneficial impacts to cultural resources, visual resources, and socioeconomics are expected.

Long-term beneficial impacts to water resources and biological resources are expected. Dual-purpose, solar-powered boats shuttle visitors to the *Ocean Still* and bring drinking water back to the pier. Daily average production of the *Still* is four liters per square meter, or 25,000 liters per day. This water provides a pint of water for the 40,000 visitors to the Pier, and a liter of water for the expected 5,000 visitors to the *Still*, reducing or eliminating the need for bottled water. The remainder of the distilled water is used to rinse the *Still* to prevent accumulation of salts and maintain the glass cover’s efficiency. Ledges embedded in the *Still* provide sunbathing opportunities for sea lions, nesting habitat for migratory birds, and a structure for mussels and other benthic organisms to colonize.