Unlike ANALYTIC TIME, in which the viewer grasps the a priori structure of the object, deciphering the relationship between its parts, and connecting everything to a structural logic or first cause...

the alternative...is that of real time, or experienced time. It is the lived time through which one encounters the riddle, experiencing its twists and deviations, its resistance to the very idea of “solution.” Or it is the experience of form as it is shown to be open to change through time and place—the contingency of shape as a function of experience.

- Rosalind Krauss, Passages in Modern Sculpture
As the average temperature within the earth’s atmosphere continues to increase, its waters respectively continue to expand and rise. Sea levels are projected to increase approximately 16” in the next 50 years and possibly even 55” by 2110. Though a relatively small amount of water by the standards of the oceans’ depths, these changes pose drastic consequences for the shorelines of many globally productive cities and their inhabitants. And because several of these cities have been founded at the mouths of fresh-water rivers, this rapid rise also threatens the remaining estuarine ecologies that still serve to protect and buffer much of these coastlines.
Responding to dramatic global and climatic transformations, this dynamic levee system preserves waterfront property, maintains areas for recreation and tourism, and conserves the estuarine ecosystems that are dependent on tidal action.

Folding Water is a new ventilated levee that protects shorelines by regulating both sides—rising sea levels and the delta and bay waters—mechanically managing tides to create micro-bay estuaries that resemble their previous forms. It departs from the conventional, static levee—or dam—by exchanging waters through a perforated pump wall to artificially manage the tides. Because it can be specifically/locally tuned to accommodate the variety of shoreline conditions of its estuary, Folding Water can be universally applied in other estuaries to regulate flow, salinity and volume. This megascaled civic project potentially provides a vital portal for the cultural and environmental future of the region in the form of a monumental FOLD of water.
CASE STUDY: SAN FRANCISCO ESTUARY

HARSHORE PROTECTION
LEVEES ALONG DEVELOPED
SHORELINES AND FARMLANDS

SOFTSHORE PROTECTION
TIDAL MARSHES + WETLANDS

OCEAN
FLOODING WATER
BAY AVATER
**WATER LEVEL MANAGEMENT: THE FOLD**

Folding Water is a levee mitigation system that maintains water elevations for existing shorelines that are susceptible to flooding and manages rising ocean waters through the design of a bifurcated water surface strategy.

Without a divisive barrier, it extends the natural ecology of the bay and maintains vistas and visual connections that characterize each bay’s unique estuarine beauty.

These estuarine recreations, or BAY AVATARS, mirror the shorelines’ present water levels, activity, and ecology, sustaining the relationship between the estuary and its inhabitants.

This stealth infrastructural system manages water and is made of water. It artistically preserves the interface of culture and ecology by reforming the bay’s surface.

**TIDAL MANAGEMENT: THE VENTILATOR**

By ventilating the regulated body of water, the levee recreates the ecological exchanges of sediment, salinity, and biota promoted by the tides.

Tidal cycles are artificially managed through a perforated wall of pump ventilators located at key sections along its full height. This allows the transport of the entire water column between the shoreline and ocean waters.

The perforations of the levee are composed of dual-functioning tubes that use the high pressure of the ocean to force the water into the Bay Avatars. Here the salt water of the ocean mixes with fresh waters and is pumped back into the ocean.

**SELF-SUSTAINING ENERGY: GEOTHERMAL AND TIDAL**

The energy-neutral aquatic infrastructure could self-sufficiently operate its pumping system using the energy extracted from tidal turbines and/or geothermal energy plants.

Desalination and wastewater disposal facilities could be incorporated into the mass of this levee structure. This thickness also opens paths of connectivity for the implementation of light-rail transit as well as hubs for ferry transfer.
Infrastructure, historically located in the realm of practical and efficient engineering, has formed in the cultural imagination as distant, monumental structures that drastically adjust our environment. While iconic in a sense, these forms exhibit little in the way of cultural representation and association in their removal from the immediacies of the environment and perception.
As much as the values of Modernity opened a rift in the visual vocabulary of what constitutes “real time” in architecture, the galvanizing values of environmental and cultural sustainability are certain to transform the visual vocabulary of mega-scale infrastructural projects.

The scale of an infrastructural project, though it may be expansive or even continental in scope, is effective as visual or corporeal interactions in very partial and intimate moments. Such structures, though monumental by nature, can be imbued with phenomena familiar to everyday life, and yet, simultaneously they can assert an enduring inscription of the time in which they were made.
Similar to the earthworks projects during the 1960s and 1970s, this proposal centers on an idea of infrastructure that registers experience in real time. Civic projects have the potential to internalize sustainable values and reallocate the experience of infrastructure from an iconic or a priori understanding to a phenomenological experience that conflates the variable nature of perception and ever-changing environmental conditions.
Andy Goldsworthy

Christo and Jean-Claude, *Surrounded Islands*, (1980-83)
Biscayne Bay, Greater Miami, FL

Walter De Maria, *Lightning Fields* (1977)
New Mexico
Bay Avatars can be tuned to local conditions to accommodate a variety of shorelines. Thus the system is applicable in other estuaries and coastal cities that are vulnerable to rising sea levels to regulate their specific flow, salinity, and volume.

The layering of transportation, water management, and energy production opens the door, not only to long-term cooperation between a number of invested municipalities, but also to the extension, overlap, and responsible use of funding that could be allotted to these varied concerns.