



ADRIAN NOORTMAN

A STUDY IN SALT MARSHES

FREDERICK LAW OLMSTED'S PLAN FOR THE BACK BAY FENS HOLDS LESSONS FOR COASTAL RESILIENCE.

BY ADRIAN NOORTMAN, HANK VAN TILBORG, AND MAIKE WARMERDAM

AFTER HURRICANE SANDY struck the northeastern coastal region in 2012, the Rebuild By Design competition was organized in which a number of Dutch design offices teamed up with American counterparts. This competition was an example of an integrated approach to complex problems. One of six winning entries was a comprehensive proposal, Living with the Bay, drawn up by a Dutch-American partnership that included H+N+S Landscape Architects along with Interboro, Apex, BoschSlabbers, Deltares, Palmbout Urban Landscapes, IMG Rebel with the Center for Urban Pedagogy, David Rusk, the New Jersey Institute of Technology's Infrastructure Planning Program, Project Projects (now IN-FO.CO/Wkshps), RFA Investments, and the Delft University of Technology. The proposal covered the water and coastal system along the southern coast of Nassau County, Long Island. Using an integrated strategy over time, the plan proposed the development of safe, clean, and natural bays and waterways that offer unique living conditions for people and nature alike.

OPPOSITE
H+N+S Landscape Architects used the Back Bay Fens as a research model for the Living with the Bay proposal.

RIGHT
In the Living with the Bay proposal, the Mill River would be transformed into a corridor that stores and filters water, provides accessible public space, and creates room for new urban developments.

BELOW
Detail of the integral regional strategy of Living with the Bay, including the development of resilient marshlands and the construction of adjustable cross dams.



LIVING WITH THE BAY:
SOUTHERN MARSHLANDS



The “slow streams” component of the plan was funded for further development as part of a Mill River project between 2014 and 2016, applying the same principles.

The goal of the Rebuild by Design competition was to realize innovative solutions for complex problems in a relatively short time frame. In practice, it appears that it is especially difficult to implement larger-scale systemic interventions. These interventions require a lot of knowledge, patience, coordination, and persistence, and also the courage to experiment while the outcome is not yet entirely certain. Yet good examples of working with

natural systems can be found all over the world, and a prime example in the United States can be found in the work of Frederick Law Olmsted on the Back Bay Fens parkland in Boston.

Olmsted created his design for the Back Bay Fens, the lower part of the Emerald Necklace park system in Boston, more than 140 years ago, and his approach shows a striking number of parallels with the problems that coastal cities in the United States cope with today.

At the beginning of the 19th century, the city of Boston was still limited to the confines of

the Shawmut Peninsula, situated in the Boston Basin, surrounded by extensive salt marshes and mud flats. During the 19th and 20th centuries, the natural coastal landscape around Boston was rapidly reshaped into a modern city.

The expansion of Boston toward the Back Bay accelerated in the 1830s when new railways to Worcester and Providence were built. The railroads cut through the existing tidal basins, hampering the tidal energy system, and announced the beginning of extensive land filling in the Back Bay. In the subsequent years the city grew steadily toward the southwest along the south bank of the Charles River. With the growth of the city,

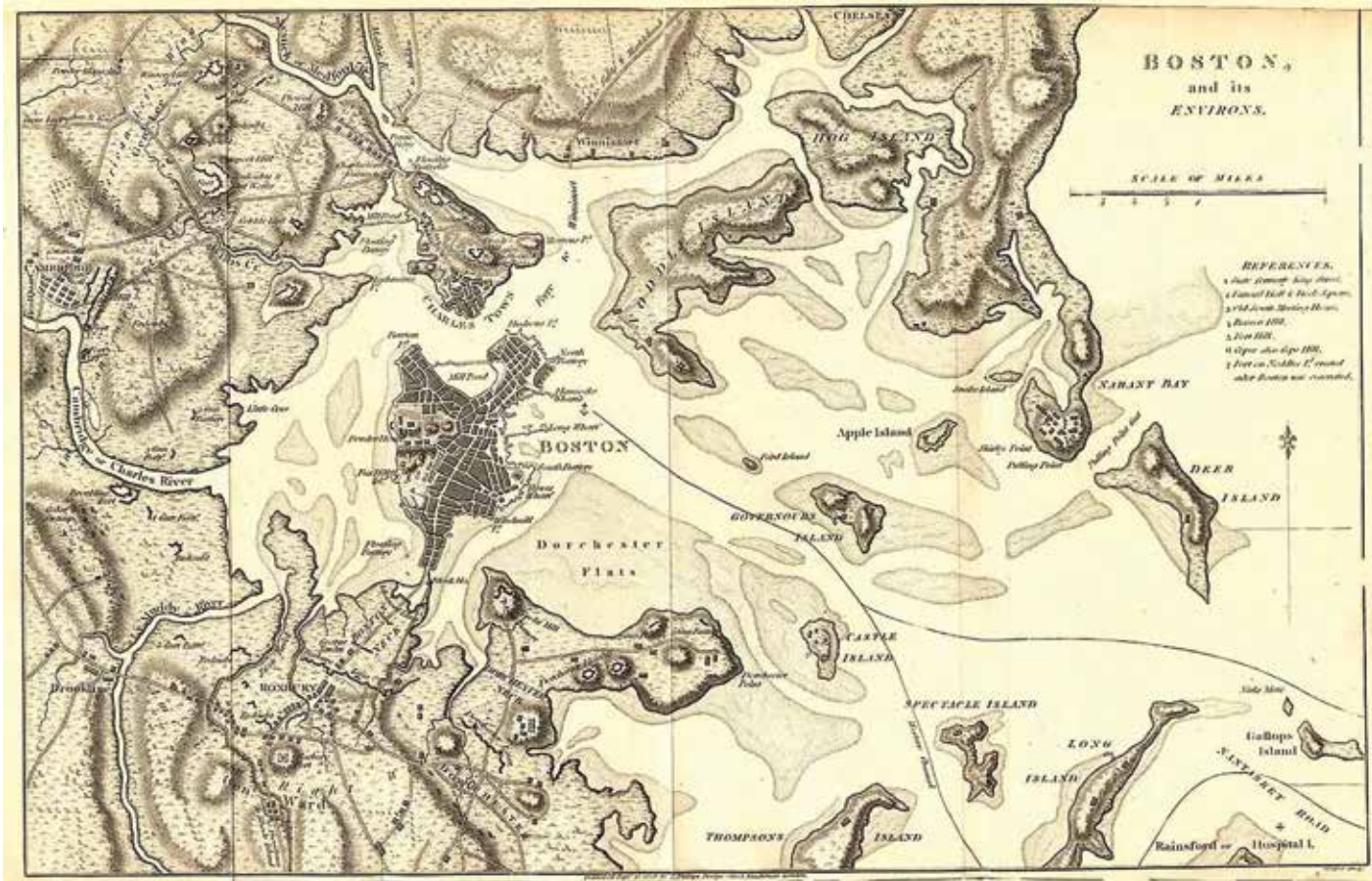
the call for more public parks and green spaces strengthened. By 1874, the landfill of the Back Bay was steadily proceeding, and land was being purchased to create a series of parks for the new urban areas of Boston.

Olmsted’s involvement with Boston began in the late 1860s, but it was not until December 1878 that he finally accepted the commission for the design of the Back Bay area. By then, large parts of the Back Bay had been filled and the city was closing in on the remaining part of the tidal mud flat, leaving an area about twice the size of the current Back Bay Fens open, surrounded by straight city streets.

ABOVE
The proposed natural system is used to restore marshlands and simultaneously stabilize the coastline.

H+N+S LANDSCAPE ARCHITECTS, PALMBOUT URBAN LANDSCAPES, BOSCHSLABBERS LANDSCAPE AND URBAN DESIGN, INTERBORO

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ABOVE
Boston in 1806; except for the Shawmut Peninsula and Charlestown, the estuary around Boston was mostly still in a natural state.

Because of the increase of impervious surface and built-up areas around the Back Bay, as well as upstream, rainwater infiltration diminished. Rainwater was discharged directly into the Stony Brook and Muddy River, the two tributaries to the Back Bay, causing ever more flooding as the size of the tidal flats decreased. On top of this, the Back Bay became heavily polluted from discharge of sewage water, industrial effluent, and garbage. This led to

the formation of sewage mud flats in the Back Bay that spread offensive odors over the adjacent city, especially at low tide. For this and several other reasons, the development of the Back Bay Fens was seen as a priority municipal park project.

For the purchase of the land in the Back Bay area, a limited budget was available. Only the part of the Back Bay with the most unstable soils and thickest

layers of mud could be acquired. Olmsted found the idea of a park on the proposed location to be an “ill-considered idea.” He understood from the beginning that focusing on the two main problems, resolving the stench and developing sufficient storage capacity for stormwater, was crucial for the successful development of the Back Bay Fens. Olmsted therefore refused to speak of a park. Instead he consistently considered the project to be a “sanitary improvement.”

The main inspiration for Olmsted’s design came from the salt marshes, the natural coastal landscape of Boston. To solve the stench problem,

he reconnected the Back Bay with the Charles River. By flooding the Fens twice a day with just a foot of salty tidal water, the stench problem was resolved. Over time, the area looked like a natural salt marsh, exactly as Olmsted envisioned it. With this early example of “designing with nature,” Olmsted introduced an entirely new approach toward landscape design that was far ahead of its time.

The decision to allow tidal water into the Back Bay was made in close cooperation with the city’s main engineer and the superintendent of sewer services. It meant that at high tide in the

BACK BAY FENS: OPEN WATER



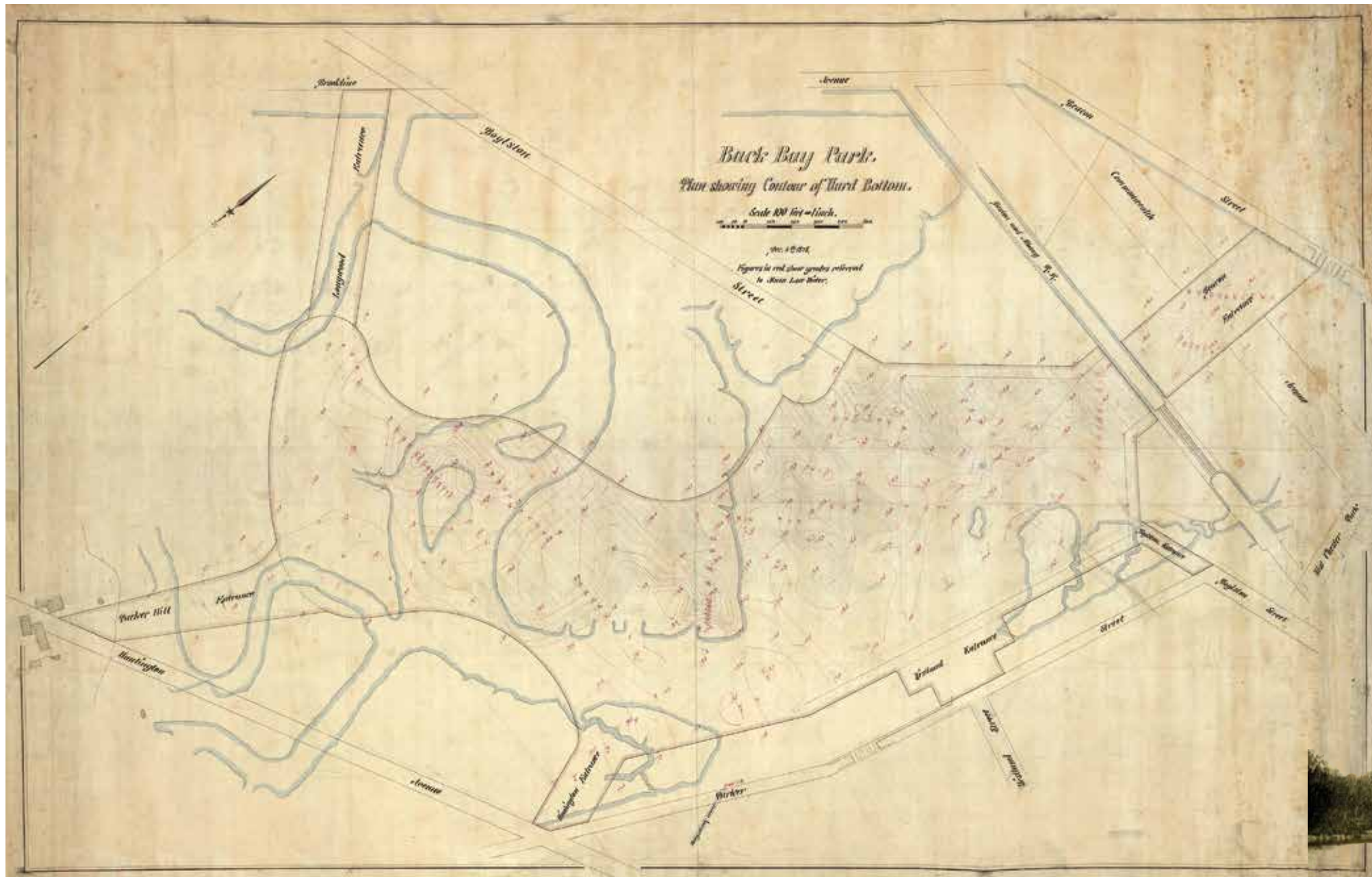
ABOVE
Student diagrams depict water surface at low tide (left) and high tide (center), indicating the storage capacity of the Back Bay Fens in the original design, and water surface in 2017 (right).

BELOW
Students mapped the development of Boston through landfill.



FLC MAPS 3/ALAMY STOCK PHOTO, TOP; BOEKEL, T. VAN; CALKHOVEN, B.; RUTTER, R. (2018). THE BACK BAY FENS: FIRST OFF OR NOT?, STUDENT REPORT, UNIVERSITY OF APPLIED SCIENCES, VAN HALL LARENSTEIN, BOTTOM

BOEKEL, T. VAN; CALKHOVEN, B.; RUTTER, R. (2018). THE BACK BAY FENS: FIRST OFF OR NOT?, STUDENT REPORT, UNIVERSITY OF APPLIED SCIENCES, VAN HALL LARENSTEIN



ABOVE
A map of the Back Bay park area in 1878, showing the open water (gray contour lines) and grades of the hard bottom relative to mean low water.

Charles River estuary, natural discharge from the Stony Brook and Muddy River had to be stored in the Back Bay Fens. During the design process Olmsted's intensive cooperation with the technicians continued. Technical aspects—such as the capacity and size needed for the basin, the redirection of sewage water to the Charles River, and finding solutions to avert the risk of erosion of the banks under the influence of wind and water—were considered jointly.

Olmsted refused to accept that artificial engineering works, such as high retaining walls, would be implemented. All the time he looked for alternatives and tried to find ways to translate “hard” engineering into “soft” landscape to achieve the intended overall natural character of the site. Many design choices, like the meandering water course, the shape of the banks, and the height and type of vegetation, served aesthetic as well as functional goals.

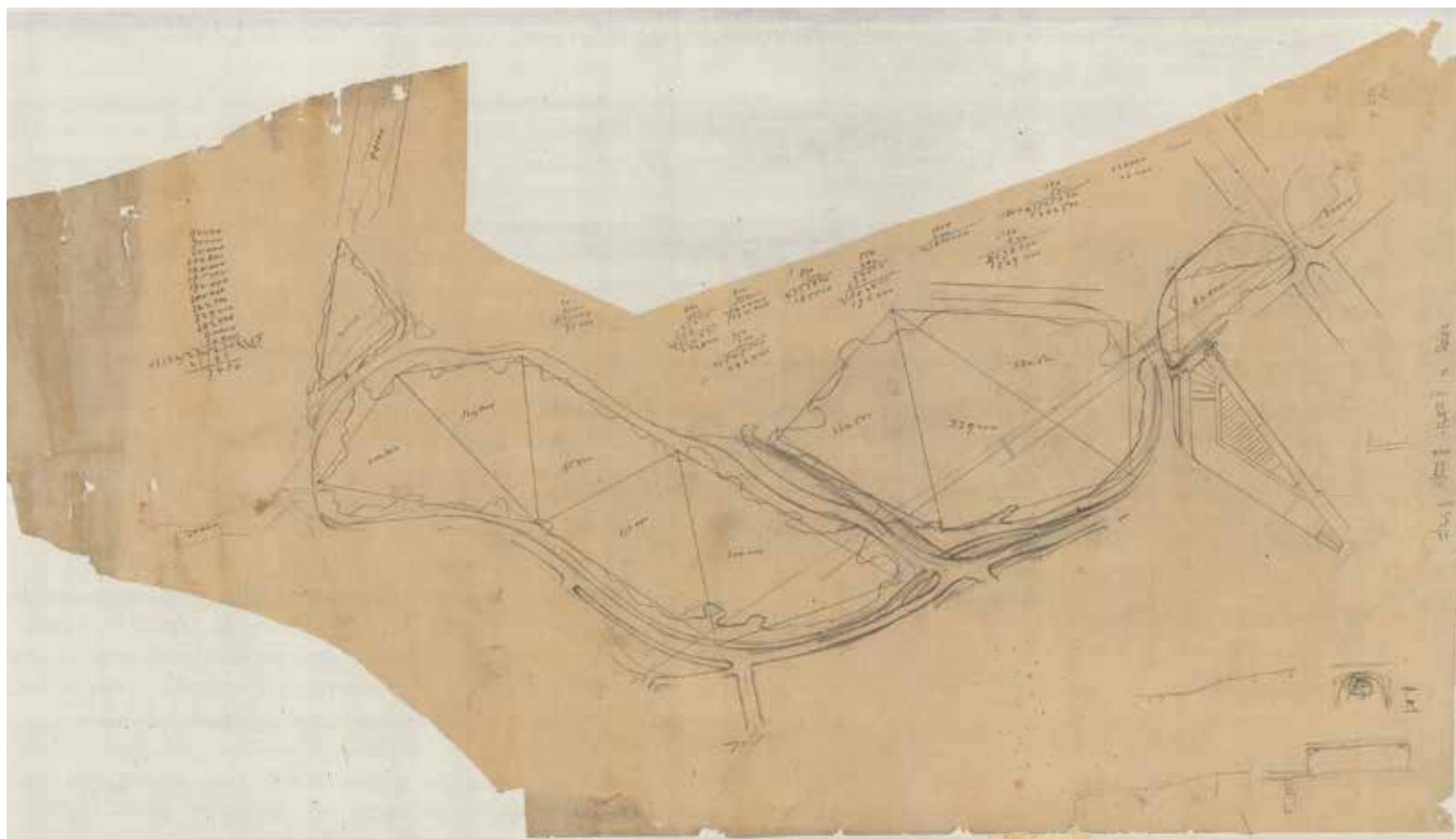
COURTESY OF THE UNITED STATES DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE, FREDERICK LAW OLMSTED NATIONAL HISTORIC SITE

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OLMSTED CONSIDERED THE PROJECT TO BE A “SANITARY IMPROVEMENT.”



BELOW
The situation in 1902; the Fens appears to be a natural wetland, just as Olmsted intended.



ABOVE
Archival diagrams from Olmsted's office depict calculations of water surface.

The unique system of roads, bridle paths, and walkways that Olmsted designed through and around the Fens also served a double purpose. The roads and paths were deliberately situated on different height levels and connected by carefully designed slopes. Besides adding scenic value and offering an optimal experience for all users, the separation of traffic at different heights also served to maximize the volume of floodwater that the area could hold.

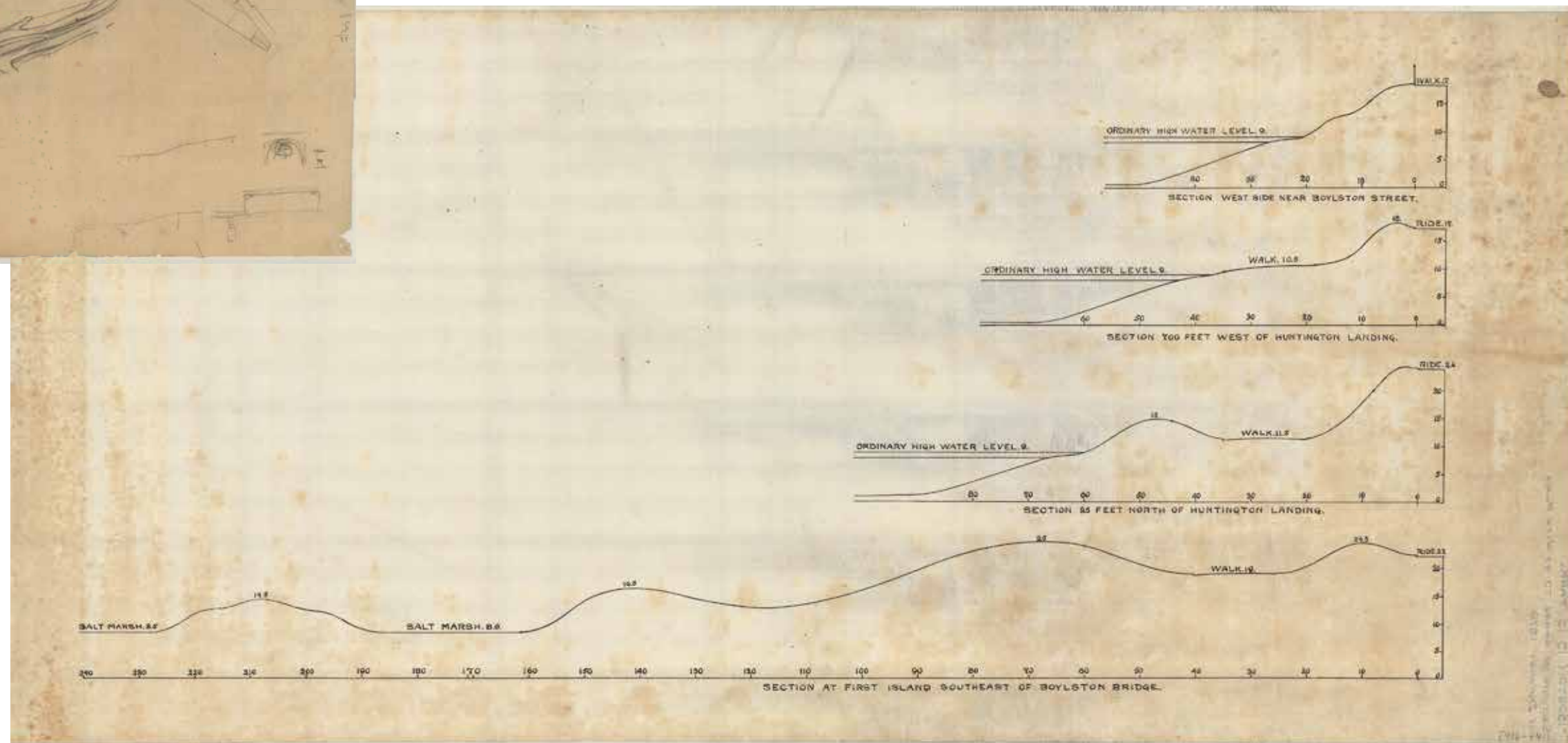
In contrast with the straight city streets, Olmsted designed the roads surrounding the Fens as gently curving scenic routes that would encourage traffic to slow down and appreciate the views over the water. A range of park entrances were designed to connect the Fens with the main infrastructure, ensuring a strong connection with the city and easy access for the public. Over time, buildings were erected along the attractive curving roads surrounding the Back Bay, thus gradually shaping the city around it.

COURTESY THE UNITED STATES DEPARTMENT OF THE INTERIOR, NATIONAL PARK SERVICE, FREDERICK LAW OLMSTED NATIONAL HISTORIC SITE

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RIGHT
Artist impression of the Back Bay area, showing Olmsted's design for the Back Bay Fens amid the developing city.

BELOW
An archival document shows sections of different slopes of the Back Bay Fens.





ABOVE
The invasive reed species *Phragmites australis* has invaded large areas of water in lower parts of the Back Bay Fens, as shown in 2017.

The construction of the Charles River Dam, in 1910, marked an unfortunate phase for the Fens. The elimination of tidal influence in the Back Bay put an end to a key principle of Olmsted's plan less than two decades after the project was finished. Between 1910 and 1975, the Fens suffered a series of additions and changes to the original design, such as a playing field, a rose garden, a war memorial site, and the Victory Gardens, all of which still hold a special meaning and great value for the community.

Despite their significance, without exception, these changes have led to a decrease in the clarity and coherence of the original design as well as to a gradual reduction of water storage capacity.

Several recent floods, in particular major flooding in 1996, caused extensive damage to the surrounding urban area and have led to the understanding that the Fens still serves as a major water retention tool for the city, but it needs con-

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WORKING WITH NATURAL SYSTEMS REQUIRES HAVING A LONG-TERM PERSPECTIVE.

stant maintenance and care. This event marked the start of new master planning and extensive resaturation of the Riverway and Back Bay Fens.

In the past couple of years, restoration works have been carried out in the Back Bay, such as the removal of the former Sears, Roebuck and Co. parking lot that was realized in the 1970s and was a major intrusion in the park system, again daylighting the Muddy River and restoring the parkway in its old glory as much as possible, while more improvements are underway.

The example of the Back Bay Fens shows that Olmsted embraced hard engineering solutions as a crucial part of his design, but he smartly combined these with soft landscaping, thus simultaneously solving environmental problems and creating an appealing landscape open to all residents of Boston. Olmsted was a pioneer in having an integrative and holistic approach to the city.

Since Ian McHarg published his book *Design with Nature* in 1969, general understanding of the relationship between human land use and the natural landscape has become more and more evident, and one would expect designing with natural systems since then to have become common practice.

However, the pressure to quickly realize feasible projects through standard technical solutions is strong, and financial, political, and legal preconditions have not always fully evolved enough to support innovative large-scale interdisciplinary projects. Olmsted understood that working with natural systems requires having a long-term perspective, considering the rhythm and dynamics of nature, and making investments now that will pay off in the long run. ●

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