



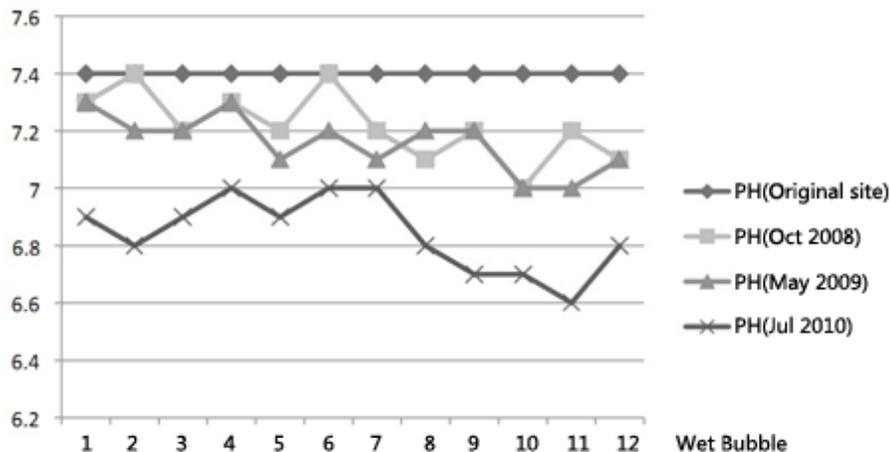
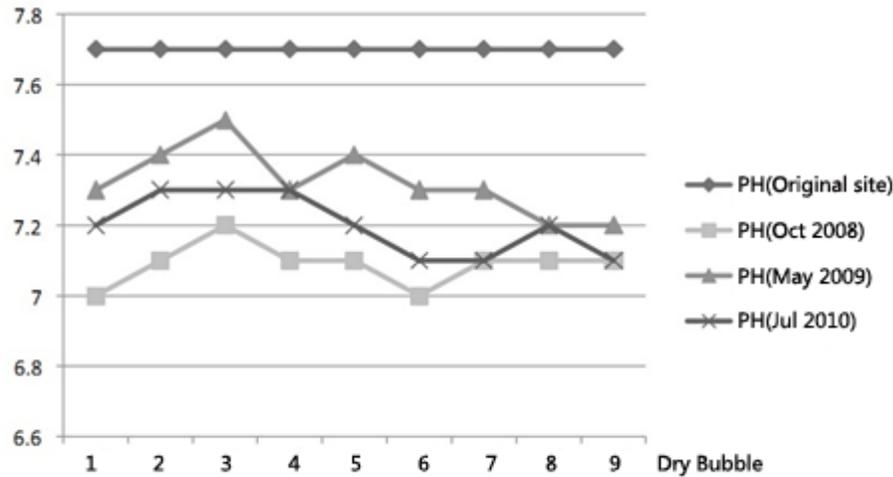
LANDSCAPE PERFORMANCE SERIES

Tianjin Qiaoyuan Park: The Adaptation Palettes – He Dong Qu Tianjin, China Methodology for Landscape Performance Benefits

Environmental

- **Improves soil alkalinity in the dry ponds and water quality in the wet ponds as evidenced by field measurements. Soil pH dropped from 7.7 and now fluctuates around 7.2, and water pH levels dropped from 7.4. to 7 or less.**

For this test, sample soil was taken from the bottom of the “bubbles” (wet and dry ponds). The results are as follows:



- **Increased the habitat value of the site, with the number of herbaceous plant species increasing from 5 on the existing site to 58 following park construction to 96 two years**

after the park opened. Ducks, geese, foxes, hedgehogs, rats, and weasels have been observed on the site.

According to statistical data of plant and animal species collected by Li Lin of Peking University in her 2011 post-occupancy evaluation, herbaceous species greatly increased, from 5 (four kinds of xerophytes, one kind of aquatic plant) to 96 species (85 kinds of dry plants, 11 kinds of aquatic plants). The number of tree species increased from 2 to 50, and animal species increased to 6, accounting for ducks, geese, foxes, hedgehogs, rats and weasels.

Total park plantings included 58 varieties of perennials and 50 varieties of woody plants. Plant communities were allowed to evolve and adapt over time.

- **Sequesters an estimated 539 tons of carbon in the trees and plants on the site, a service valued at approximately \$7,200.**

The calculation included the carbon sequestration benefits provided by trees and the extensive perennial plantings in the park. The online Tree Benefit Calculator (www.treebenefits.com) was used to calculate the total carbon sequestration from the 2,950 shade trees of mixed species planted throughout the park. As a result an estimated 527 tons of carbon is sequestered in these trees. Shade tree species include ginkgo (*Ginkgo Liloba L.*), willow (*Salix babylonica*), pagoda tree (*Sophora japonica Linn.*), Chinese ash (*Fraxinuschinensis Roxb*) and so on.

According to the study undertaken by Hongyu Wang and Guangsheng Zhou, the carbon fixation of reed wetland is 13.32t/ha, therefore it is estimated that 12tons of carbon are sequestered in 8,997m² reed.

According to statistics from China CDM project Management Center, sequestering 1 ton of carbon cost at least \$13.40; in this situation sequestering 539 tons of carbon can be valued at approximately \$7,223.

Social

- **Reduces the noise level from 70dB outside of the park to 50dB in the park as evidenced by field measurements.**

Noise was measured using hand-held noise meters to take readings at 6 points inside the park and 6 points outside the park along the highway that forms the northwest border of the site. See map at right for locations.



- **Improves access to green space for the 20,000 nearby residents who can now walk to a park in less than 15 minutes. The park is also served by 26 bus routes.**

Before this park was constructed, the closest park for the 20,000 nearby residents was Hedong Park, located about 1.7km away. Assuming a walk pace of 1.2m/s (<http://wenwen.soso.com/z/q97030475.htm>), it would take residents at least 24 min to get to this park. Since the construction of Qiaoyuan Park, their travel time to a nearby urban green space is significantly reduced.

- **Is a significant destination within Qiaoyuan Park, which is visited by 350,000 people every year, most of whom come from the surrounding communities. Of these visitors, over 50% are senior citizens and 40% are children.**

According to statistics from the Qiaoyuan Park Administration, 350,000 people visit Qiaoyuan Park every year. Among them, over 50% of the visitors were senior citizens and 40% were children. Most of the visitors were from the surrounding communities.

- **Provides educational opportunities for approximately 500 children from nearby schools, with additional students participating in summer vacation programs and regular activities at the adjacent Bridge Museum.**

The Bridge Museum is located in Qiaoyuan Park, adjacent to the Adaptation Palettes. Nearby schools send about 200-300 students to visit the Bridge Museum twice a year. In addition, groups from the surrounding community, such as the autonomous Residents' Committee organization, hold summer vacation programs for children at the Bridge Museum and park up to three times each year. The Bridge Museum itself also organizes many activities and receives about 2,000 visitors annually.

- **Improves ecological awareness and environmental consciousness of park visitors, with 83% of people surveyed saying they approve of the park's ecological style.**

According to a questionnaire, 83.2% people surveyed said that they approved of the park's ecological style. The ecological design concepts of the park and interpretive signs within the park raised awareness and increased the residents' knowledge of their surrounding environment.

Economic

- **Saved approximately \$25,500 in lumber costs by reusing 84.5 cubic meters of old railroad ties in the construction of the observation platforms and bridges.**

84.5 cubic meters of salvaged railroad ties were purchased and used in the construction of the wood platforms and bridges in Qiaoyuan Park. Given the prices of old crossties (\$107 dollars per cubic meter) compared to new treated lumber (\$408 dollars per cubic meter), the park saved an estimated \$25,500 in material costs.

Cost Comparison Methodology

- **When compared to the typical cost of weeding, pruning, irrigating, and fertilizing a traditional park, the low-maintenance "bubbles" (wet and dry ponds) save nearly \$19,000 in maintenance costs each year.**

In a traditional park, the maintenance for green areas includes weeding, pruning, irrigation, and

fertilization. Typically, the labor cost is \$0.69/m², the cost of fertilizing is \$0.08/ m², and the cost of irrigation is \$1.31/ m². As the eco-designed “bubbles” need almost no maintenance, the resulting savings are \$18,714 per year for the 8,997 m² area. (Wet bubble area is 5,371m², dry bubble area is 3,626 m².)

- ***The design of the ponds and use of native plants maintain water quality, requiring only small applications of water treatment chemicals. This saves nearly \$5,000 each year when compared to a traditional park’s spending on water treatment chemicals.***

Only a few water treatment chemicals are needed to maintain water quality with an annual cost of \$1,572. A traditional park spends \$6,556 a year in chemicals to maintain water quality (<http://zfxgk.beijing.gov.cn/columns/97/2/262143.html>). That is an annual saving of \$4,984.

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