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超越场地的多维度观察：昆山杜克花园的情境生成

OBSERVATIONS BEYOND THE SITE: UNFOLDING OF LANDSCAPE PROCESS IN THE DESIGN OF DUKE GARDEN IN KUNSHAN

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摘要

观察是阅读场地与启发设计的开始。当设计场地缺乏明显特征时，设计者不仅需要细致观察，同时也要跳出场地现状限制，通过研究拓展观察范围。这个过程包括对场地内在因素的思考，以及针对设计对象的核心内涵进行场景参照与延伸，形成情境的模拟、选择与表达。江苏省昆山市杜克花园的场地现状属于典型中国城郊景观，缺乏明显的地理特征，这迫使设计师进行场所精神的深度挖掘。这样依托于情境生成的另类观察过程从三个角度入手：一是对同一脉络下异地先例的审视比较；二是对超越场地范围的区域生态开展地文学研究；三是从时间维度考察前期项目的效果及其与后期项目的关联性。这三个方面的观察使杜克花园的设计得以探索“花园”一词的当代精神内涵，最终表达为具体的设计形式。

关键词
杜克花园；花园精神；异地性；地文学；延时性；情境；观察与表达

ABSTRACT

Observation is the beginning of reading site and inspiring design. When the site lacks obvious features, designers not only need to observe in detail but also step out of the site's physical boundaries and expand the scope of observation. This process involves reflection on the intrinsic factors of the site, seeking landscape reference in the broader context according to the subject's core connotations, through which design concepts can emerge from the simulation, selection, and expression of scenarios. The new Duke Garden, located in the city of Kunshan in Jiangsu Province, is situated in a typical Chinese suburban area, which bears little distinction in geographical features. The ordinary site condition forced designers to search for deeper characteristics of the place through alternative methods which allow designers to examine the site from three perspectives: 1) through the study and comparison of precedents which share a spiritual lineage; 2) through the physiographical investigation on regional ecosystem to which the site belongs; and 3) through a revisit of the preceding phases of the project and a probe into the temporal connection between adjacent sites. Observations from these three perspectives have enabled the design of Duke Garden to explore contemporary spiritual connotations of the landscape typology of “garden” and intepret it through this project.

KEYWORDS
Duke Garden; Garden Spirit; Off-Site; Physiographical; Time-Lapse; Scenario; Observation and Representation

1 项目背景

杜克大学昆山校区坐落于江苏省昆山市西北部的高教园区内，是由昆山市支持，杜克大学与武汉大学联合创办的学校。校园总面积约77.5hm^2，其中杜克花园位于校园东部与东北部，占地约28.9hm^2（图1）。目前，一期校园已经建成，二、三期校园和杜克花园正在同步建设中。

杜克花园场地现状为典型的城郊景观（图2），以农田为主，包含部分苗圃，一条市政道路从场地中部穿过。场地北部人工挖掘形成的白窑湖约9.5hm^2，东侧为宽约25m的渠化河道。由于长期的土方挖掘，湖岸和水渠岸线呈规则几何形。水体最深处达11m，穿透两层地下水层，但水质只达到IV~V类。场地中植物品种与栖息地类型单一，仅在北侧岸际有部分成熟乔木，中部有小片苗圃植被。如何通过设计修复遭到破坏的场地特性，还原生态活力，提升水质，增加生物多样性；以及如何在缺乏设计依据的情况下赋予杜克花园新的、鲜明的场所精神，成为杜克花园设计面临的两大挑战。

2 场地观察与设计过程

在西方造园理论中，设计师通过造园过程将自然与人造物进行融合式演绎，形成了所谓的“第三自然”。这一概念最早由文艺复兴时期的史学家雅各布·彭法迪奥和巴尔托罗莫·迪亚吉奥几乎同时提

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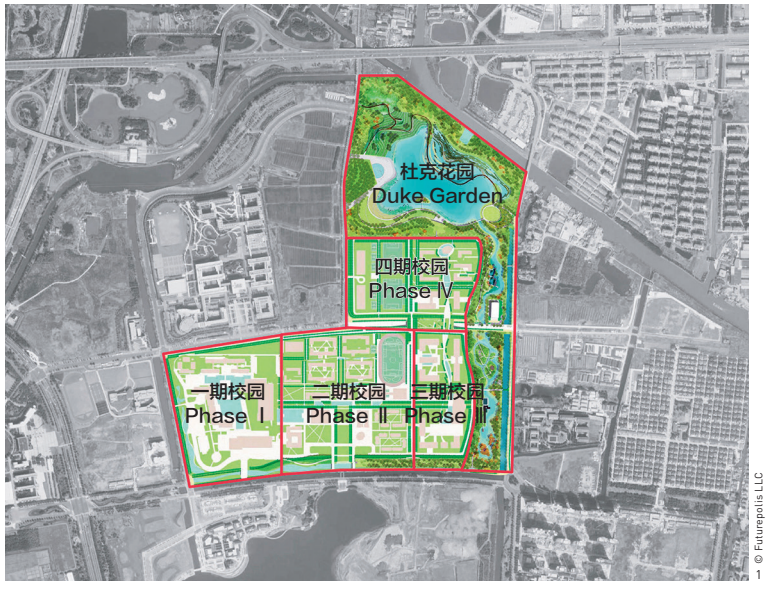

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出；当代艺术史学家克劳迪娅·拉扎罗将其解释为自然与艺术交织而成的难以分辨的整体。自然成为了艺术的创作者并具备了艺术本质，二者结合后创造了一种区别于自身的全新存在——“第三自然”①[1]。

美国杜克大学本部的杜克花园即是基于“第三自然”理念设计的经典案例。花园场地位于北卡罗莱纳州的山麓地带，这片曾经鲜有人迹的原始景观构成了“第一自然”，以宗教、科教、园艺为代表的一系列人工元素通过造园过程融入了当地的自然生境，从而营造出兼具人工与自然特征的“第三自然”。

昆山所属的中国江南则代表了另一种与之相通又相异的造园传统。江南私家园林在建造之初往往没有太多特殊地形和显著自然特征，大多只是由围墙从城市或郊区中切割出来的平地，区别在于地块大小和围合度。造园者基于对场地的观察和对南方山水的理解，将选择与合成的情境投射到场地上，所形成的“第三自然”呈现出高低错落、山水相间、楼台掩映的景象。尽管景观元素大同小异，每个园林却都独具特色。

昆山杜克花园延续了中国江南园林的情境塑造方法：它没有简单地复制杜克大学本部花园的形式或元素，而是在精神传承的基础上，通过广泛了解场地文脉，深入挖掘场地潜力，从而形成根植于本地的景观解决方案。人与自然的关系是随着历史与文化变迁的，“花园”的内涵也随之拓展。杜克大学本部花园的历史发展为昆山的设计设定了坐标，而新的情境塑造过程则立足于江南水乡的区域背景。设计师既需要回应当代生态语境下的校园文化，也需要以回应生态环境问题为切入点寻找当代花园精神。在这一思路下，基于三个不同视角的深度观察逐步帮助设计师形成设计概念，分别是异地性考察、地文学考察和延时性考察。这三个过程不仅包括通常的地形地貌与植被的视觉感知与记录，还切入了深层的分析与思考——从“观察”（observation）的范畴深入到了“考察”（investigation）的范畴。

2.1 异地性考察

异地性考察，即通过洞悉“别处”相似的文化景观与文化传统，达到精神境界的迁移。在昆山杜克花园项目中，设计团队通过对杜克大学本部花园的景观情境考察，思考如何将一部分相似的花园文化精神植入昆山杜克花园。

杜克大学本部围绕著名的杜克教堂而建，它刚柔并济的布局与东西交融的设计体现了杜克大学“博学笃信”的校训，即知识与信仰的融合。在美国杜克花园的克伯森亚洲树木园中，符号化的日式红桥是美国造园师对东方异国情调的援引（图3），反映当时西方社会对东方

① 拉扎罗在《意大利文艺复兴花园》一书中的原句是“自然和艺术是不可分割的整体，自然既是艺术的创造者也具有艺术的精髓。它们共同缔造了一个既非自然也非艺术，而是由两者共同创造出来的存在”。

1. 分阶段建成的校园及杜克花园区位图
2. 场地现状航拍照片（向西）。一期校园已经建成，二、三期校园和杜克花园正在同步建设中。

1. Location of the phases of campus construction and Duke Garden
2. Bird's-eye view from east. Phase I of the campus has been built up while Phase II and III as well as the Duke Garden are still under construction.


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3 © Erika Zambello

3. 杜克大学本部花园日式红桥。在克伯森亚洲树木园内，这座木桥横跨在园内的小河上，掩映于竹林中，反映了美国景观设计师对东方文化的想象。
4. 水袖桥渲染图。平行于水上森林的人行栈道，灵感来源于昆曲中的水袖。
5. 鱼鳞铺装渲染图。滨水步道的铺砖灵感源自“太湖三白”中的白鱼形象。
6. 区域土壤分析。昆山区域内主要由夯实土、高活性强酸土和强淋溶土组成。场地位于大面积的夯实土区与高活性强酸土区的交界处。

3. The red bridge in Japanese style in the original Duke Garden. Located in the Culberson Asiatic Arboretum, the wooden bridge hides itself behind the bamboo, reflecting the curiosity in and reception of the oriental culture in the West world at the time of its building.
4. Rendering of the water sleeve bridge. The bridge runs parallelly to the promenade in the wetland forest like a long dance sleeves of Kunqu Opera costume.
5. Rendering of the fish-scale-liked pavement. The pattern comes from the scales of whitefish, which is known as one of the three famous "white" symbols of Taihu Lake in Jiangsu Province.
6. Analysis of soil at regional scale. The soil of Kunshan is mainly composed of compacted soil, highly active acid soil, and highly leached soil. The site is located at the transition belt of compacted soil and highly active acid soil.

文明的好奇与接纳。在当代的语境下，以杜克大学为代表的美国高等教育被引入中国，杜克大学本部花园成为即将建成的昆山杜克花园的“别处”。因此昆山杜克花园在设计上回应了杜克大学本部花园对东方文化的想象，二者在精神上一脉相承，但在表现上需要加以区分。设计团队相信这个项目需要基于明确的地域性，而地域文化应以当代的尺度和与西方对话的方式来传达。具体落实在对江南园林的理解上，江南文化以无胜有，大面积的白墙黛瓦犹如中国山水画的留白；江南园林中的短桥往往是最简单的石板，连栏杆都没有。在昆山杜克花园中，江南园林的这些特质以含蓄的方式表达在了一些被抽象化了的景观元素中（图4，5）。

但在功能与绩效层面，杜克大学本部花园对昆山的设计具有很强的借鉴意义。1935年夏，北卡罗莱纳州暴雨造成的洪涝摧毁了刚刚兴建一年的杜克花园。重建时，设计师艾伦·彼尔德·希普曼刻意抬高了地势，并更换了植栽。1980年，设计师琳达·朱厄尔又开挖了蓄水湖，使花园能够更加韧性地应对洪水[2]。

相应地，设计团队保留并将白窑湖水体转化为中央水景，遵循填挖方平衡原则改造周边水深与岸线形态，恢复了有益于重塑湿地栖息地的水体特征；设定调蓄容量，使中央水体成为周边区域的大“海绵”；针对不同水源设计不同的净化路径，逐步提升水质，并通过东侧水道，为周边地块和待建校区输送净化水源。这一系列设计既垂范了杜克大学本部花园的设计，也反哺了昆山本地的生态环境。

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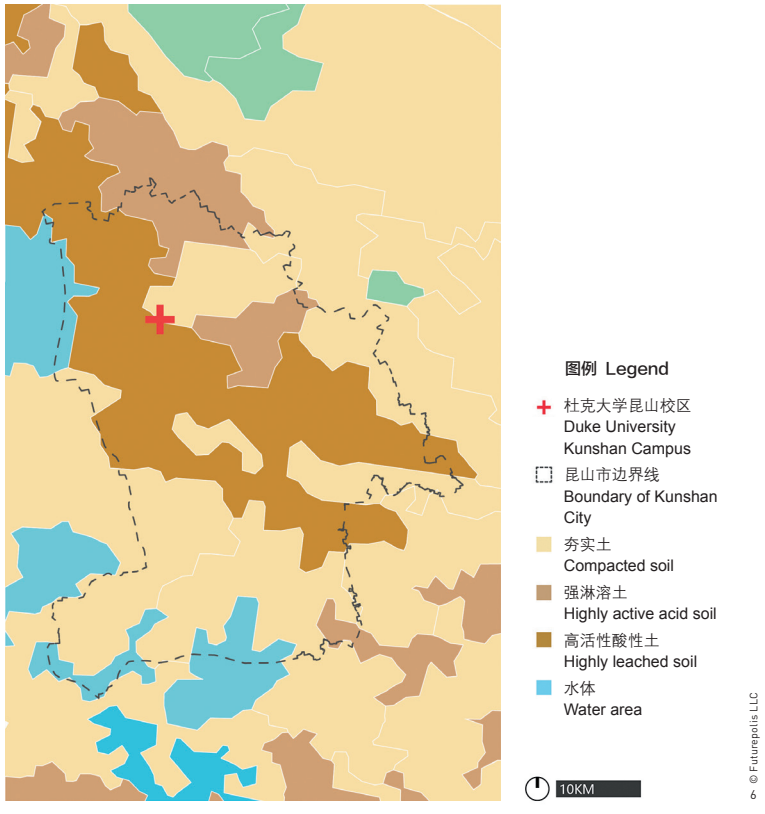
2.2 地文学考察

地文学考察来源于伊恩·麦克哈格开创的生态分析与设计的方法体系。它是对大尺度区域环境的多维度X光透视式检查，通过分类法和

② 贝里兹拜迪亚在《阿姆斯特丹森林》一文中的原句是“景观的价值（或是个体的或是社会的）通过一个开放设计的体系来表达，这个体系通过诸如风和水的冲蚀和植物的轮替建立一个生物进程，并通过对场地产生的作用来塑造它的景观”。

③ 对一期校园水处理策略的具体介绍详见曾颖发表于《时代建筑》2017年第4期的《水生态在空间与时间维度上的塑造：昆山杜克大学校园作为微型海绵城市设计的解析》一文，以及时惠来和林中杰发表于《建筑学报》2018年第3期的《“上善若水”：昆山杜克大学生态景观设计》一文。



剖面法的结合，对不同地文特征进行立体剖解，得到适宜性结论[3]。这种对地理要素的深入考察可帮助设计者发现不同地理人文信息在各层面的联系，从而推导出地文特征背后的因果关系，使设计因地制宜。

针对基地缺乏景观特色的现状，设计团队将场地放置于更为宏观的生态尺度下进行考察，从而更好地确定场地在区域中的定位。首先，昆山地区湿地密布，是候鸟迁徙路线上的重要驿站，而杜克花园则位于城市近年着力打造的高教区绿网系统内，使其成为连接周边绿地、湿地及生态廊道的有机组成部分。这些条件为解答场地绿化密度低和生态条件不佳等现状问题提供了线索。同时，设计团队从水文、土壤和植被等方面对昆山所处的苏南冲积平原栖息地进行深入调查，采用地文学分析方法，获取更为精确的生态信息，帮助设计团队构筑新的景观情境。

在水文层面，昆山地区所在的苏南冲积平原是以水为基底的自然冲积地带，地形平整、地质柔软有弹性且渗水性较强。杜克花园的设计通过大面积的“软质元素”还原与原始地貌相近的空间形态布局，有意模糊水地分界，凸显出江南景观中的柔性感官特征。在土壤和植被方面，历史上苏州地区长期的水稻种植已基本改变了区域内原本的土壤结构，一般认为主要由人为夯实土组成。但分析发现，昆山地区的土壤构成中还有高活性强酸土和强淋溶土（图6）。其中，强淋溶土的存在使设计团队有理由推断这里曾存在大面积的森林景观。设计团队结合气候与植被等其他元素的地文分析最终得出了能够反映区域原始景观多样性的组合类型：森林、草甸与淡水湖泊的组合。设计借此围绕湿地森林、湿地草甸与水岸混合带创造出新的栖息地，强化生态结构，提升生态连通性，并恢复温带草地景观，用更可持续的景观类型替代高作业强度的农地景观（图7）。

在勾画平面草稿时，设计团队从水滴滴落在纸面的印迹与动态中获得灵感，并在具化过程中参考各个栖息地所需的最小面积做出相应调整，使水面轮廓与栖息地功能形态基本吻合（图8~10）。同时，设计团队尽量让以上几种栖息地以其自身最朴实的状态呈现在使用者眼前，并依托开敞的湖面，让光线、水、倒影提升游览体验，这种趋于自然的表达方式力图将人带回到一个不事雕琢的情境中（图11）。

2.3 延时性考察

延时性是景观都市主义具有代表性的概念，即景观不是创造出来的静态场景或画面，而是在很长的一个时间段中逐步成长、演化、成熟乃至最终衰退的过程。景观设计需要考虑社会与自然因素的不断介入，更有效地设定与引导城市景观生态的演变[4]。正如景观理论家安妮塔·贝里兹拜迪亚的观点，后现代的设计在结果预期上是开放式的，它通过设置“生物性的过程”让所设计的景观在时间轴上演变，在逐步呈现的过程中景观得以构建②[5]。

昆山杜克大学作为一个系列项目，提供了很好的延时性考察的机会。在一期校园设计中，设计团队即构建了对整个场地生态功能与空间营造的初步设想。该设想在一期到二期再到杜克花园的递进式设计过程中得到不断检验和修正。在一期校园设计中，设计团队即从生态系统的视角出发考虑如何模糊人工与自然界限，使其相互渗透。由此带来的动态平衡和冗余，为校园空间创造了更多韧性，从而能够有效应对极端气候事件。如一期校园的中央景观湖具有系统管理雨洪的中枢功能，湖心平台亦可适应水位变化而呈现出不同的空间状态（图12~14）。场地周边看似自然的水生池塘实际上也暗含着一套完整的雨水处理系统，并很好地运行了生物净化的一系列程序③[6][7]。这在一定程度上引导了杜克花园的设计方向——杜克花园中心水体的设计采取了类似的水位调控方法，使水生态处理和景观空间的塑造合二为一（图15）。

在表达手法上，如果说一期校园是江南私家园林的当代阐释与海绵城市的微缩模型，那么杜克花园则是以花园之名融合江南地区的地理特征，是江南景观系统在当代语境的呈现。一期校园中以土木工程方法为主，景观配合建筑去塑造室外空间，强调设施的系统作用；而在杜克花园的设计中，景观成为主体，开阔的空间促生了一种更加简练和独具意境的创作。但是从整体来看，一期、二期与花园是密不可分的，它们不但带来空间上的系列收放和流线变化，而且在水量和水质方面互相调蓄。杜克花园与主校区共同形成了一个“海绵”，使校园整体上具备更高的生态韧性（图16，17）。

在使用中，一期校园的空间营造和美学理念得到了师生的普遍认

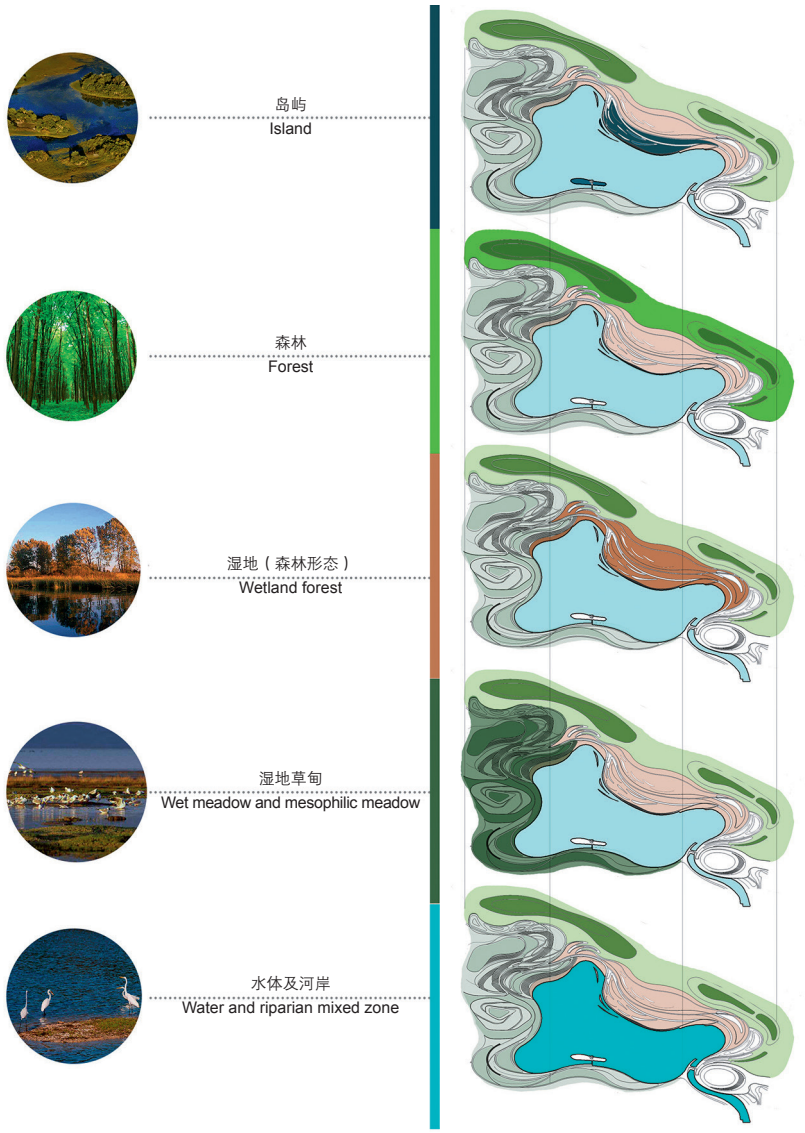
可（图18）。与此同时，校园的湿地景观也成为了生态课程的教学场所，学生在科学教育中更加认同校园的文化定位（图19）。可以说，对一期校园建成效果的观察和使用的反馈鼓励了设计团队在杜克花园中更坚定地摈弃流于表面的形态设计，转而将设计融于生态功能和多样化的空间体验中，通过空间序列和节点而不是符号化元素来突显地域文化，将注意力全面聚焦于有长期效应的生态重建上。

3 讨论与评述

“观察”一词的涵义是多解的。在昆山杜克花园的设计过程中，观察不仅包括在场行为，还引入了研究，将“观察”拓展到“考察”的范畴。这个拓展的过程包含了异地性考察、地文学考察和延时性考察三个方面。这三种考察过程帮助设计师逐步厘清思路、反思“观察”的内涵、发掘场地潜力。这种工作方法也将设计考察的范围从在地扩展到区域乃至全球，同时把时间维度纳入空间设计的考察范畴，搭建起景观情境的演化框架。

杜克花园项目也让我们有机会重新审视“花园”这一古老的景观类型。麦克哈格在《自然不止于花园》一文中曾说，与其他设计类型相比，花园是在做一种简化的工作，在其创造过程中排除了很多自然现象[8]。而昆山杜克花园的设计则试图将多种景观生态浓缩于花园之中，这证明二者未必互斥。设计团队不仅借助延时性考察给出了一个跳出追求静止与永恒之美的传统花园的局限而去拥抱“时间与变化”的设计方案，同时也在异地性考察中思考了“花园的当代意义”。这些思考促使设计师尝试对花园精神作出基于场地特征的诠释，并在地文学考察的辅助下，实现了生态景观的系统化布局。

需要强调的是，设计团队在项目中所采用的“考察先于设计，分析贯通设计”的方法虽然已是欧美设计实践中的主流思维，但在中国仍待普及。随着中国更多的城市发展计划付诸实践，郊区景观的设计需求也会持续增长。在面对缺乏场所精神的场地时，设计师同样可以跳出直观景象的限制，开展一些溯源性的、区域性的、延时性的考察工作，并以此为出发点展开设计，摈弃过度表达，追求以“空”为“多”、用“境”生“景”的设计目标。**LAF**



7. 杜克花园中不同种类的栖息地。将新造的栖息地具体化为景观形态，由水体向周边扩展，彼此相连形成一个微生态系统。
8. 杜克花园平面设计草图

7. Different habitats in Duke Garden. The proposed habitats are represented into specific landscape patterns according to the outline of the water body, together forming a micro-ecosystem.
8. Sketches of the site plan of Duke Garden

项目信息

项目地址：中国江苏省昆山市高教园区
项目面积：28.9hm^2
项目委托：昆山创业控股集团有限公司
景观设计：Futurepolis未来都市规划建筑设计事务所
首席设计师：时惠来
设计团队：林中杰、高伟、庞会涛、郑立
合作团队：法国Biotope生态工程咨询公司
设计时间：2018年9月–2019年10月
施工时间：2019年9月至今

致谢

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1 Project Background

Duke University Kunshan Campus is located in the Higher Education District in the northwest of Kunshan, Jiangsu Province, China. It is a new research university jointly created by Duke University in the USA and Wuhan University in China and funded by the government of Kunshan. The total area of the campus is around 77.5 hm^2. Duke Garden is located in the east and northeast of the campus with an area of about 28.9 hm^2 (Fig. 1). Phase I of the campus has been built up while Phase II and III as well as Duke Garden are still under construction.

Kunshan Duke Garden is situated in a typical suburban landscape (Fig. 2). It is occupied by farmland and several plant nurseries, with a municipal road passing through. The excavated Lake Baiyao in the north of the site is around 9.5 hm^2. In the east, there is a canal of around 25 meters in width. Due to the long-time practice of excavation, the edges of the lake and the canal are shaped in regular geometry. The deepest depth of the water body is around 11 m, penetrating two layers of groundwater. However, the water quality are found in Class IV and V. The site is monotonous in terms of plant species and ecological habitats; there are only some matured trees to the north of the lake and small clusters of plant nurseries in the middle of the site. Therefore, the two primary challenges of the design of Duke Garden include: 1) how to restore the natural character of the site that has been damaged during excavation and farming, while enhancing ecological vitality, water quality, and biodiversity; and 2) how to provide Duke Garden with a fresh spirit of the place under the limit of the absence of distinctive site identity.

2 Site Observation and Process of Design

In Western garden theories, designers merge nature and artifact through garden making to form the so-called Third Nature. This concept was initially proposed by Renaissance historians Jacob Bonfadio and Bartolomeo Taegio. Contemporary art historian Claudia Lazzaro revisited the interpretation of this concept as the interweaving of nature and art into an indistinguishable whole. The nature becomes the creator of art and gains the essence of art. The combination of the two creates a completely new being, which is neither one nor the other, but a "Third Nature." ①[1]

The original Duke Garden of Duke University in the USA is a beautiful manifestation of this theory. The garden is located in the Piedmont region of North Carolina, characterized by its wild landscape with little intervention by humans, which constitutes the First Nature. A series of artificial elements, represented by

图例 Legend

1 净水湿地 Water purification wetland
2 人工湿地 Constructed wetland
3 入口广场 Entrance plaza
4 旱喷广场 Dry fountain plaza
5 停车场 Parking lot
6 水袖小道 Water sleeve path
7 保育草地 Conservation meadow
8 湿地栖息地 Wetland habitat
9 森林栖息地 Forest habitat
10 中心水体 Central pond
11 观鸟屋 Bird-watching cabin
12 主要体验路径 Main path
13 自然课堂路径 Path of nature education
14 覆土建筑 Earth-sheltered building
15 亲水平台 Waterfront platform
16 露天舞台 Outdoor stage
17 水袖桥 Water sleeve bridge
18 水上森林 Wetland forest
19 保育森林 Conservation forest
20 创意花园 Workshop garden
21 冥想空间 Meditation room
22 休憩平台 Rest platform
23 现有电站 Existing substation
24 曲桥 Meandering bridge
25 竹林幽径 Bamboo path
26 静思小筑 Reflection folly
27 跌水景观 Water cascades

① Lazzaro's original statement in *The Italian Renaissance Garden* is "nature and art are united into an indistinguishable whole, in which nature becomes the creator of art and shares the essence of art. Together they produce something that is neither one nor the other, and is created equally by each."

9. 杜克花园总平面图。花园里北部以生态净化和人群聚集的功能为主，南部并行的几条人行小径提供了更加私密的环境，让人在游赏之余可以静思。

9. Site plan of Duke Garden. The north part functions as an ecological purification and a gathering area while the south part provide more private spaces to stay in quiet.

religion, science, education, and gardening, were integrated into local habitats when the garden was built, thereby creating a Third Nature that claims both artificial and natural characteristics.

The Jiangnan Region (South-eastern area of lower Yangtze River Delta), where Kunshan is located, represents a similar yet different garden-making tradition. The potential sites for private gardens in Jiangnan urban areas usually lack distinguished topographies or natural features. Most of them were simply parcels of flat lands framed by walls separating them from the busy city, although these plots vary in size and peripheral circumference. Based on the observation of the site and understanding of the Jiangnan landscape, literatis projected a selected and synthesized scenario onto the site, forming a Third Nature through the interaction between nature and buildings, and between water and terrains. Although the landscape elements are similar, specific employment of such a method, however, makes each garden unique.

The design of Kunshan Duke Garden further develops the scenario-making method of the gardening practice in Jiangnan. It does not simply replicate the form or elements from the original Duke Garden; instead, it is based on spiritual inheritance to invent a landscape design solution that is rooted locally through investigation of the city's cultural context and exploration of the potential of the site. The relationship between human and nature is related to the vicissitude of history and culture, and the connotation of "garden" has also been extended. The evolution of Duke Garden in the USA gives a reference to its counterpart in Kunshan, which combines with new contemporary interpretation of the local water-town landscape tradition in Jiangnan. The designers need to respond to the university culture with the contemporary ecological context, and look for the contemporary garden spirit with an environmental consciousness as the point of departure for the design. Based on this idea, deep observations in three perspectives gradually assist the designer team to come up with design concepts, which consists of off-site observation, physiographical investigation, and time-lapse observation. Besides the commonly-used perception and recording of topography and vegetation, these three processes also have involved analytical thinking at a deeper level, which go beyond the realm of "observation" towards the territory of "investigation."

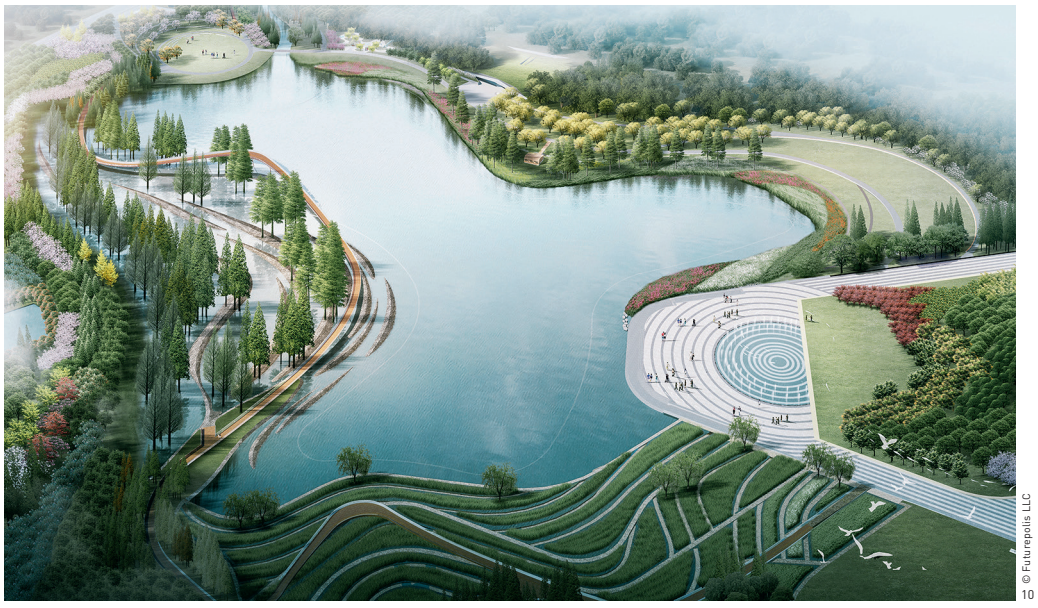
2.1 Off-Site Observation

Off-site observation describes the migration of the spiritual state through insights into similar cultural landscapes and traditions located elsewhere. In Kunshan Duke Garden project, the design team considered how to embed a portion of similar garden cultural spirit into the design by studying the landscape of the original Duke Garden.

Duke University in North Carolina was built around the renowned Duke Chapel. Its forceful yet harmonious layout and integrated aesthetics of the East and the West reflects Duke University's motto, "Eruditio et Religio," i.e., the merge of knowledge and faith. In Culberson Asiatic Arboretum which is part of Duke Garden, the symbolic red bridge in Japanese style represents the American garden designer's imagination of oriental exoticism, which reflects the curiosity in and reception of the

10. 花园中心水体鸟瞰图
11. 水上森林效果图

10. Rendering of the central pond of Duke Garden from bird's-eye view
11. Rendering of forest wetland



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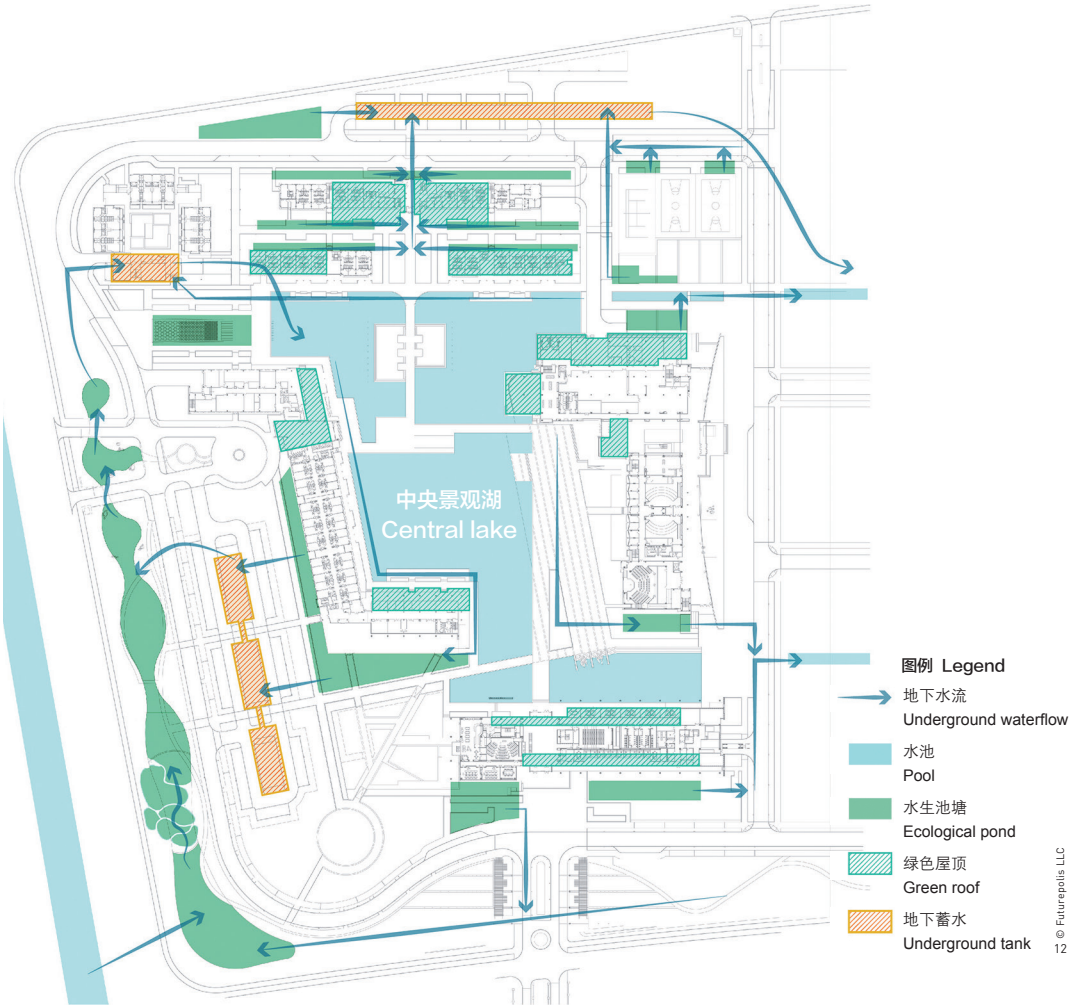
12. 一期水处理。一期南侧的地表污水先进入一连串的水生池塘，再存储在地下蓄水池中。溢出部分汇入中央景观湖。中央景观湖向西可以进入二、三期校园的排水渠，最终汇入杜克花园的中心水体中。
13. 一期校园湖心平台水位变化模拟图。在不同的水位条件下，平台不同的状态增加了场地的趣味性。
14. 一期校园的湖心平台

12. Water treatment of Phase I. The surface wastewater from the south of Phase I is stored in the underground tanks after purified with a series of ecological ponds. The overflow running into the central lake is discharged into the drainage ditches in Phase II and III, and finally conveyed into the central pond of Duke Garden.
13. Platform on the central lake of Phase I under different water levels. The varied scenarios raise interesting experience to the site.
14. Platform on the central lake of Phase I



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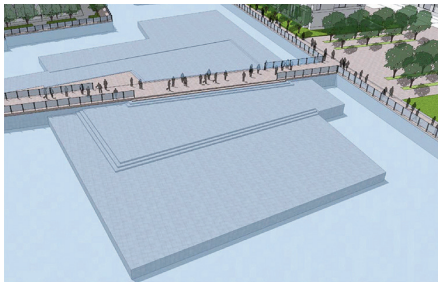
洪水期
Flood period


常水期
Ordinary condition


枯水期
Drought period
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oriental culture in the West world at the time of its building (Fig. 3). Today, American higher education represented by Duke University is introduced to China, and the Duke Garden in the USA becomes the “elsewhere” of the upcoming Duke Garden in Kunshan. Therefore, the new garden design needs to respond to the cultural imagination of the orient in old Duke Garden. The vision embedded in both gardens are consistent, yet their representations should be distinguished. The design team believes that this project needs to build on the recognition of regional characters, and the regional cultures should be conveyed at a contemporary scale as a dialogue with the West. As one of the outstanding features of Jiangnan gardens, the culture prefers simplicity to complixity. Large areas of white walls and black


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tiles resemble the emptiness in Chinese landscape paintings. The short bridges in Jiangnan gardens are often built in the simplest form with stone slates but without railings. In Kunshan Duke Garden, these qualities of Jiangnan gardens are represented in abstract forms of contemporary culture (Fig. 4, 5).

However, in terms of function and performance, the Duke Garden in the USA serves as a valuable reference to the design in Kunshan. In the summer of 1935, a flood caused by heavy storms hit the city of Durham in North Carolina and almost completely destroyed the Duke Garden, which had only been built for a year. During its reconstruction, landscape architect Ellen Bilddle Shipman intentionally elevated the terrain and changed plant species to better adapt to extreme climate events. In 1980, Linda Jewell, who renovated the garden, dug a pond for water storage, enhancing the resilience of Duke Garden against flooding[2].

Accordingly, the design team of Kunshan Duke Garden retained and transformed Lake Baiyao into a central waterscape, remoulded the bathymetry and edge form through on-site cut-and-fill, and restored the water features beneficial in reshaping wetland habitats. The design team also modified the water level for the central pond to act as a big sponge for surrounding areas. Different purification paths were designed for different water sources, in order to gradually improve the water quality. Purified water is transported to surrounding areas and other campus areas through the east waterway. This series of design strategies not only inherit the idea of resilence in the Duke Garden in the USA but also respond to the local natural environment in Kunshan.

2.2 Physiographical Investigation

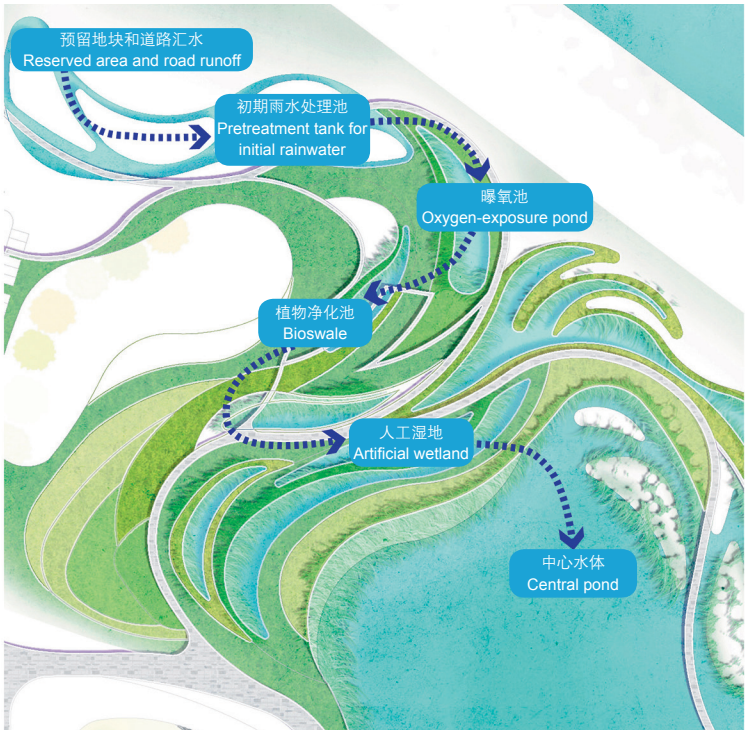
Physiographical investigation originated from the methodology of ecological analysis and design pioneered by Ian McHarg. It represents an in-depth multi-dimensional investigation of large-scale regional environments. Through a combined work of classifying and sectioning, an appropriate conclusion is obtained through three-dimensional dissection of different physiographical features[3]. This in-depth study of geographical features can help designers discover the connections of various information in geography and humanity at different levels. Thus it derives the logics behind these physiographical features, allowing design to adapt to the local conditions.

Given the lack of in-situ landscape characteristics, the design team examined the site by placing it at a macroscopic ecological scale to better understand its physiographical conditions. First of all, the location of Kunshan is a node on the migratory route of birds, and the city is characterized by a high density of wetlands. The new Duke Garden is situated in the green space network system of the Higher Education District that the city has been developing in recent years, with an attempt of making it an integral part in connecting the surrounding green space, wetland, and ecological corridors. These conditions provided clues for solving some of the current problems on site, such as low green coverage and poor ecological conditions. Meanwhile, the design team conducted in-depth investigations of the habitats of alluvial plains in southern Jiangsu in the aspects of hydrology, soil, and vegetation. Analytical methods of Physiography were employed for more precise ecological information, which helped construct new landscape scenarios.

On the hydrological level, the alluvial plains in southern Jiangsu is a natural alluvial zone under-layered with water. The terrain is flat, and the geology is soft and elastic with a high water permeability. The design of Duke Garden uses large areas of “soft elements” to restore the spatial layout similar to its original topography, intentionally blurring the water boundaries to highlight the sensorial characteristics in Jiangnan landscape. In terms of soil and vegetation, the long-term rice farming in Suzhou has changed the regional soil structure. It is generally believed that the soil type is mainly composed of artificially compacted soil. However, analysis revealed that, in Kunshan

15. 杜克花园水处理分析图。相嵌的月牙形湿地景观与净水功能相结合，将场地外的地面汇水以低成本的生态方法处理排入中心水体，并加以重复利用。
16. 校园海绵功能分析图。杜克花园与主校园的水量和水质方面互相调蓄，不仅缓解了极端气候的危害，也节约了水资源。

15. Water treatment of Duke Garden. The crescent wetlands serving as an aesthetic landscape and purification system collect surface runoff from the surrounding areas, purify it in a low-cost ecological method, and then discharge it into the central pond for a reuse.
16. Campus sponge. Duke Garden and the main campus can adjust water of quantity and quality with each, relieving the challenge of extreme climate events while saving water source.



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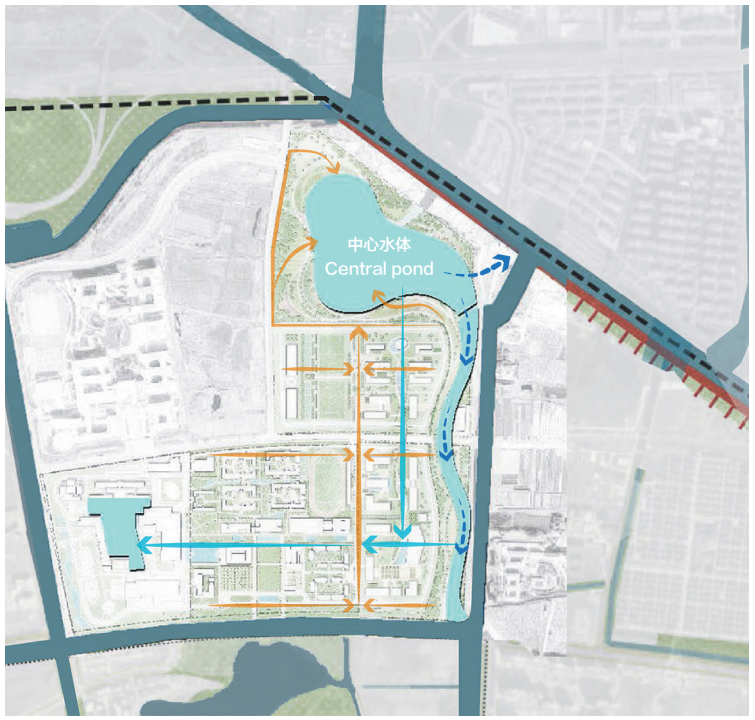
② The original sentence of Berrizbeitia described in "The Amsterdam Bos" is "In landscape, these values (individual over collective) are expressed through a system of open-ended design that is also largely based on setting up a biological process, such as erosion by wind or water, or plant succession, and letting the process through time, shows its effect on the site, constructing its landscape."

③ The detailed water treatment strategies can be learned in "Shaping the Spatial and Temporal Dimensions of Hydro-Ecological Landscape: The Design of the Duke University Kunshan Campus as a Micro Sponge City" by Zeng Ying published in the 4th issue of *Time Architecture* in 2017 and "'The Supreme Virtue Is Like Water': Ecological Landscape Design of Kunshan Duke University" by Shi Huilai and Lin Zhongjie published in the 3rd issue of *Architectural Journal* in 2018.



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area, there are still highly active acid soil and highly leached soil in the soil composition (Fig. 6). Among them, the presence of strongly leached soil provides the design team with clues to infer that there used to be a large area of forest landscape. The design team combined the geological analysis of other elements such as climate and vegetation to reveal indigenous Kunshan landscape in terms of landscape typologies: a combination of forest, meadow, and freshwater lakes. The design thus created three new complementary habitat types of wetland forest, wetland meadow, and riparian mixed zones, in order to strengthen the ecosystem structure, enhance ecological connectivity, and restore temperate meadow landscapes. By so doing, the labor-intensive agricultural landscape would be replaced with more sustainable ones (Fig. 7).

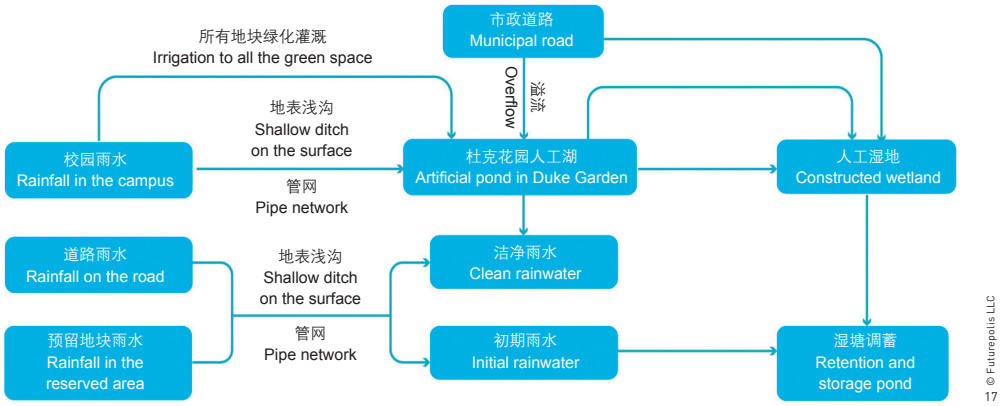
The design concept was also inspired by the dynamics of water on paper surface, as often seen in Chinese painting or calligraphy. Articulating details of the garden, the design team adjusted the layout based on the minimum area needed for each habitat and matched water contour with the habitat functions and forms (Fig. 8 ~ 10). Meanwhile, we also tried to expose the aforementioned habitats in their most authentic states to visitors, relying on the open lake surface to let light, water, and reflection enhance the recreational experience. This natural means of expression that favors austerity of nature aims to bring visitors back to a place that is not prevalent with sculpted artifice (Fig. 11).

2.3 Time-Lapse Observation

Time-lapse is a representative concept in the theory of Landscape Urbanism, in which landscape is not a static scene or picture, but a long-term process of gradual growth, evolution, maturity, and decline. Landscape design is required to consider the continuous intervention of social and natural factors, and more effectively set and guide such a transformation of urban landscape ecology[4]. As the landscape theorist Anita Berrizbeitia notes, postmodern design is open-ended in anticipating for a result; it allows the designed landscape to evolve over time by setting up a "biological process," which is capable of building landscape as it gradually proceeds②[5].

As a series of projects, the whole campus of Kunshan Duke University provides a great opportunity for time-lapse observation. In the Phase Ⅰ of the campus design, the design team built a preliminary framework for the ecological system and the space-making layout of the entire site. The idea was continuously inspected and corrected during the progressive design process from Phase Ⅰ to II then to the Duke Garden. In Duke University Campus Phase Ⅰ, the design team approached the issue from the perspective of ecosystem and considered how to blur the boundary between the artificial and the natural, enabling both to permeate each other. The resulted equilibrium and redundancy enhance the resilience of the campus against extreme weather events. For example, the central lake in Phase Ⅰ has the pivotal function of systematic stormwater management, and the platforms on and around the lake respond to the fluctuation of water level to present different spatial characteristics (Fig. 12 ~ 14). The seemingly natural aquatic ponds on the outskirt of the central campus are equipped with a hidden stormwater treatment system and can effectively carry out a series of biological purification procedures. This precedent experiences, to a certain extent, informed the design of Duke Garden③[6][7]. The design team has used similar methods to control the water level of the central pond in the garden, so that the ecological treatment of water and shaping of the landscape are combined into one (Fig. 15).

In terms of design expression, if Phase Ⅰ of the campus is a contemporary interpretation of the classical Jiangnan gardens as well as a miniature model of the Sponge City, the new Duke Garden would be an amalgam of geographical characters in Jiangnan area reflecting the changing culture of garden and a



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17. 校园径流分析示意图
18. 一期校园围绕水生态形成具有教育功能的海绵校园
19. 一期校园中的外圈湿地渗滤系统

17. Runoff analysis of the campus
18. Phase I acts as an ecological sponge in the campus with educational programs
19. Infiltration wetland system set along the border of Phase I

representation of Jiangnan landscape system in a contemporary cultural context. An engineering approach dominated the design of Phase I, where landscape cooperates with buildings to shape the outdoor spaces and prioritize the systematic function of the facility. In contrast, in the design of Duke Garden, landscape becomes the focus as the open spaces prevail to shape its unique atmosphere. As a whole, however, Phase I and II are inseparable from the garden. Not only do they bring a sequence of compression-decompression spatial variance with changes in circulation, but also adjust water of quantity and quality with each other. Together the garden and the campus form a large "sponge," enabling the local environment to achieve a higher level of resilience (Fig. 16, 17).

Since it is put in use, the landscape of Phase I with its space-making and aesthetic concepts (Fig. 18) has been widely recognized by teachers and students of the university. Meanwhile, the wetland landscape of the campus has become a teaching venue for ecological classes. Students are more aware of the cultural orientation of the university through science education (Fig. 19). It can be said that the observation of the performance of the earlier phases and users' feedback have encouraged the design team to abandon superficial designs that are concerned only about forms. Instead, the design is expressed in ecological efficiency and diverse spatial experiences, which reflect the regional culture in sequence and with nodes spatially rather than symbolically, by focusing on ecological reconstruction that has long-term effects.


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3 Discussion and Review

The meaning of "observation" can be interpreted in multiple ways. During the design of Kunshan Duke Garden, observation is no longer confined as in-situ behavior, but introduces research that expands "observation" to the realm of "investigation." This act of expansion includes three aspects: off-site observation, physiographical investigation, and time-lapse observation. These processes help designers gradually clarify ideas, reflect on the meaning of "observation," and explore the potential of the site. This method also expands the scope of design observation from a site scale to a regional and even global scales. It simultaneously incorporates temporality into the design work, so that an evolutionary framework of landscape scenarios is built.

Kunshan Duke Garden also gives us an opportunity to revisit the ancient landscape typology of "garden." Ian McHarg once discussed in his essay "Nature is More Than a Garden" that gardens are works of simplification in comparison with other design categories, during which many natural phenomena are excluded[8]. The design of the Kunshan Duke Garden, however, tries to condense a plethora of landscape ecologies into the garden, proving that there might not be such a schism between "garden" and "nature." The design team used the time-lapse method to make a plan that embraces time and change, which is different from a limiting pursuit for stability and eternal beauty in traditional garden-making. Furthermore, they also paid attention to the contemporary significance of "garden" during the process of off-site observation. These contemplations prompted designers to interpret "garden spirit" based on specific local characters, with the assistance of physiographical investigation, to achieve a systemized layout of ecological landscapes.

It is worthwhile to note that, although the aforementioned design methods (investigate before design and design with analysis) have already been the mainstream thinking in European and American design practice, it is yet to be popularized in China. As more urban growth plans in Chinese cities are put into construction, the need for suburban landscape design will continue to grow. In the face of the sites that lack notable characters, designers have the choice to step out of site limitations and carry on alternative observations. Then, design is set off in such direction that abandons over-expression to achieve design goals which favor "less" as "more" and pursue "scenario" over "scenery." **LAF**

PROJECT INFORMATION

LOCATION: Higher Education Park, Kunshan, Jiangsu Province, China
AREA (SIZE): 28.9 hm^2
CLIENT: Kunshan Chuangye Holding Group Co., Ltd.
LANDSCAPE ARCHITECTURE: Futurepolis
CHIEF DESIGNER: Shi Huilai
PROJECT TEAM: Lin Zhongjie, Gao Wei, Pang Huitao, Zheng Li
COLLABORATOR: Biotope
DESIGN PERIOD: September, 2018 ~ October, 2019
CONSTRUCTION PERIOD: September, 2019 to present

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