



1. 风之域。从斯皮内里兵营现存墙垣内望向野花花园。
1. Wind Gardens. View of wildflower gardens seen from within the Spinelli Barracks' remaining walls.

① 早在1938年，为了城市健康和安，斯图加特市规划部门便就深入的气候分析展开了跨学科合作。

风之域

——一个集降温、生产及娱乐于一体的新型城市公园

AEOLIAN FIELDS

— A NEW URBAN PARK TO COOL, PRODUCE AND PLAY

OFICINAA设计事务所, TRANSSOLAR设计事务所 / OFICINAA, TRANSSOLAR

全球的城市在呼吸，通过城市峡谷和绿色空间从腹地和水体获取新鲜的空气。每个城市有着不同的呼吸，城市中空气的流动或剧烈，或缓慢，或起伏。一些大都市中心面临着呼吸越来越缓慢、越来越轻微的情况，并将最终面临因其自身的空气污染和空气温度增加而窒息的危险。人们对于通风走廊——这难以捉摸的“城市之肺”知之甚少。解码这些强大的城市呼吸系统有利于发掘革命性工具的潜力，进而设计更为健康的社区和城市。

曼海姆有望成为2023年德国联邦花园秀的主办地，其发起了为原美国军事基地这一新地块的一项设计竞赛。场地占地面积近100hm²，毗邻大片农业用地、公园绿地及居住社区。曼海姆位于莱茵河和内卡河两条河流的交汇处，是中欧的连接中心，也是德国巴登-符腾堡州最重要的工业中心。由于靠近河流网络和两条较低的山脉——奥登瓦尔德山和普法尔兹山，为场地的贸易和工业发展提供了战略机会，但这样的地理条件也造就了德国境内一个最温暖而潮湿的小气候环境。

高温高湿的空气加之城市通风条件较差，工业生产导致城市环境中周期性空气污

染和热应力的产生。这些有害气体条件带来的挑战激发了曼海姆市——以及与曼海姆市相邻的更早开始研究的斯图加特市^①——自19世纪70年代开始进行开创性研究，采用城市气候学方法处理城市环境中的空气质量。在曼海姆，城市规划部门广泛采用城市气候学分析，并出版了众多研究和规划，例如“格鲁祖格-曼海姆西部发展规划”（1992年）、“开放空间保护策略”（1993年）、“格鲁祖格-曼海姆北部发展框架”（1995年），以及“布鲁-曼海姆水域发展规划”（2008年）。这些研究得出了共同的结论，其指出，大片连续的非森林/绿色开放地域对于促进新鲜空气交换进入城市以帮助城市环境进行散热，是必不可少的。自1992年曼海姆市出台主要规划后，设计和组织都受到了约束，以保护能够有助于城市降温，以及周边的山坡和河流汲取新鲜的空气的绿色之肺。沿莱茵河和内卡河的绿色廊道和市中心东面的大型绿色走廊都尤为重要。竞赛要求设计团队考虑到竞赛区域中包含的通风走廊（当地范围内的4个走廊之一），并遵照城市气候学的前沿研究建议，为2 000名新迁居民设计新的社区。这个通风走廊可供河谷和山脉的风与城市进行交换——即实现气流风每

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摘要
“风之域”（一个可用于降温、生产及娱乐的新型城市公园），是OFICINAA和TRANSSOLAR设计事务所为位于曼海姆的原美国军事基地所做的竞赛入围方案，其采用空气的流动作为设计前提。设计方案提出用一系列大型景观形态来塑造风的流动极具在该场地中的特性。该方案描绘了一个新型公园，其运用空气来雕琢空间环境，以提升社区的使用和健康，在加强城市和临近街道通风性的同时，也能够防止热量累积和空气污染。
关键词
生物气候学；景观设计；城市设计；城市气候学；通风走廊；小气候；舒适和健康

ABSTRACT
Titled Aeolian fields (a new urban park to cool, produce and play), the competition entry by OFICINAA and TRANSSOLAR for Mannheim's former US military base, uses air movement as a premise in design. The design proposes a series of large-scale landscape features to sculpt the wind flow and its qualities through the site. While promoting the ventilation of the city and the adjacent neighborhoods and preventing accumulation of heat and air pollution, the proposal sets forth a new park with spatial conditions crafted by air for the community's use and wellbeing.
KEY WORDS
Bioclimatic; Landscape Architecture; Urban Design; Urban Climatology; Ventilation Corridor; Microclimates; Comfort and Wellbeing

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日循环，即上升风和下降风。

竞赛的焦点在于为曼海姆的市民提供一个新型公园，同时连接周边的绿地，在山脉和河谷之间的区域范围形成一个连续的通风走廊。运输网络也会随之产生改变，以补充自行车道和慢跑步道的缺失，并消除该地区目前杂乱的主要交通路线。因此，从逻辑上讲，该竞赛的核心是“连通曼海姆”。竞赛中严谨的气候分析，成为了以连续的空间网络来实现必要的通风顺畅的保障。这项研究表明需要一个贯穿整个地区、至少500m宽的走廊，并需要拆除原美国军事基地（斯皮内里兵营）的大部分现存建筑。

OFICINAA设计事务所和TRANSOLAR

设计事务所（其主要负责气候工程）的参赛作品入围提案名为“风之城”（一个可用于降温、生产及娱乐的新型城市公园）。方案采用空气的流动作为设计前提，使空气污染的区域快速通风，创造了一个可以提升曼海姆居民健康的新型公园。其不仅仅简单地按照竞赛要求建立一个单一的大型通风走廊（实现通风顺畅），而是提议将之分为两条走廊：一条较为主要的走廊始自北面，通过主要的农业用地（运载湿气），另外一条次要的走廊始自东部，其可以缓解目前临近社区对南部地区的热岛效应。这一设计初衷为项目中更小尺度下的，有关宜人的、季节性的空间利用的设计想法提供了指导。

2. 场地现状由北向南鸟瞰图。图中前景为原美国军事基地，中间部分为农田。

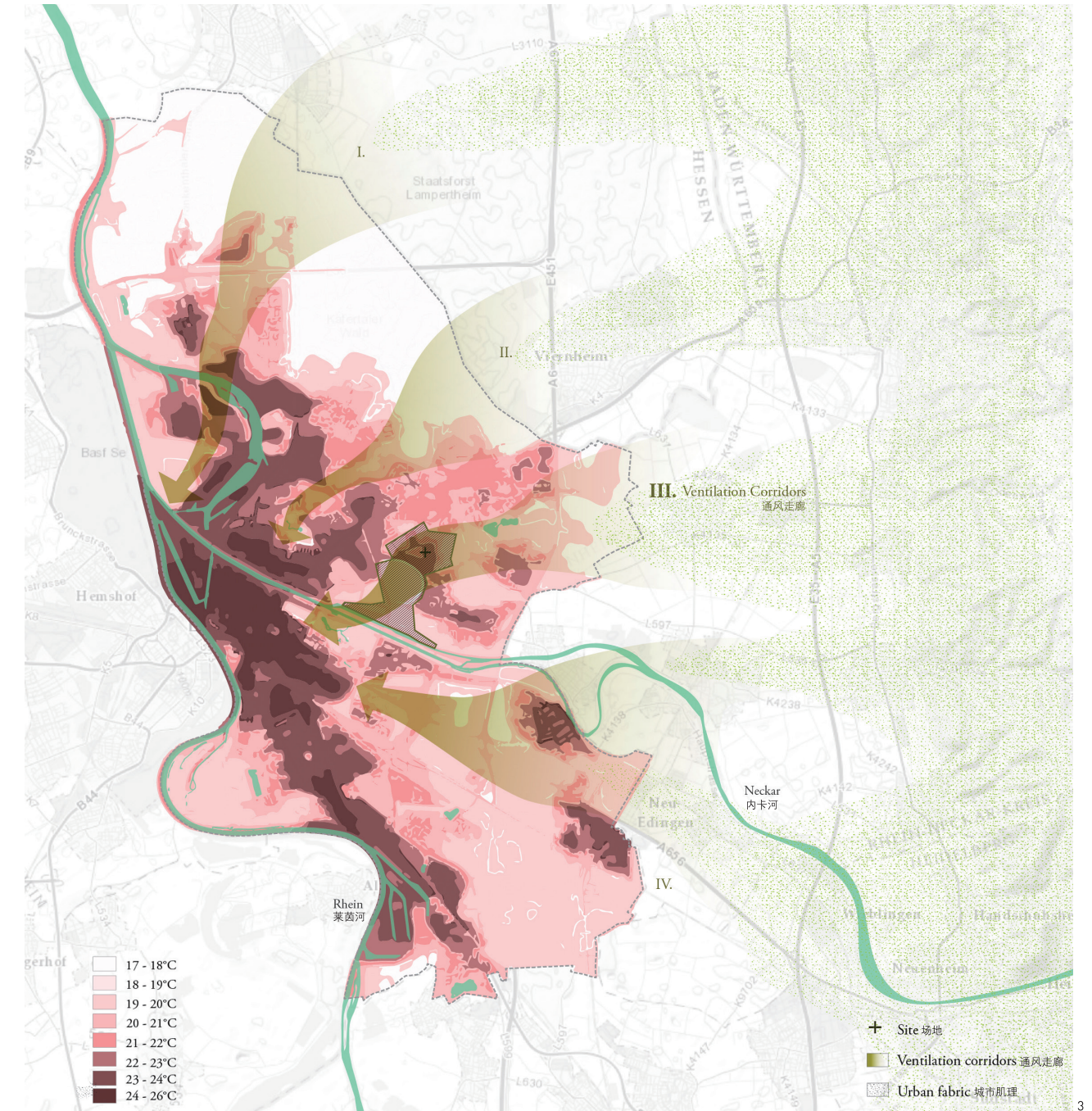
2. Aerial view of the existing site north to south. The former US military base in the foreground and the agricultural fields in the middle ground.

3. 4条通风走廊和曼海姆热变化示意图。曼海姆遭受着热应激影响，特别是在酷暑时节（7月和8月）。通风走廊有助于将山上温度较低的夜风引入曼海姆。

3. Four ventilation corridors and Mannheim's thermal variances. Mannheim, particularly in high summer (July and August), suffers from thermal stress. The ventilation corridors help the city to ventilate at night with colder winds from the mountains.

项目地址：
德国曼海姆市
项目面积：
127.5 hm²
项目委托：
德国曼海姆市政府
景观设计：
OFICINAA设计事务所
首席设计师：
Silvia Benedito (OFICINAA设计事务所)、
C. Alexander Häusler (OFICINAA设计事务所)
项目负责人：
Silvia Benedito (OFICINAA设计事务所)、
Matthias Schuler (TRANSOLAR设计事务所)
项目团队：
OFICINAA设计事务所：Geunhwan Jeong、
Peter Zuroeste、Courtney Goode
TRANSOLAR 设计事务所：
Markus Krauss、Ashwin Ghanta
设计时间：
2014年8-10月

LOCATION:
Mannheim, Germany
AREA (SIZE):
127.5 hm²
CLIENT:
City of Mannheim, Germany
LANDSCAPE ARCHITECTURE:
OFICINAA
CHIEF DESIGNERS:
Silvia Benedito (OFICINAA), C. Alexander Häusler (OFICINAA)
PROJECT LEADERS:
Silvia Benedito (OFICINAA), Matthias Schuler (TRANSOLAR)
PROJECT TEAM:
OFICINAA — Geunhwan Jeong, Peter Zuroeste, Courtney Goode
TRANSOLAR — Markus Krauss, Ashwin Ghanta
DESIGN PERIOD:
August - October, 2014



方案提议划分出4个较大尺度的、能够影响当地主要空气流动的景观特征，并以此为基础形成不同特色景观区域，我们称之为四大园区，分别是森林园区、高地园区、湖泊园区和太阳广场园区（现有的U型建筑）。每个园区的范围、所包含的景观、形式和位置等都会对气流进行塑造（引导、抬升、涡旋、增强），每个园区的这些特质也会使空

气具有不同的气味、湿度、声音和温度。每个元素都会对临近的公共区域的热力和风速产生影响，以便增强和连接绿色走廊。相比这些元素所产生的自然裨益而言，由这些要素创建引人入胜的公共空间来纪念这个区域的文化和农业遗产也同等重要。森林园区颇具活力，它形成了具有局部可透性的空气通道，促进了生物多样性，同时还作

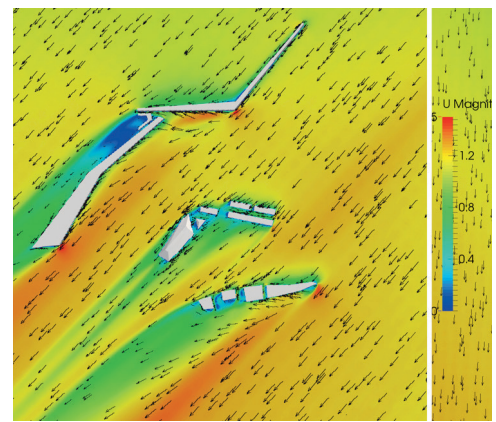
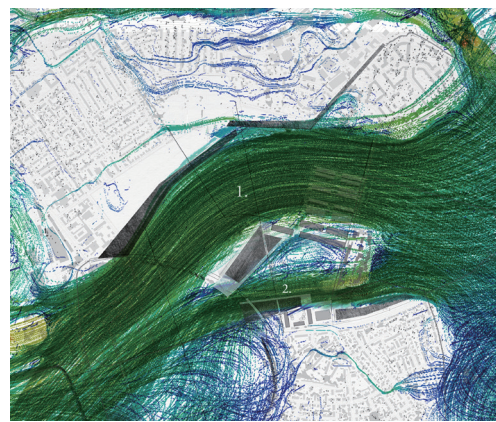
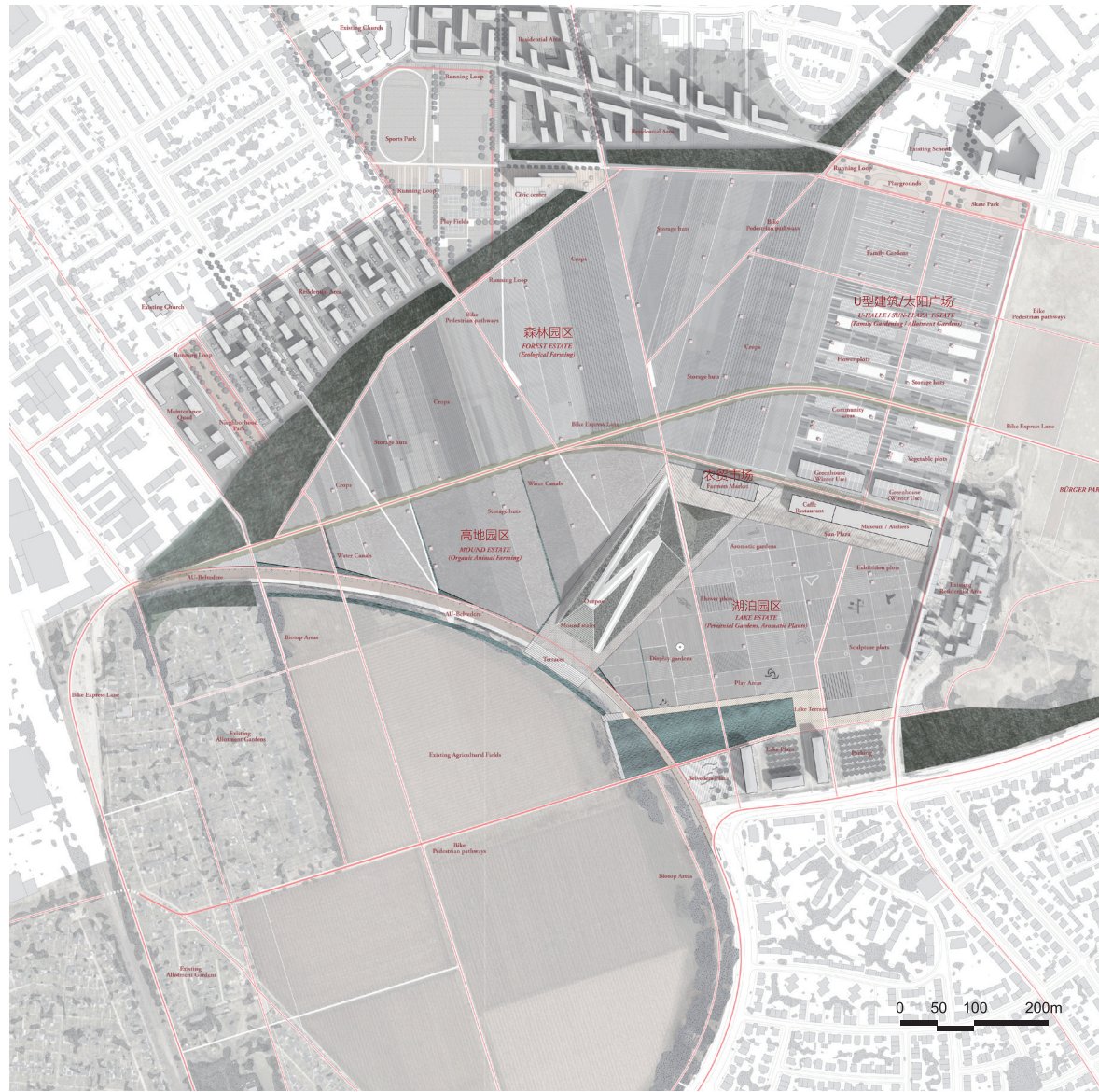
为大型水体缓冲器和空气过滤器，能够提供局地荫蔽和小气候环境。该景观园区保留了大规模农作物和本地作物生产，例如谷物和豆类、土豆和白菜、甜菜根、罂粟以及蜂蜜产品。

地势较高的地区中的大型水体形成了湖泊园区。作为一个季节性雨水缓冲区，它营造了局地小气候环境，为生物多样性提供了栖息地，同时也是场地上下层区域灌溉用水的源头。其大部分区域面向公众开放，可容纳多种社区活动。气味和颜色也是这个园区与众不同的一大特点，主要包括薰衣草、广藿香和薄荷等芳香植物，以及向日葵和油菜花等颜色鲜艳的花朵。这里亦可作为大型展览及城市活动用地。

位于气流之上的高地园区像一座岛屿，该园区利用包括局地上升风在内的方式平稳地引导风向，同时保护太阳广场远离风的侵袭。这里还设有一座观景台，还不时设有庞大的储存体块，或以原斯皮内里兵营的建筑拆除材料填注的土丘。高地园区为有机耕作、畜牧业和在农业生产中的最佳实践教育提供了场所。其不仅融合了娱乐功能（高地冬天可用于滑雪，夏天用于放风筝），而且园区顶部还能俯瞰城市美景。

该地区的旧有建筑围合了U型建筑/太阳广场园区。广场朝南坐落、视野开阔，建筑的墙壁和地板成为了广场的蓄热体。它在凉爽晴朗的日子里收集和存储太阳能热，到傍晚的时候缓慢释放，创建了舒适宜人的小气候环境。该园区毗邻农贸市场，可为家庭菜园、产品交换和不同类型的展览提供场所。作为该地区现有的象征性建筑，U型建筑被完整地保存了下来，以作为艺术家工作室，并促进教育项目朝提升社区健康的方向发展。

这些景观特征不仅与通过该地区的气流交互作用，还使得新区域可在一年四季供人们漫步、观景，在寒冷的冬季亦可为人们遮风避雪。“风之城”开创了一种能够在城市和社区尺度塑造气流的新型城市景观，对于这个一马平川的地区来说是一个新的地标，一个通过对风进行雕琢来为个人和群体带来身心双重愉悦的新的“公共场所”。LAF



- OFICINAA设计事务所和TRANSOLAR设计事务所的方案。平面图包括场地周边地区，以及场地北部附近的一个拟建设的社区。
- 设计的景观特色与气流（预先性风模拟）。该模拟试图研究不同景观元素的尺度和方位，以及它们对气流的影响（风速和风向）。
- 气流模拟（CFD测算结果）。计算流体动力学模拟的测算结果显示出了通风廊道的分岔点，以及现有U型建筑和新的高地园区中的不同风速情况。
- 主要和次级通风走廊。通风走廊拥有两个尺度：地区尺度和场地尺度。在场地尺度中，通风走廊被设计为一个“气流分流器”，以使场地的空间条件和使用形式多样化。

- Proposal by OFICINAA and TRANSOLAR. Site plan includes the adjacent areas, and proposed neighborhood on the nearby Northern portion of the site.
- Proposed landscape features and wind flow (preliminary wind simulations). These are preliminary attempts used for finding the scale and positioning of the various landscape elements and their effects on wind flow (velocity and direction).
- Air flow simulation (CFD results). Tests using computational fluid dynamics simulations suggest the bifurcation of the wind corridor and the various velocities of air flow within the existing U-Halle and the new mound.
- Primary and secondary ventilation corridors. The ventilation corridor operates under two scales: at the regional and at the site scale. At the site scale it is proposed as a bifurcation of the wind flow in order to diversify the spatial conditions of the site and its uses.



- Primary ventilation corridor (city scale) 主要通风走廊（城市尺度）
- secondary ventilation corridor (neighborhood scale) 次级通风走廊（社区尺度）

Cool air from agricultural fields, parks and bodies of water 来自于农田、公园和水域的冷空气

Areas of thermal stress on site 场地的热应力地区

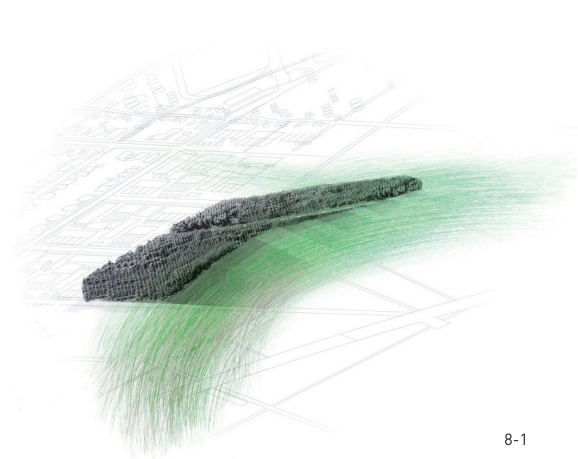
Thermal map in summer, 10 pm, August 31, 2009. 夏季热感图（2009年8月31日晚10点）

- 17 - 18°C
- 18 - 19°C
- 19 - 20°C
- 20 - 21°C
- 21 - 22°C
- 22 - 23°C
- 23 - 24°C

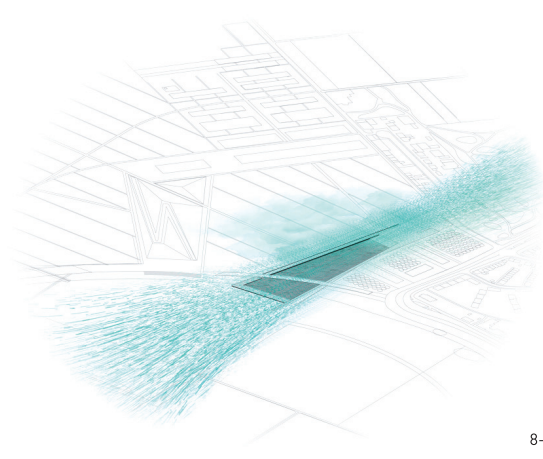
Cities worldwide breathe and respire, pulsing fresh air from their hinterland and bodies of water through urban canyons and green spaces. Each city breathes differently, with airflows hastening, slowing, and eddying. The challenge is that some metropolitan centers are taking slower and shallower breaths than ever before — eventually at risk of suffocating from their own air pollution and increased air temperatures. Ventilation corridors are the poorly understood, elusive lungs of the city. Decoding these powerful urban respiratory networks has potential to reveal revolutionary

tools for designing healthier neighborhoods and cities. In anticipation of being the next site for Germany's Federal Garden Show in 2023, Mannheim issued a competition for the new site grounds to be designed—a former US military base of approximately 100 hectares adjacent to large swathes of agricultural fields, park land, and residential neighborhoods. Located at the confluence of two rivers, the Rhine and the Neckar, Mannheim is a connection hub in Central Europe, and one of the most important industrial centers of the

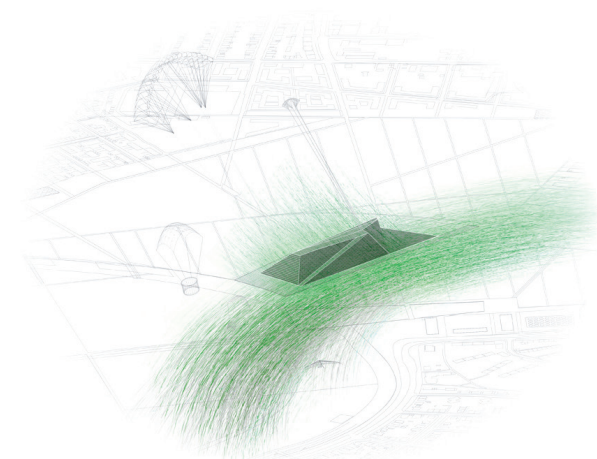
Baden-Württemberg state in Germany. The river network and the proximity to two low mountain ranges, the "Odenwald" and "Pfälzer Wald" offers strategic opportunities for trade and industrial development, but they also generate one of the warmest and most humid microclimates in Germany. The overlapping of industrial production with high temperatures and humidity in the air, coupled with poor urban ventilation, causes periodic air pollution and thermal stress in the urban environment. The challenges posed by these detrimental atmospheric conditions



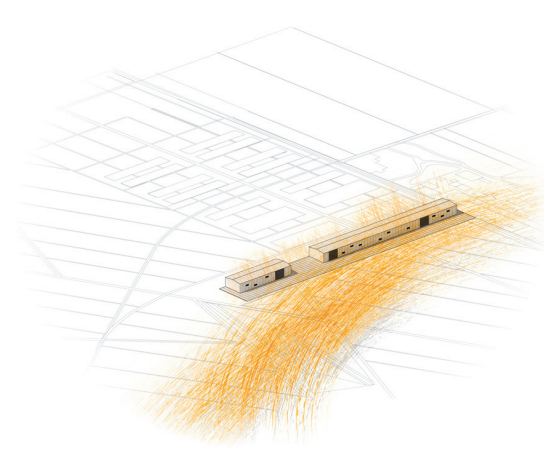
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8-2



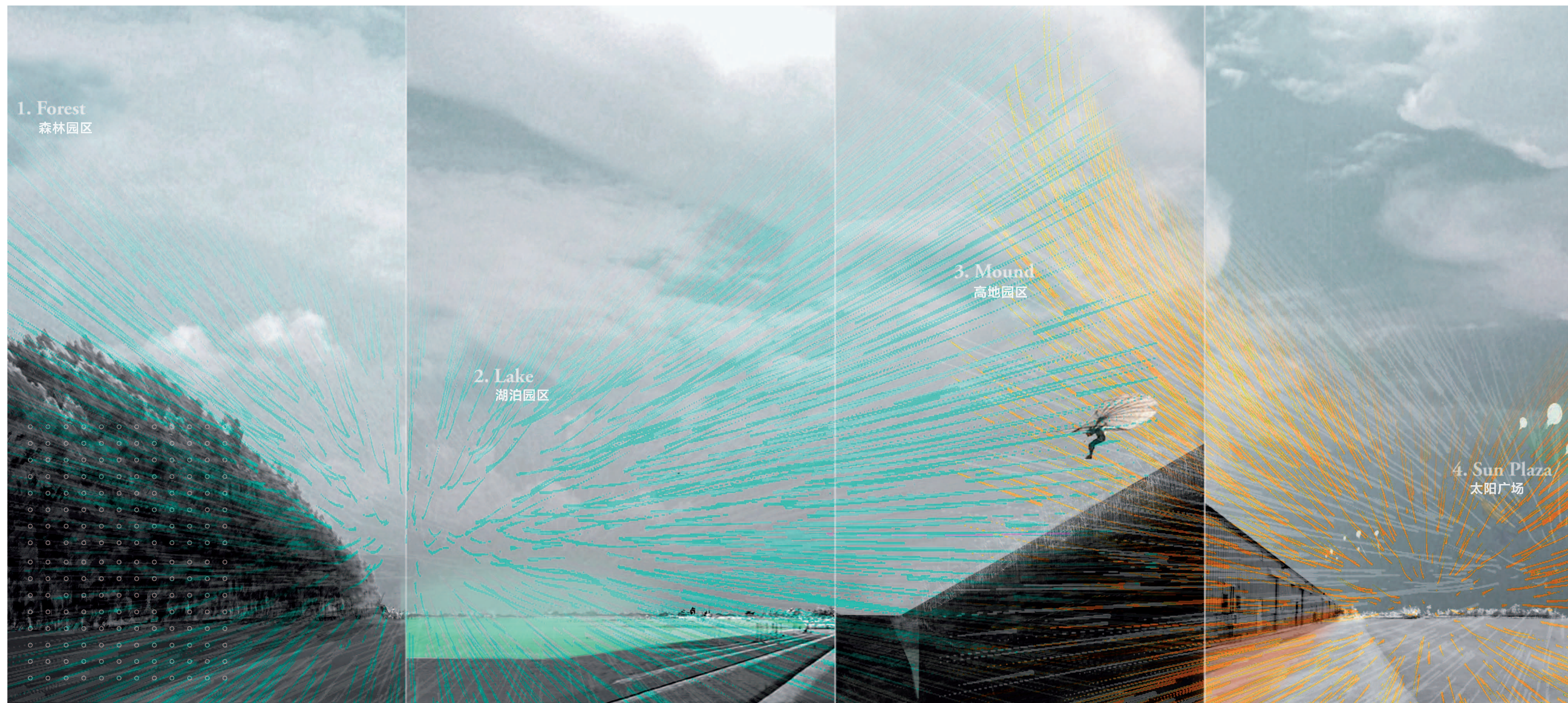
8-3



8-4

- 8-1. 森林园区。这片林地可以使来自山间的气流涡旋，并使之穿过场地和农田。
- 8-2. 湖泊园区。通过空气对流，该湖泊园区可以将风导向地势较低的农田，并使风速在农田的东端得以提升。
- 8-3. 高地园区。高地园区是场地拆毁后的残余地带。其方位、形式和体量使得其能够将风引向湖区，并将场地分为两个主要的区域：一个是北部大面积的农田地区，另一个是南部及主要入口广场中与社区相关的公共用途地区。
- 8-4. U型建筑/太阳广场园区。设计方案对具有历史和象征意义的现有U型建筑（原军事铁路仓库）进行了部分保留。U型建筑坐北朝南，面向城市，而且建筑尺度也使之成为了一个受人欢迎的日常公共空间——一个可供人们交流、学习和举行活动的空间。其还是一个免于冬季冷风侵袭的场所。
- 9. 土地与气流间的4种景观特色。这4种景观特色结合不同的功用，为场地体验与场地中增加光照和（带有气味、湿气、声音的）气流的转变打造出了不同的环境和空间条件。

- 8-1. The Forest. The proposed forest funnels wind that descends from the mountains and guides it through the site and agricultural fields.
- 8-2. The Lake. The Lake, through convection, pulls the wind down towards the lower agricultural fields, while increasing the velocity at its eastern end.
- 8-3. The Mound. The Mound is the result of the debris generated from the demolition onsite. Its positioning, form and volume allow it to guide the wind through the lake, while bifurcating the larger site into two main areas: one dedicated to large farming (north) and another dedicated to public use as related to the neighborhood on the south and major entry plazas.
- 8-4. The U-Halle / Sun-Plaza. The proposal keeps part of the existing U-Halle due to its presence and symbolism (former military rail warehouse). Its orientation towards south and the city, and scale makes it a favorable amenity for everyday public use — a place for exchange, learning and events. It is also a place that is sheltered from the cold winter winds.
- 9. Four landscape features: between the land and the air. Associated with a different use, the four landscape features craft various atmospheres and spatial conditions for experiencing the site and its transformation with augmented light and air flow [one that carries scent, humidity, sound].



① Stuttgart's Planning Department worked across disciplines to commission in-depth climate analysis for urban health and safety as early as 1938.

motivated the city of Mannheim — alongside the earlier example of the neighboring city of Stuttgart^① — to undertake pioneering studies since the 1970's that engage methods of Urban climatology to address air quality in the urban environment. All urban climatology analyses in Mannheim were tightly interwoven with the urban planning department and resulted in numerous published studies and plans, such as the "Grünzug Mannheim West" (1992), "Open Space Preservation Strategy" (1993), "Framework Grünzug Mannheim North" (1995), and the "Blau-Mannheim Blau" (2008). One of the generally conclusion from these studies was that the large continuous swathes of non-forested / green open lands were essential to promote the necessary exchange of fresh air into the city, while helping the cooling of the urban environment. Since major planning efforts in 1992, the design and organization of the city of Mannheim has been regulated to protect the green urban lungs that help cool the city and pull fresh air in from the surrounding hillsides and rivers. The green corridors along the Rhine and the Neckar rivers are of particular importance, as well as a large green corridor to the east of the city center. The competition brief follows the recommendations of these pioneering studies in urban climatology. Therefore, it asks the

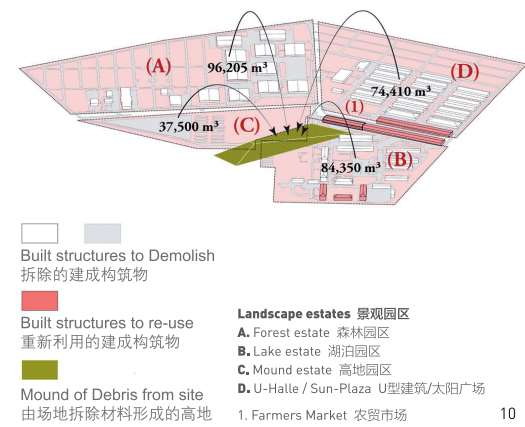
design teams to take into consideration the mandatory ventilation corridor zoned for the competition site (one of the four corridors at the regional scale), and the design of a new neighborhood for 2,000 new residents. This ventilation corridor will allow the opening of the city to the wind exchange between the river valleys and the mountains — to the daily cycles of wind flow, namely the anabatic and katabatic winds.

The central focus of the competition is to connect citizens of Mannheim through a new public park, while simultaneously connecting the surrounding green space to generate a continuous ventilation corridor at the regional scale between the mountains and the river valleys. Transport networks will also be altered to close gaps in bike and jogging paths, as well as remove a major traffic route that currently fragments the site. Thus, the central motif is logically, "Mannheim Connects". The implementation of the required ventilation easement using a continuous green space network was supported by careful climatic analysis contained in the brief. This study requires a corridor of a 500 meters minimum width throughout the site and the demolition of most of the existing buildings of the former US military base (the Spinelli Barracks).

The competition entry from OFICINAA

10. 4个园区及农贸市场示意图
 11. 结合生产和使用的景观园区方案。每个园区都具有一种特别的生产和使用类型。这既使场地的季节性和使用形式更好地结合，也使得场地的活力变得更加清晰明确。

10. Diagram of the four landscape estates and the farmer market
 11. Landscape estates proposal for corresponding production and uses. Each estate corresponds to a particular type of production and use. This both promotes symphonic play between seasons and occupancy, and triggers a clear identification of the site dynamics.



Forest 森林园区

Local agricultural products: grains and beans, potatoes, beets, cabbage, poppy, and honey production.
 当地农产品：谷物和豆类、土豆、甜菜根、白菜、罂粟以及蜂蜜产品。

Lake 湖泊园区

The most publically accessed and welcoming estate. Scents and colors predominate: aromatic plants such as lavender, patchouli, mint, and colorful flowers, such as sunflower and rapeseed. A place for large scale exhibitions and city receptions.
 该园区是向公众开放程度最高，且最受欢迎的园区。园区的气味和颜色特色：包括薰衣草、广藿香和薄荷等芳香植物，以及向日葵和油菜花等颜色鲜艳的花朵。这里亦可作为大型展览及城市活动用地。

and TRANSSOLAR (Climate Engineering), titled Aeolian fields (A new urban park to cool, produce and play), uses air movement as a premise in design to ventilate the region from air pollution and to generate a new park for the wellbeing of the residents in the city of Mannheim. Rather than simply comply with the request for a single large wind corridor (easement), the proposal bisects it into two main corridors: a primary corridor that flows

from north through the main agricultural fields (carrying humidity), and a secondary corridor flowing in from the east that acts upon the existing heat island emanating from the adjacent neighborhood (to the south). This initial design motivation guided smaller scale ideas about program, comfort and seasonal occupation.

The proposal calls for four large-scale landscape features that bifurcate the primary

air movement through the site, and generate the basis for distinct landscape districts, which we refer to as the Estates: The Forest, The Mound, The Lake, and the Sun-Plaza (existing U-Halle). The scale, material, form and location of each landscape feature sculpts the airflow (guide, uplift, funnel, amplify) and acts upon these qualities to carry scent, humidity, sound and temperature. Each element modifies the thermal conditions and wind velocities within



Mound 高地园区

Mound estate is dedicated to organic practices on animal farming and education on best practices. It also integrates recreation (mound for winter ski, kite flying in summer), play and prospect the city from the top of the mound.
 高地园区为有机畜牧业和最佳实践教育提供了场所。其不仅融合了娱乐功能（高地冬季可用于滑雪，夏季用于放风筝），而且园区顶部还能俯瞰城市美景。

the adjacent public areas in order to enhance and connect the green corridors.

Equally important to the natural benefits of these elements are the ways they create engaging public space that celebrate the cultural and agricultural heritage of the site. The Forest (Der Wald) is highly dynamic. It frames the air passage, is partially permeable, supports biodiversity, and acts as a large water buffer and air filter, while creating local shade

U-Halle / Sun Plaza U型建筑/太阳广场

Adjacent to the Farmers Market, this landscape estate is a place for family gardens, produce exchange, sculpture exhibitions and artists' shows. The U-Halle, an existing symbol on the site, remains to host studio artists, to promote education towards well-being in the community. 该园区毗邻农贸市场，可为家庭菜园、产品交换、雕塑展览和艺术表演提供场所。作为该地区现有的象征性建筑，U型建筑被保存了下来，以作为艺术家工作室，并促进教育项目朝提升社区健康的方向发展。

and a microclimate. This landscape estate sustains large crops and local produce, such as grains and beans, potatoes and cabbage, beets, poppy and honey production.

The large water body on the upper site level characterizes The Lake (Der See) estate. It acts as a seasonal rain buffer, creates local microclimate, provides habitat for biodiversity, and is a source of irrigation water for both levels of the site. It is the most

publically accessible and welcoming estate for community oriented events. Scents and colors also distinguish this estate: aromatic plants predominate such as lavender, patchouli, mint, and colorful flowers like sunflower and rapeseed. It is a place for large-scale exhibition and city receptions.

The Mound (DerBerg) is elevated above the airflow like an island, and uses smooth redirection of the air, which induces local up winds, while shielding the Solar Plaza from wind. It also provides a prospect lookout and optional monolithic storage volume or berm filled with demolished material from the Spinelli Barracks and site construction. This landscape estate is dedicated to organic farming practices, animal husbandry, and education about best practices in agricultural production. It also integrates recreation (mound for skiing in winter, and flying kites in summer), and provides a prospect of the city from atop the mound.

The old buildings on the site frame the U-Halle / Solar Plaza (Die Sonnen-Plaza). With an unobstructed southern exposure, the Plaza is protected by the thermal mass from the building walls and floor. It collects and stores solar heat on cool sunny days, and slowly releases it to create a comfortable microclimate into the late evening. Adjacent to the farmers market, this landscape estate is a place for family gardens, produce exchange, and various exhibitions. The U-Halle, an existing symbol on the site, is kept intact to host studio artists, and promote educational programs towards wellbeing in the community.

While these landscape features interact with the airflow through the site they also promote new grounds year-round to meander, prospect, and shelter during the cold days of winter. Aeolian fields proposes a new civic landscape that sculpts airflow at the city and neighborhood scale, a new landmark against the flatness of the site, and a new "Commons" that crafts air for sensory and physiological well-being, both for the individual and the larger collective. **LAF**