

排泄物景观：

孟买的临界性景观

Sh*t scape:

Mumbai's Landscape In-Between

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摘要 ……

当今世界上，几乎、甚或根本没有卫生设施可用的人口数量日益增加。这个问题在印度尤为突出，这个国家有7.5亿人口没有足够的卫生设施。随着城市人口的迅速增加，像加尔各答、孟买和新德里等城市，甚至已无法为新移民提供诸如卫生设施、洁净水源等最基本的市政服务。因此，这些城市中新移民的生活条件非常不理想。

“排泄物景观：孟买的临界性景观”这个项目，计划创建一个以人类的排泄物为基础的完全功能化的景观。它位于孟买桑贾伊·甘地国家公园西缘的阿巴帕达采石场，该采石场将一个现有的居住区和一个山坡上的贫民窟分隔开来。这个项目试图将人类排泄物看作是丰富的、可再生的资源，而不是废弃物。通过将特定的生物过程和基础设施设计与当地的社区联系起来，本项目旨在使居民需求和附近国家公园需求之间的关系变得更加和谐。

关键词 ……

排泄物景观；孟买；生物过程；基础设施；当地社区

Abstract ……

A growing number of the world's population has little or no access to sanitation. This is particularly prevalent in India, where over 750 million people are without adequate sanitation facilities. With burgeoning urban populations, cities like Kolkata, Mumbai and Delhi are incapable of providing even basic municipal services like sanitation and clean water for many of the cities' recent migrants. As a result, living conditions for these new arrivals are less than ideal.

“Sh*t scape: Mumbai's Landscape In-Between” proposes the making of an entirely functioning landscape built from human excreta. Its location, Appapada Quarry, is found along the western edge of Sanjay Gandhi National Park in Mumbai. The quarry separates an established neighborhood and a hillside of informal settlements. The project takes the view of human feces as an abundant and renewable resource rather than waste. By linking certain biological processes, infrastructural strategies, and local communities, a more harmonious relationship between the needs of the human residents and those of the nearby National Park can be established.

Key words ……

Sh*t scape; Mumbai; Biological Process; Infrastructure; Local Community

“排泄物景观：孟买的临界性景观”

项目计划创建一个以人类的排泄物为基础的完全功能化的景观。作为对阿巴帕达采石场的景观干预措施，我们旨在通过恢复被人类的栖居生活所破坏的“土壤”，同时以有益于植物群落的方式充分发掘森林的价值，从而形成一个新的、不断演变的景观。该项目还力图使当地社区参与到景观的创作和施工过程中来，并从中受益。

该项目和很多与此相关的想法均来源于2009年春在宾夕法尼亚大学开展的一门景观设计专业研究生课程。课程期间，我们于2月初对孟买进行了为期10天的访问。在最初的7天中，我们停留在珊瑚社

区的哈瑞-奎师那神殿，并对包括桑贾伊

进行了考察和调研。本文中的项目即源自我们在孟买的亲身体验，同时感谢我们的导师

众不同的洞察力、耐心及好奇心。

巧合的是，在我们筹备行程之时，

百万富翁》热映。出于课程需要，我们必须与新移民面对面交流并感受他们的生活境遇。接下来的内容将对该研究进行阐述，以帮助读者理解这一复杂的环境与多种问题并存的局面——这也是我们设计的一部分。

表1 “城中村-贫民窟”调查

1. 对城市生活的看法?	2. 对住房条件的看法?	3. 对赚钱机会的满意程度?	4. 能否稳定地赚取足够的收入?
不确定 8%	相当不错 15%	很不满意 10%	完全不能 14%
农村生活更好 20%	满意 11%	不那么满意 77%	偶尔 68%
城市生活绝对是更好的 72%	可以容忍 34%	相当满意 13%	不确定 4%
	非常糟糕 40%		相当稳定 14%

社区

孟买位于印度次大陆的西海岸。它是印度最大的城市，也是地球上人口最密集的地区之一。它的活力，源自于其作为大型港口城市、金融枢纽和世界电影业中心的地位。由于农业逐渐趋于产业化，以及城市繁荣发展的前景，导致了在过去的几十年间大量的农村移民迁入孟买。在过去的20年中，这种大规模的农村人口迁入城市的现象在整个印度和南亚都非常普遍。根据印度的人口调查，1991~2001年间，有7 300万印度人口从农村地区迁到城市中心。而这个趋势自2001年以来仍在持续。随着城市人口的不断增长，印度的城市已不能为如此多的移民提供诸如卫生设施和清洁水源等最基本的市政服务。因此，这些城市中新移民的生活条件非常不理想。

尽管许多移民坚信，在城市里他们能找到更优越的生活，然而随之而来的现实与他们的预期却相去甚远。他们试图摆脱贫困，但贫困仍然如影随形。尽管艰辛，但很多人还是觉得城市生活要优于以

“城中村-贫民窟”的调查数据真切地反映了人们对这种生活条件的普遍看法，也反映了这些将贫民窟视为家园的新移民的生活态度（表1）。虽然该调查只包括4个问题，但还是在一定程度上反映出这些孟买新移民的生活状况以及他们对孟买的看法。

吉尔并不是唯一关注孟买这个区域

《城市：大问题的小指南》中也提到这个问题。他指出，城市贫困人口中有相当一部分人，他们在城市的生活条件比在农村还要糟糕。同时，他也很快体会到了这些生活在城市贫民窟的人们的智慧。如他所称，这些人“经常在这种不断扩张且日益精巧的非正规聚落中建造自己的房子”。西布鲁克和吉尔的观点看似相互矛盾，但实际上，这些从农村迁移到城市的人们过得还不如那些生活在农村的人们，至少就经济情况而言是这样的。对城市所能带来的机遇的守望和对美好未来的憧憬，是他们坚持留在城市的动力。在外人看来，

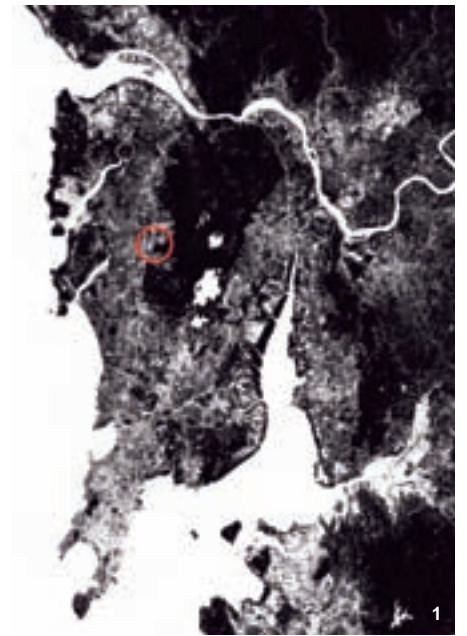
过高的密度和恶劣的住房条件似乎是这些城市贫民窟给人留下的第一印象，然而居住在贫民窟里的人却认为随着经济状况的改善，住房条件也会得到提升。这两个因素和吉尔调查里的最后两个问题说明，排泄物景观的目的并不是解决住房问题，而是为了让移民有更多机会搭上城市经济的快车。

季风

在这个课程中我们所学的第一件事就是认识季风对印度次大陆的影响。季风的影响范围覆盖包括孟买在内的整个印度地区。大约从6月至9月，夏季的西南季风会来自阿拉伯海的水汽吹向次大陆的大部分地区，其带来的降雨约占印度全年降雨量的80%。接着从12月到3月，季风转向，将会为印度东南部和斯里兰卡带来大规模降雨，而包括孟买在内的印度的绝大部分地区，在这几个月将遭受持续干旱。

对于那些生活在次大陆季风区的居民来说，处理这种短时间内的集中强降雨的传统方法是建造阶井和蓄水槽，也被称为“Talao”。这些“Talao”在西南季风来临时能够收集雨水，留作旱季使用。孟买的旧地图显示，这些岛上曾经散布着很多蓄水槽，一些小社区或小村落经常依水槽而建。虽然孟买现在只剩下两个蓄水槽——邦冈嘎和邦达拉，但其实还有许多这种被遗忘了的蓄水槽分布在各地。这些蓄水槽不仅能够提供饮用水，还满足了其他各种家庭用水的需要。有些蓄水槽，如孟买撒尔塞特岛上的邦达拉蓄水槽，在过去是专门用来清洗牲口的。

那些居住在城市贫民窟的人，往往只能依靠城市管道的偶发漏水来收集用水，或者从水井和水渠里取水。而这些水的卫生都得不到保障。人们露天排便的习惯更是对水源造成了严重污染。这些人通常在社区附近，要么沿着水道边的半干地，要么沿着铁轨随处大小便。由于这些地方常常被用作小规模蔬菜种植田，所以无形中造成了排泄物、食物和水源之间非常危险的交叉污染。很多人都认为厕所问题也



1. 场地区位图
2. 场地周边生活条件
1. Site location
2. Living conditions near site



许就是拥有将近1 300万人口的孟买最为严重的问题。甘地在发表关于改善贫民窟问题的讲话时称之为卫生问题，是“在所有问题中最被忽视的问题……会危害身体健康，滋生疾病”。即使到今天，据估计，仍有约7.5亿的印度人口缺少足够的卫生设备。将水源和厕所严格分离是排泄物景观首先需要考虑的一个问题。

边界

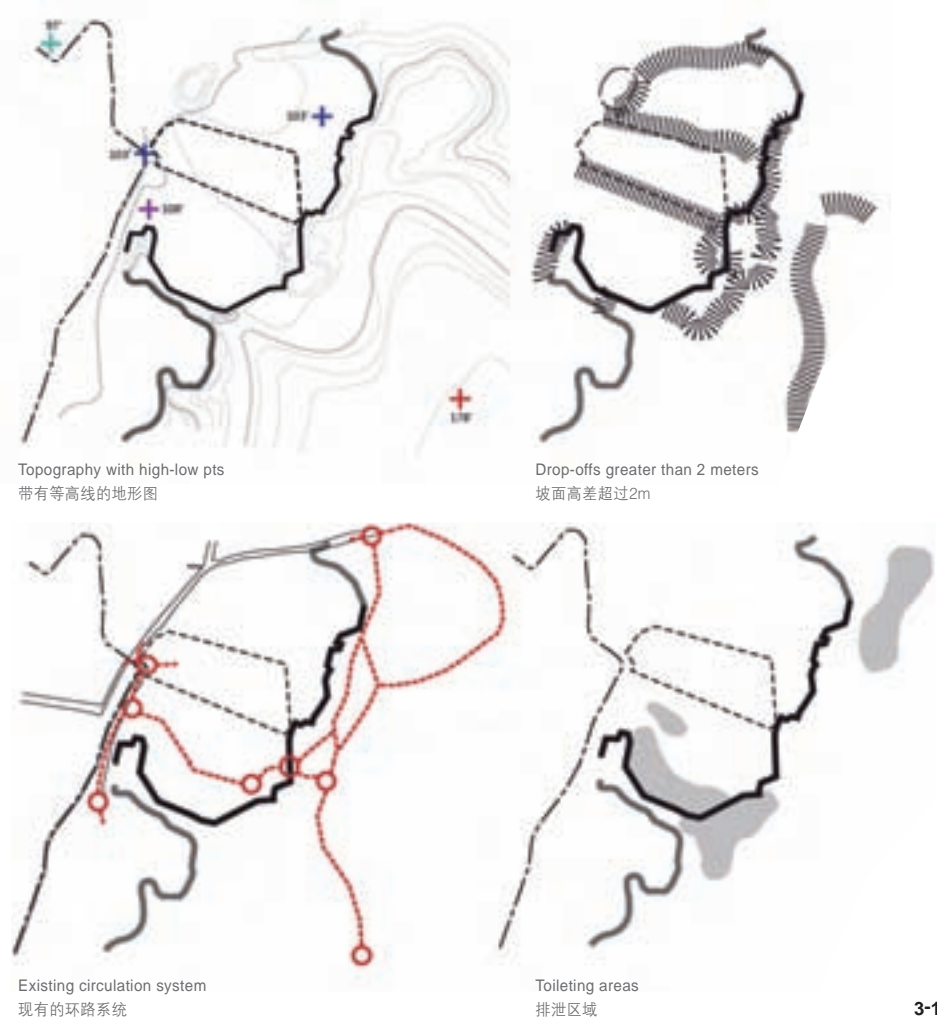
W
的撒尔塞特岛的中心。它的独特之处在于其位于大都市中心地带的同时还保有丰富

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地国家公园的两侧都受到来自合法和非法聚落的越来越大的压力。砍伐公园的植物当作薪柴的做法在当地由来已久。因此，从公园的角度来看，目前的居住形式对其脆弱的景观构成了威胁，并阻碍了公园在重新造林方面所作出的努力。

本设计课程的重点在于公园的西缘。沿着这一边缘，这些城市贫民窟的范围已经逐渐向上扩张到公园内的山坡上。虽然国家公园已经对这些贫民窟进行了定期拆除，但它们通常在几个小时之内又被重建。公园周边的一些地区虽然已竖起栅栏及围墙，试图阻止人们非法居住在公园里，其作用却往往是形同虚设。这样看来，试图驱逐和阻挡这些人的做法只是毫无远见的解决方案，无法解决城市沿着公园边缘扩张的问题。这些方法的失败自然会令我们对刻意在这块颇具争议的土地划定边界一事产生质疑。这门设计课程以及排泄物景观试图做的，就是制定一个景观战略或景观框架，通过景观来激活这个城市和公园的交界区域，使之变得“更具活力和生产性”。

范围

本研究的实施范围是阿巴帕达采石场。该采石场将东马拉德的一个现有社区和附近山坡上的一个贫民窟分隔开来。这个采石场仅仅是沿着公园西缘分布的众多废弃采石场中的一个。大多数情况下，这



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些采石场的中心都无人居住，但在这些景观的垂直切面的下方、上方以及周围地区，人们为了让自己过上更好的生活，依旧固守在这样的城市边缘地带。他们自行建造的房屋同时也在一定程度上反映出了其生活的艰辛和顽强。城市的整体运作依赖于这些坚忍不拔的人们，但他们所面对的城市服务——供水、污水处理、教育和经济——却极其有限。生活在贫民窟中的人们不仅被社会所孤立，他们还必须不断面对自身合法性的问题。

采石场中心的阿巴帕达空地，是孟买北部几个社区的儿童和成年人用作娱乐和节庆时聚会的场所。这里有少量的食物生产，但也仅限于为数不多的香蕉树和椰子树。加之分布范围不广，所以产量也不高。

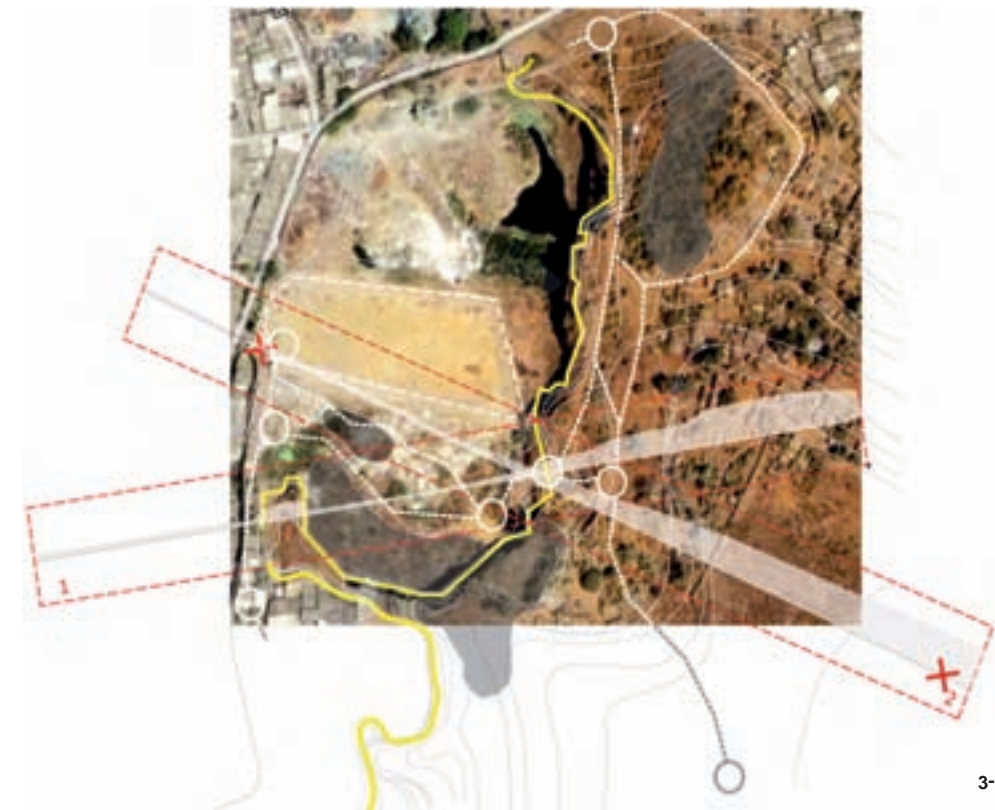
也许最值得引起重视的是供当地民众

在采石场以及采石场附近地区大小便的几个区域。这不仅对附近一条小溪的地下水造成了污染，当地居民也错过了一个利用这些资源的机会。

排泄物景观

排泄物景观设计了三大基础设施“插件”：建造类似沟壕的堆肥厕所；一条用来跨越采石场墙体的石径；以及用来蓄水的石砌“蓄水槽”。其他一些小的插件应包括：一个慢砂过滤池，用以过滤饮用水；由竹子、椰树和香蕉树构成的、具有景观意义的小树林；还有专门在西南季风来临时使用的坑式厕所。

这条石径将成为这些擅自居住在采石场上方的居民与城市之间的连廊。它应当尽可能与一条现有的通向采石场底部的小

Existing composites with study strips
根据研究地带绘制的场地现状复合分析图

3. 场地分析图：图中灰色部分为居民排泄区域。
4. 阿巴帕达采石场
3. Site inventory: Toileting areas in grey.
4. Quarry Panorama

路相邻。考虑到斜坡的坡度，应该延长这条小路的长度。有了这条便捷的道路，采石场两侧的社区就可以通过空地或位于社区中心地带的开放空间联系起来。

为了充分利用贫民窟的肥料，该设计需要建造几个类似沟壕的堆肥厕所区块。修建时要充分利用地形，将沟壕设在地形

陡降的地方，这样可以减少施工人员的工作量。沟壕由裸露的石块构成的后墙和由当地的玄武岩砌成的前墙构成。每个沟壕区块包含6个面积约为1.5m × 1.5m的厕所“隔间”。有3条可移动的竹制斜坡以供选择，每个斜坡都通向两间厕所。斜坡顶端的两侧都有可旋转打开的小门，可以保



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护基本的隐私。从采石场上方的厕所可以俯瞰下方城市的壮观景色，在采石场底部的厕所则能看到公园的景色。每一间厕所后方都有一个储物区，用来存放覆盖堆肥的覆盖材料。在厕所背面仅一臂之长的距离外将设置一个小渠，用来存放这些覆盖材料，人们可以在使用完厕所之后用覆盖材料对排泄物进行遮盖。这种覆盖材料可以除臭，还隔绝了苍蝇，并且通过加速堆肥过程减少疾病的传播。厕所管理人员应该进一步地管理好这些覆盖材料，保证它们的正常供应。最后，这些厕所将会轮流开放，每隔大约4个月清理一次（一年被分为3个这样的周期，西南季风期是其中之一）。这些已经部分降解的肥料随后被移置到朝向公园上坡的一个地方，进行大约为期一年的固化过程。固化过程是对病原体的进一步消除。随着时间的推移，厕所和固化过程中将形成一种富含营养的堆肥肥料（腐殖土）的循环。腐殖土形成以后，可以被添加到现有的土壤里，增加耕种面积，或是用于改良已投入农作物生产的土壤。

再生林是这片景观产生经济效益的原动力。柚木和印度紫檀都是极其珍贵的木材产品，但成材时间相当漫长。社区和国家公园之间的合作关系，可以促进再生林计划的开展，同时也让看护这些珍贵木材的各社区能够分享他们通过苗木销售而最终获得的额外收益。

当地人还可以通过另一种方式来盈利，那就是种植市场上销售的药用植物。阿育吠陀（Ayurvedic）医学中所使用的植物绝大部分都是印度的本土物种。阿育吠

陀是一种源于印度的古老生活方式，这种生活方式在西方国家也受到推崇。阿育吠陀医学中的许多重要植物，如印楝、阿周陀那和其他一些榄仁树属的物种，都是孟买所在的马哈拉施特拉地区土生土长的物种。

该生产的所有环节都需要水源。这些居住在城中村的人们，将会像他们的祖先一样，通过属于他们的蓄水槽取水。这些蓄水槽由混凝土和当地的石材制成，在各地均有分布。蓄水槽里取出的水将经过慢砂过滤池的净化，供人们饮用。其中部分水体经过合理的分配和利用，可以用于家庭食物生产的小型地块和大规模农业企业的发展。

拥有了水、改良的土壤、食品供应以及当地人民的适应力，这片景观将随着时间逐渐演化，渐渐地生产出越来越多不同的农产品、木材和阿育吠陀药用植物。对水和厕所系统的其他规定可以由当地社区来具体制定。这个计划同时也包括了对水收集、灌溉以及其他必需的对水资源管理方式的规定。

结论

这个景观设计项目展示了其有可能实现的情景：它试图回答由这块土地和它的居民所提出的许多问题。不可避免的是，这是一个主观的规划，所展现出来的前景是乐观的，但尚不完整。

这一景观项目如果想要真正取得成功，不仅需要社区的投入，还需要人们根据自身需要对其进行灵活应用。因此，我们希望众多家庭共同协作来维护这个景观，就像维护一个村庄体系。甘地相信，如果“城市是政治的症结”，那么治愈它的自然方式就是让城市的居民名副其实地“心系村庄”，这样“所有的其他问题都会迎刃而解，症结很快就会治愈”。同样，简单地通过努力去解决一些基本问题，例如这些生活在城市边缘地区的人们的卫生和供水设施问题，也能够潜移默化地、广泛地影响到孟买的许多其他地区——

“Sh*t scape: Mumbai's Landscape In-Between” proposes the making of an entirely functioning landscape built from human excreta. The vision for a landscape intervention at Appapada Quarry is one which takes advantage of this resource by recovering the “soil” from the settlements while extracting the essence of the forest, in the form of beneficial flora, and utilizes both as a generator for a new and evolving landscape. The project seeks to enable local community participation in the making, processing and profits of this landscape.

The project and many of the ideas presented here were developed during a Spring 2009 landscape architecture graduate studio at the University of Pennsylvania. As a studio, we travelled to Mumbai for ten days at the beginning of February. For the first seven days, we stayed at the Hare Krishna Temple in the neighborhood of Juhu. Our days were spent traversing and investigating the western side of the island of Salsette including the Sanjay Gandhi National Park. The studio projects came from our direct on-site experience in Mumbai and the remarkable insight, patience and curiosity of our faculty advisors Anuradha Mathur and Dilip da Cunha.

Coincidentally, at the same time we were preparing for our trip, Danny Boyle's *Slumdog Millionaire* was out in cinemas. As a studio, we knew we should come face-to-face with new migrants and their living conditions. The following sections describe the research conducted in order to understand the complex conditions and juxtapositions we would be designing within.

The Community

Mumbai is located just off the west coast of the Indian subcontinent. It is the largest city in India and one of the most densely populated places on the earth. Its dynamism

results from its position as a large port city, a financial hub, and a world center for cinema. Due to the industrialization of rural farming, and the promise of prosperity founded in the city, Mumbai has received an influx of migrants over the past several decades. For the past twenty years, this mass migration has become commonplace throughout India and South Asia. According to the Census of India, from 1991 ~ 2001, 73 million Indians had migrated from rural locations to urban centers. The trend has continued since 2001. With burgeoning urban populations, Indian cities are incapable of providing even basic municipal services like sanitation and clean water for so many migrants. As a result, living conditions for these new arrivals are less than ideal.

Although many migrants believe that the better life they seek can be found in the city, the realities faced upon arrival tend to be much different than expected. The poverty many seek to escape often awaits them on the streets and in the neighborhoods they settle in. Despite hardships, many find city life to be better than their former lives in rural India. Rajesh Gill's "Slums as Urban Villages" survey data provides a revealing look at some commonplace assumptions about the living conditions and attitudes of those who call these informal communities home (Table 1). Although the survey only includes four responses, it offers a view into the life and perspectives of recent migrants to Mumbai.

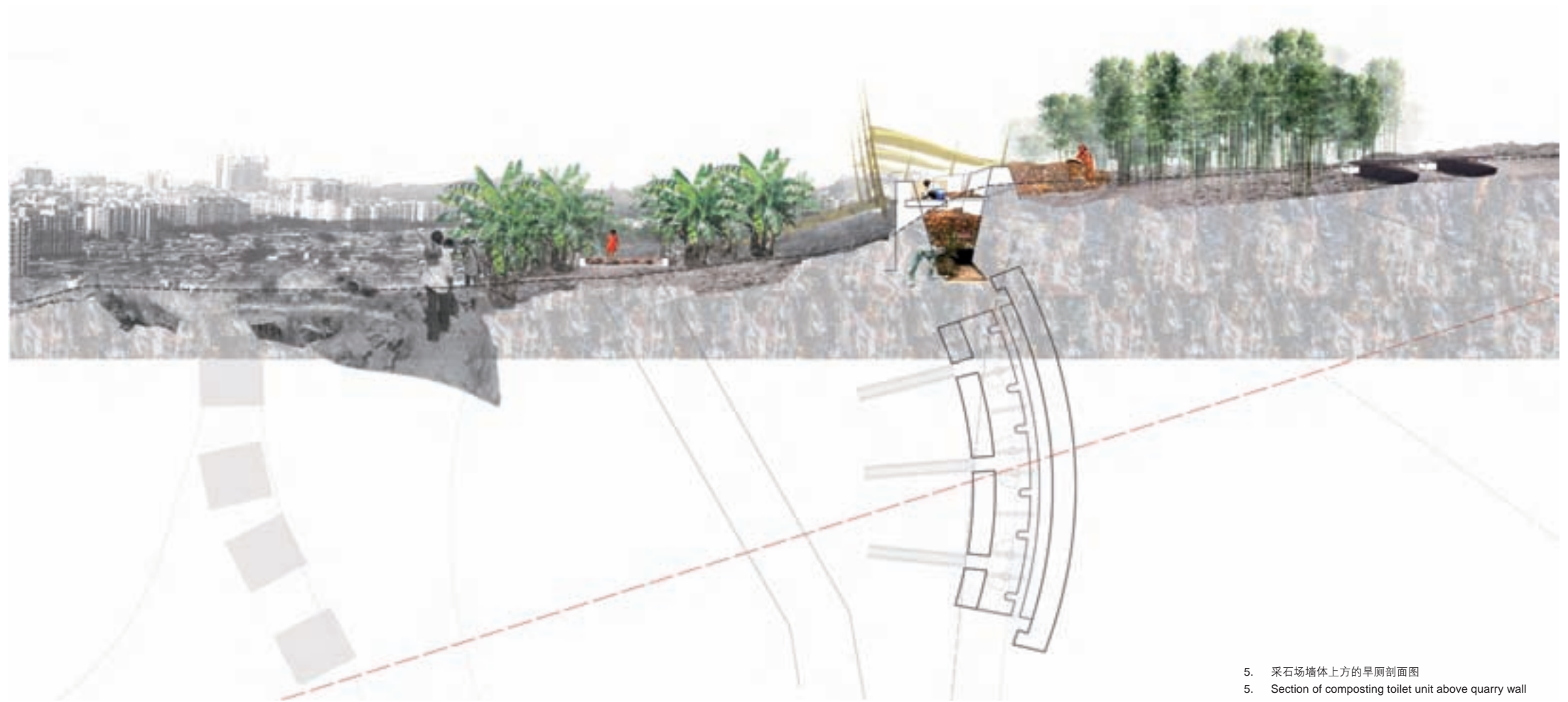
Gill is not the only scholar looking at this sector of the city. Jeremy Seabrook takes up

the issue in his work, *Cities: Small Guides to Big Issues*. While he states that many of the poor in the city are worse off than in the rural areas, he is also quick to acknowledge the ingenuity of the people living in these informal settlements. He says, they “often create their own work in an ever-expanding and increasingly ingenious informal sector”. On the surface what Seabrook and Gill are saying appear to contradict one another. What seems to be the case, however, is that recent migrants to the city are, in fact, worse off than those in rural areas — at least economically. It is their outlook about the possibilities the city affords and general optimism about their prospects that keep them in the city. Density and housing conditions seem to be the first thing an outsider notices about these

communities, but in the minds of the informal settlement dweller, housing can be upgraded as economic situations improve. These two factors and Gill's final two questions point that Sh*t scape is away from a housing-based solution, and instead, toward a direction of increasing migrants' access to the economic success of the city.

The Monsoon

One of the first things we were taught in studio was the importance of the monsoon for the Indian subcontinent. All of India, including Mumbai, is affected by seasonal monsoons. The summer monsoon winds bring moisture from the Arabian Sea to most of the subcontinent. It occurs from roughly June through September and brings roughly 80%



5. 采石场墙体上方的旱厕剖面图
5. Section of composting toilet unit above quarry wall

of India's rainfall. Then, from December to March, the monsoon reverses. Southeastern India and Sri Lanka see significant rain during this period, but the vast majority of India, including Mumbai, is left dry for these months.

For those living in the monsoon regions of the subcontinent, the traditional method for dealing with this influx of heavy rainfall over such a short period of time was to construct step-wells and tanks, also called "Talao", to collect rainwater during the monsoon and store it for the dry season. Older maps of Mumbai show many of these tanks scattered about the islands usually surrounded by a small community or village. Although there are only two remaining tanks in Mumbai, the Banganga and the Bandra, the remnant infrastructure of many forgotten tanks do still exist. Tanks were not only water sources for drinking, but for all manner of household requirements. Some, like the Bandra tank on the island of Salsette in Mumbai, were reserved for washing cattle.

For those dwelling in informal settlements, access to water is typically only available through opportunistic harvesting of water from leaks in the city pipes or by collecting it from wells and watercourses. None of these are reliable sources of clean water. Water sources are often additionally compromised through the habit of open defecation. Informal toileting usually occurs adjacent to communities either along stretches of semi-dry land next to waterways or alongside rail tracks. Since these spaces are also often used for small-scale vegetable gardening, it sets up a potential dangerous mixing of fecal matter with food and water supplies. Toilets are seen by many as perhaps the most important issue in this city of nearly 13 million. Gandhi himself, when speaking of the improvement of villages, called sanitation, "the most neglected of all the problems..."

Table 1 "Slums as Urban Villages" Survey

1. Views regarding city life?		2. Views on type of housing?		3. Satisfaction over economic opportunities?		4. Views of ability to secure sufficient income?	
Uncertain	8%	Quite Good	15%	Very Bad	10%	Not at all	14%
Rural Life was Better	20%	Satisfactory	11%	Not So Good	77%	Only Sometimes	68%
City Life is Definitely Better	72%	Tolerable	34%	Quite Good	13%	Uncertain	4%
		Very Bad	40%			Quite Well	14%

that undermine physical well-being and breed disease". Even today, it is estimated that about 750 million Indians lack access to adequate sanitation facilities. Establishing a clear distinction between water resources and toileting is a priority of Sh*t scape.

The Territory

Sanjay Gandhi National Park lies at the center of Mumbai's northern island of Salsette. It is unique in that it has a wealth of biodiversity while sitting in the center of a substantial metropolis. Because of this, both sides of Sanjay Gandhi National Park are under increased pressure from legal and illegal settlements. There is a long history of the removal of park flora for use as firewood. Thus, from the park's perspective, settlement in its present form threatens the sensitive landscape and thwarts the park's efforts at reforestation.

The focus of the studio course was the western edge of the park. Along its territory, informal settlements have increasingly spread up the hillsides into parkland. Some attempts to remove settlements have taken place periodically, but they are usually built back within a matter of hours. In some places along the periphery, the park has erected fences and walls as a deterrent to settlement only to find out later that these too, are often penetrated or circumvented. It would appear, then, that the twin attempts of population removal and barrier construction are short sighted solutions to the problem of peri-urban development along the park's edge. The failure of these methods inherently leads to a questioning of the deliberate demarcation of this contested ground. Our charge for the studio, and what Sh*t scape attempts to do, is to develop a strategy, or framework, for the landscape that

can activate a more "dynamic and productive" terrain along the city and park's edge.

The Ground

The operating ground for this investigation is Appapada Quarry. The quarry separates the established neighborhood of Malad East and a hillside of informal settlements. This is just one of many abandoned quarries dotted along the western park periphery. For the most part, the centers of these quarries are left uninhabited, but beneath, around and above these vertical cuts in the landscape people are clinging to the margins of the city in order to make a better life for themselves. Their self-constructed houses speak at the same time to a hardscrabble existence and to a certain toughness of those who live there. The functioning of the city as a whole is dependent upon these resilient people, yet their access to the services of the city — water, sewer, education and economy is remarkably limited. As if being an isolated part of society were not enough, they also must deal with the constant threat of their own legitimacy.

In the center of the quarry is the Appapada Maidan where children and adults from across several northern Mumbai neighborhoods congregate for recreation and festivals. There

is a small amount of food production, but this is limited to a few banana and coconut trees. This is not widespread, therefore, not abundant.

Perhaps the most significant is the several areas in and around the quarry environs utilized by the local populace for toileting. Apart from contaminating ground water in an adjacent stream, it also represents a missed resource opportunity for this same population.

The Sh*t scape

Sh*t scape proposes three major introductory insertions: constructed trench-like composting toilets, a stone pathway traversing the quarry wall, and stone "tanks" for the retention of water. Other minor insertions should include a slow-sand filter for availability of potable water, a grove of bamboo, coconuts and bananas to begin the functioning of the landscape and pit toilets for use during the monsoon season.

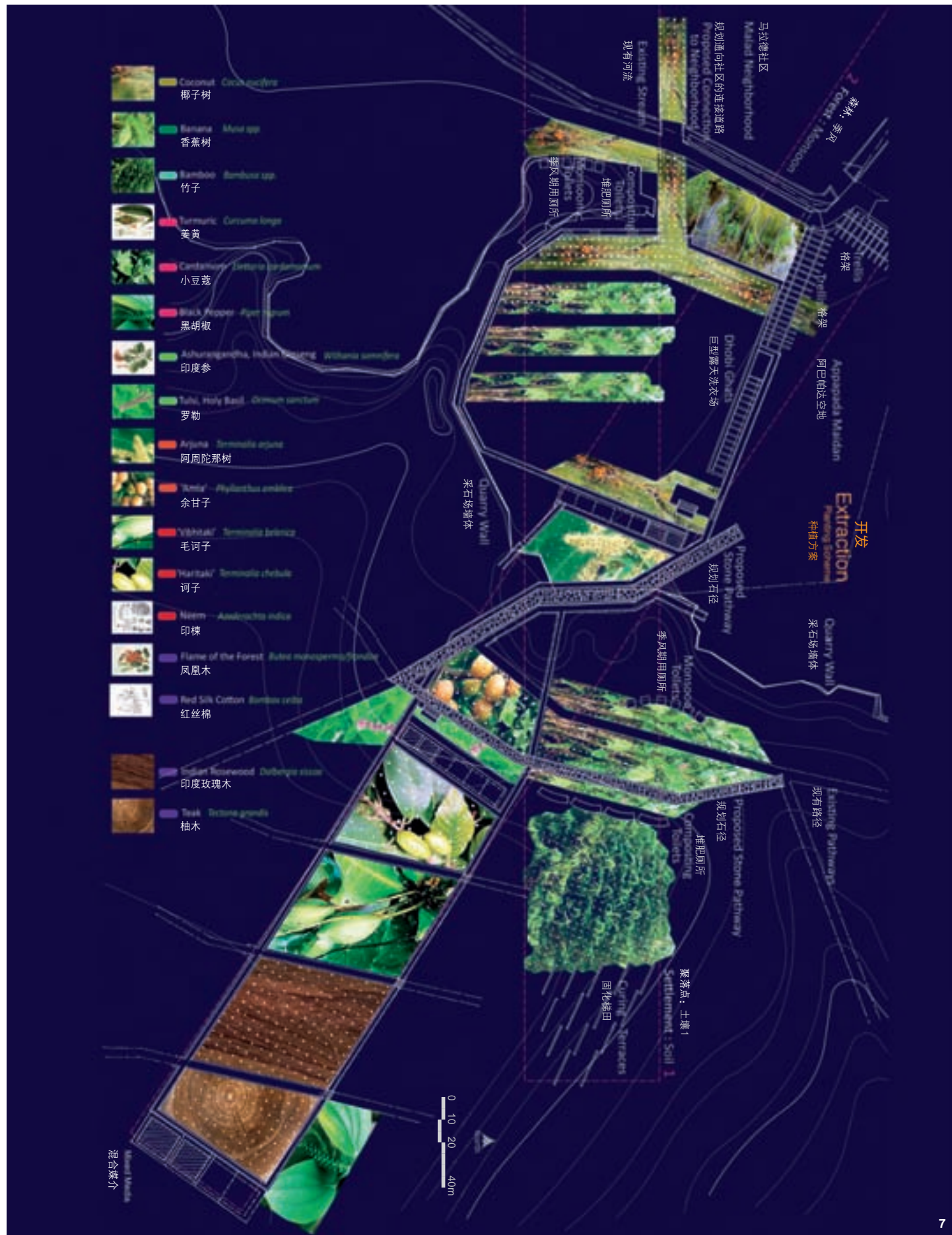
The stone pathway will provide the physical connection to the city for the squatters living above the quarry. It should be constructed as near to the location where existing trails lead down to the quarry floor. Due to the steepness of the slope, the path should extend in length. Thus, through

convenient routing, the communities on either side of the quarry can be linked together via the maidan, or community open space located in the center of the quarry.

In order to utilize the nutrient resources of the settlements, the plan calls for the construction of several trench-like composting toilet modules. To take advantage of the topography in the creating of the trenches, they are located where the landscape drops off steeply, providing less work for those who will construct them. Exposed stone for the back wall and a constructed front wall, also from native basalt, will form these trench structures. Each module contains six toileting "rooms" approximately 1.5m × 1.5m. They can be accessed by walking up a choice of three removable bamboo ramps — two rooms to each ramp. On the top of the ramp, on either side, are small gates that swivel for access and provide some modest privacy. The toilets located above the quarry will have spectacular views to the city below, while the toilets at the base of the quarry will have a view to the park. Behind the toilet units, there is a storage area for composting cover material. This material will be provided along a channel at the back of the toilet just arm's length away, so the toilet users can



6. 具有集水渠和过滤系统的采石场墙体剖面图
6. Section above quarry wall with water catchment and filtration system



cover the fecal matter when finished. This cover will remove the smells and keep flies from accessing the fresh organic material. It will also hasten the breakdown of diseases by accelerating the start of the composting process. Cover material should be further managed by those overseeing the toilets in order to keep them in proper working order. Finally, the toilets will be alternated and cleaned out roughly every four months (the year being divided into three sections of four months with the monsoon being one of them). The partially composted material is then moved to a location uphill, toward the park for roughly one year of curing. The curing duration is further insurance against pathogens. Over time the toilets and curing process will produce a rotation of nutrient rich composted manure (humus). When it is ready, humus can be added to the existing soil to create new areas for cropping or to improve soil already under cultivation.

Re-forestation is seen as the initial financial driver of this landscape. Teak and Indian Rosewood are extremely valuable forest products, but take considerable time to grow to maturity. A partnership between the community and the National Park could result in improved re-forestation programs while also allowing the communities that care for the valuable timber to share in the eventual windfall from the sale of their trees.

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Another way for the locals to make money is to grow medicinal plants that could be sold on the market. India happens to be the native range of nearly all plants used in Ayurvedic medicine. Ayurveda is an ancient way of life developed in India that has become popular in the West. Many important plants found in Ayurvedic medicine, such as Neem, Arjuna and several other species of the Terminalia genus, are also native to the region of Maharashtra, which Mumbai is a part of.

All of this production will require a water source. Like the ancients, these urban villagers will have access to water from their own decentralized "tanks" also constructed from a combination of concrete and local stone. From these, the community will be able to filter water through a slow-sand filter for their drinking water. A portion of the water can be managed and utilized for the growing of small family food plots and the more extensive agricultural enterprises.

With water, improved soil, food supplies and the resiliency of the local population, this landscape can evolve throughout time to accommodate more varieties of produce, timber and Ayurvedic plant material. Additions to the water and toilet systems can be made as required by the local community. Within the plan there are also provisions for collection, irrigation and other water management necessities.

Conclusion

The completed landscape architectural project is a playing-out of a possible scenario; one that attempts to answer the many questions that the territory and its players are asking. By necessity, this is a projective enterprise, and therefore represents an optimistic, yet incomplete effort.

If this landscape is to be a success, it will need not only the inputs from the community, but their ingenuity in adapting the plan to their own uses. As such, it is hoped that this landscape could be maintained through multi-family networks, much like a village system. Gandhi believed that if the "city is a boil on the body politic", then the natural way to heal it is for the city dwellers to become truly "village-minded", then "all other things will automatically follow and the boil will quickly heal". Likewise, simply making efforts to resolve some basic problems like sanitation and water access for those living at the margins of the city has the potential for widespread effects on many other parts of Mumbai — particularly this sensitive edge along Sanjay Gandhi National Park. **LAF**

7. 以创建丰产的经济景观为种植理念，种植包括本地果树、材用树种及阿育吠陀药用植物。
 7. The planting scheme focuses on creating an economically productive landscape with native fruit, timber, and Ayurvedic plants.