

Bioremediation

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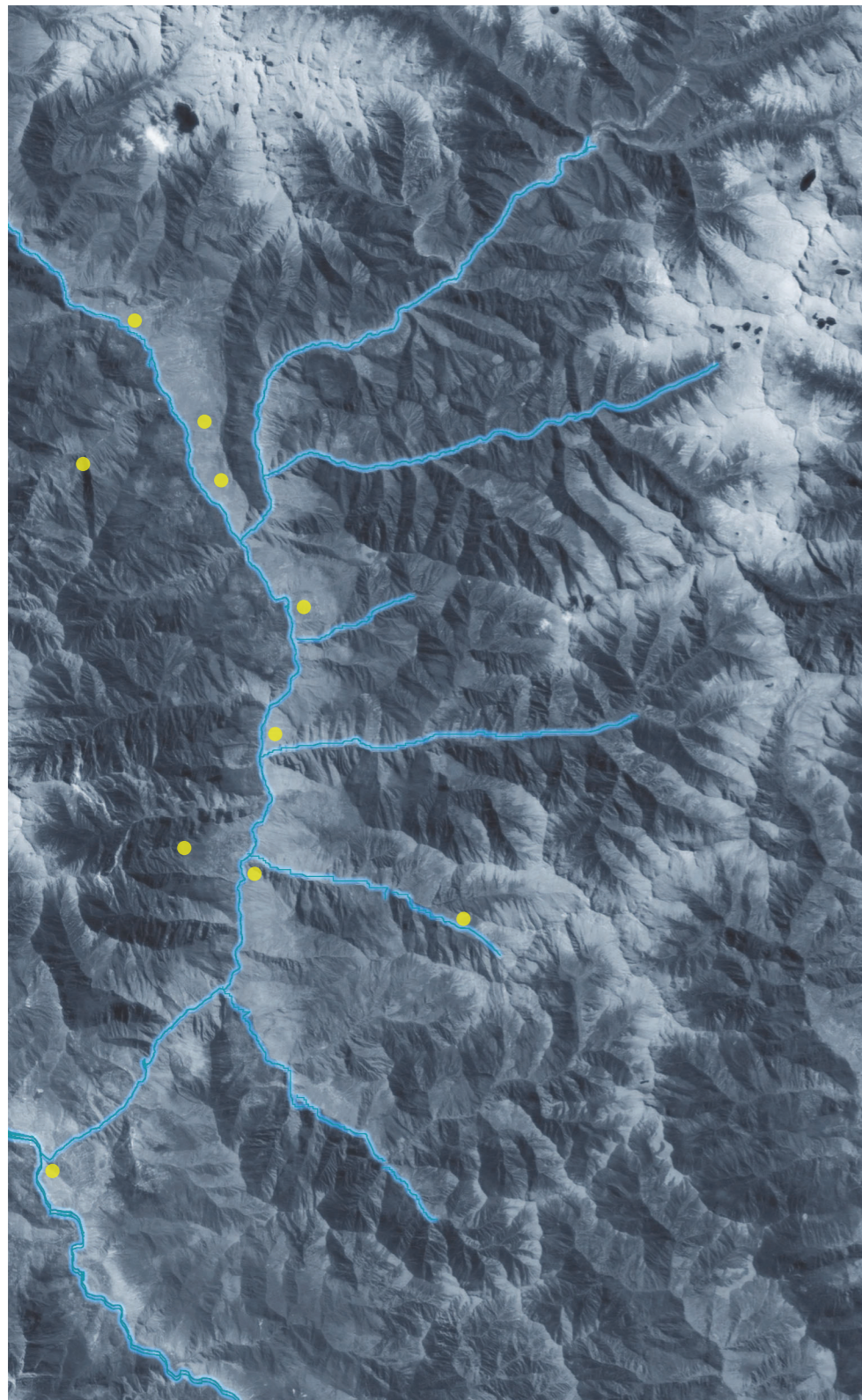


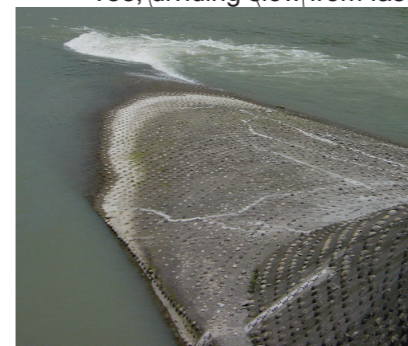
Figure 5.1 Zagunao Watershed, waterways and villages highlighted



Figure 5.2 bamboo baskets filter slow stream as it joins fast stream at Fish Mouth Levee



Figure 5.3 Fish Mouth Levee, dividing slow from fast



Du Jiang Yan irrigates over 5,300 square kilometers of land - 2,300 years ago - 100,000 taels of silver - 3 main constructions - Yuzui (Fish Mouth Levee): divides stream - Feishayan (Flying Sand Weir): connects stream - Baopingkou (Bottle-Neck Channel): distributes water

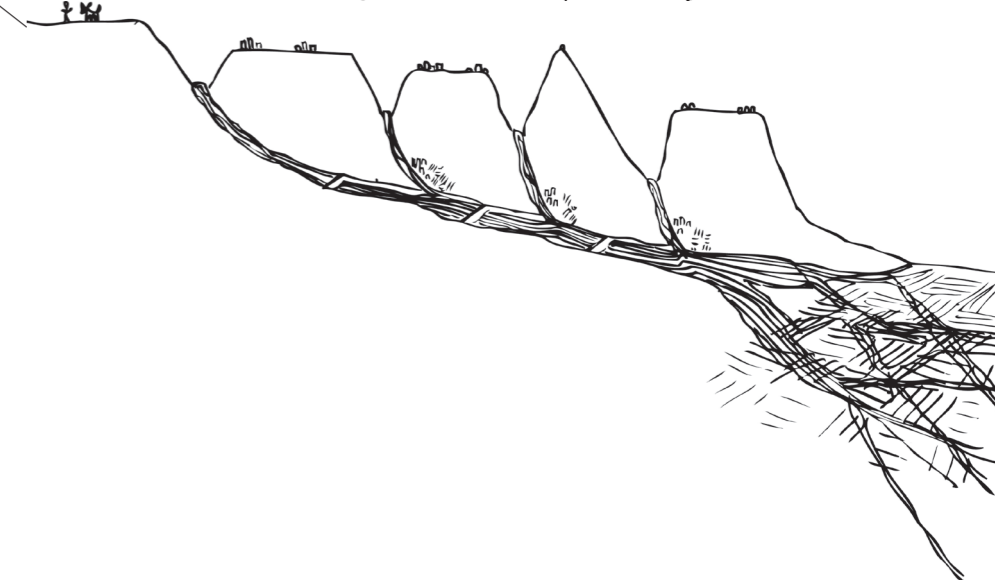
Water in China follows a simple diagram (below), supporting a clear pattern of human inhabitation. Where clean, fresh water is redundant, settlement is supported. If not, no building is possible. Living dependent on these redundancies, locals of the Zagunao Watershed, the Qiang people, have developed sophisticated techniques to slow, filter, and draw water.

Although the modern manifestation of this is heavy damming along the Zagunao river, which has resulted in channelization of the river and loss of habitat for fish and wildlife, traditional techniques are still latent in the landscape.

A magnanimous example of Qiang water culture is the waterworks at Du Jiang Yan (left). This 2,300 year old channel system irrigates the entire Szechuan Basin. What can we learn from this important work of civil engineering?

The waterworks functions according to a simple principal: an impediment in a stream causes the stream to branch. A change in depth controls velocity. So, the grand rivers of western China must pass through Du Jiang Yan. Enormous concrete impediments divide the stream into fast and slow. In the slow stream, sediment falls to the bottom and the edge. In the fast stream, the energy of the river is allowed to pass. Then, the two streams re-join, where the fast stream passes through a set of bamboo weirs, which filter larger objects.

Can we use this diagram to help Taoping?



修复生存环境的自然功能 可持续发展的第一步

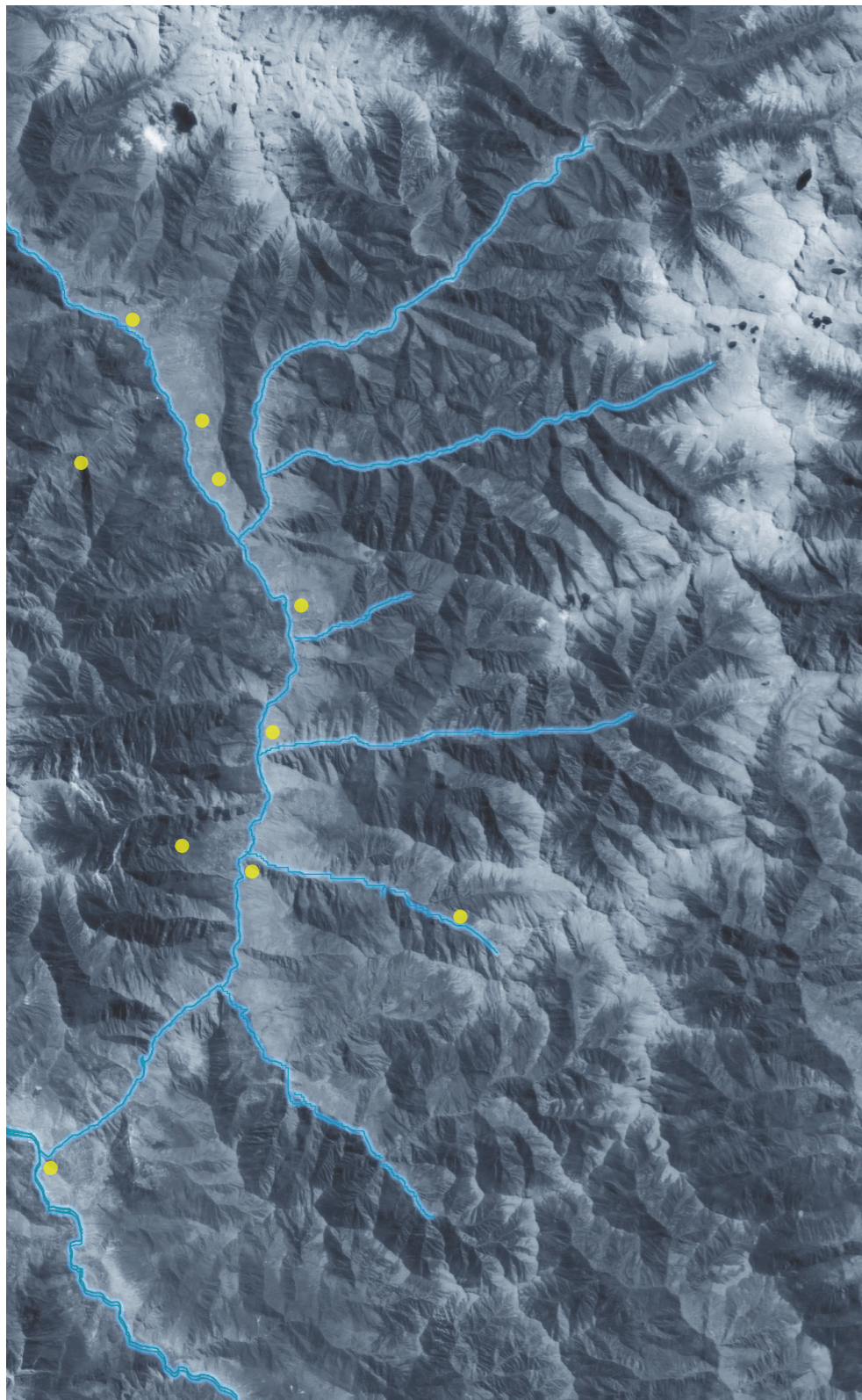


图 5.1 杂谷脑河流域，河流和村庄被标记在图上



图 5.2 竹篾子在鱼嘴堰被用来减缓水流的速度



图 5.3 鱼嘴堰，将水流分隔成快速与慢速的水流



都江堰灌溉了超过了5300平方公里的土地 - 2,300年前 - 100,000两的白银 - 3个主要的建设工程 - 鱼嘴：分隔水流 - 飞沙：合并水流 - 宝瓶口：引导水流

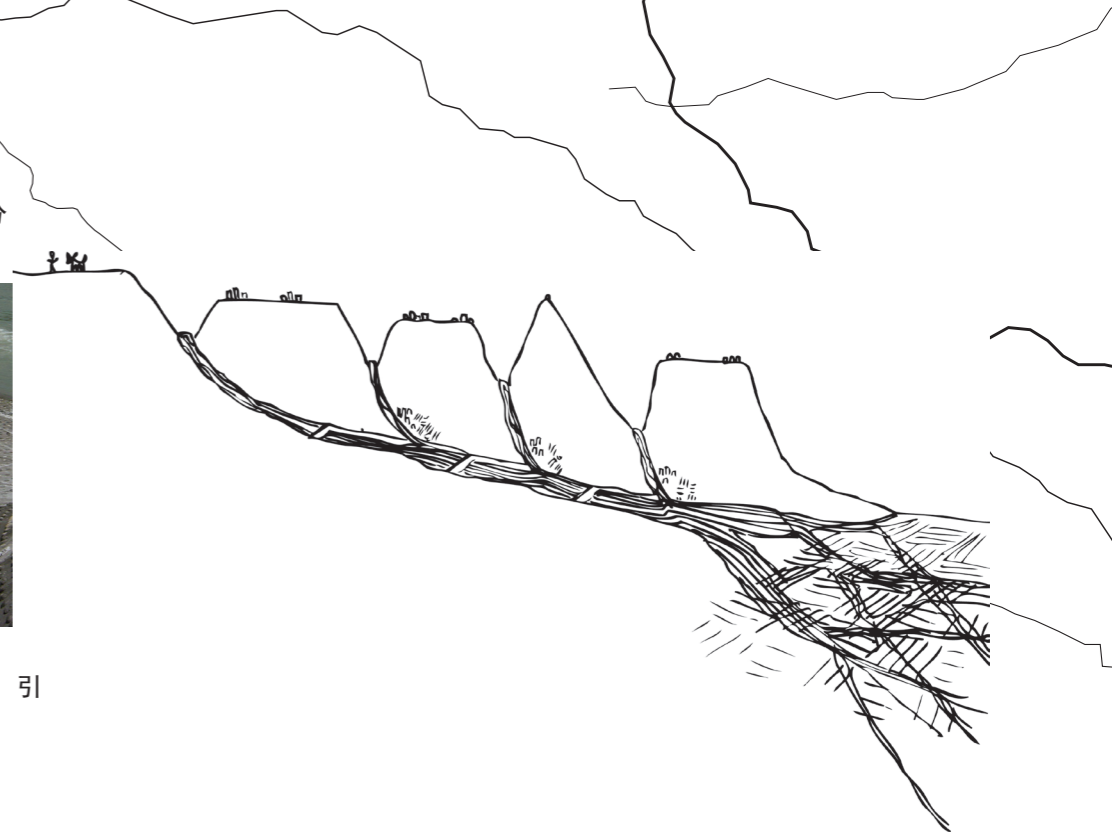
在中国，水的使用遵循以下一个简单的图表，并提供了一个清晰人居模式。在有干净、新鲜和充足的水的地方，就有居住地。没有水，就没有人居。在杂谷脑河流域、羌族人民发明了高深的技术来减缓、过滤、和引用水。

尽管在现代，沿杂谷脑河建造的大坝导致河水的分流和鱼类以及野生生物的消失，但（水处理的）传统技艺仍然被继承下来。

都江堰工程是一个卓越的水文化例子。这个有2300年历史的灌溉系统养育了整个成都平原。我们可以从这个水利工程中学到什么呢？

都江堰的水系统基于一个简单的原理工作：在岷江中构筑的障碍物（堰）将江水分流。河床深度控制着流速的变化。中国西部的主要河流都必须经过都江堰。坚实的江堰将江水分为快流和慢流两部分。在缓慢流动的江水中、泥沙跌落到江水的底部和边缘。在湍急的江水中、河水迅速的流过。然后，这两条江水再次会合并经过一系列竹堰，将较大的物体过滤掉。

问题是，我们可以用这种方式来帮助桃坪吗？



2010年3月30日草稿

Bioremediation

Water in Taoping

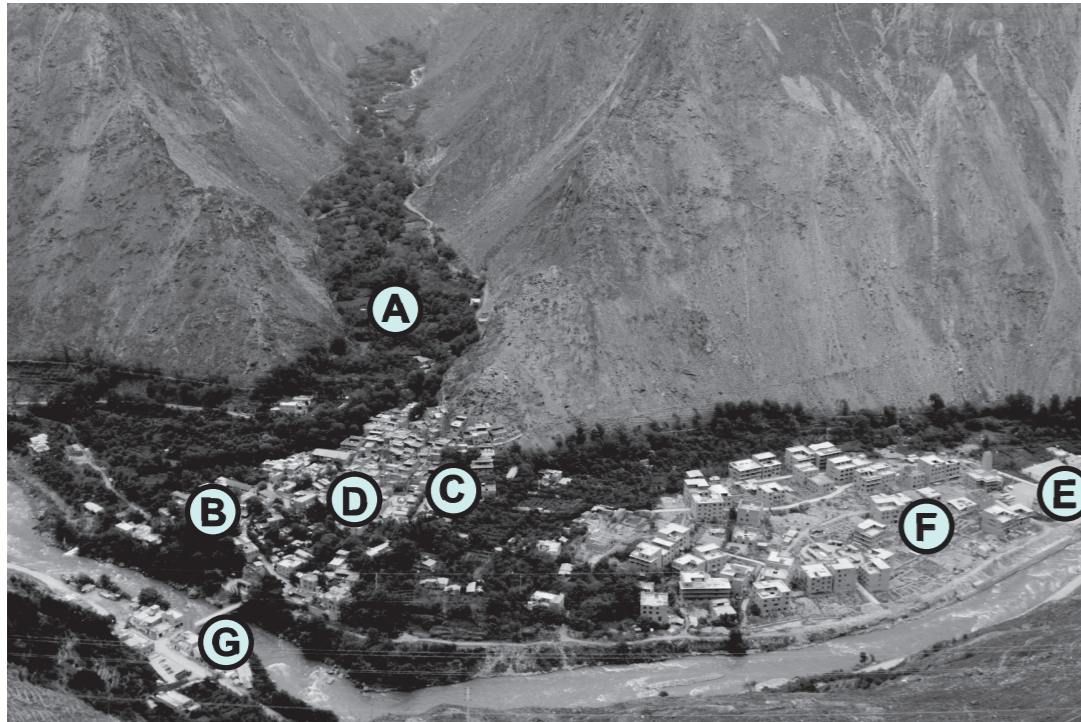
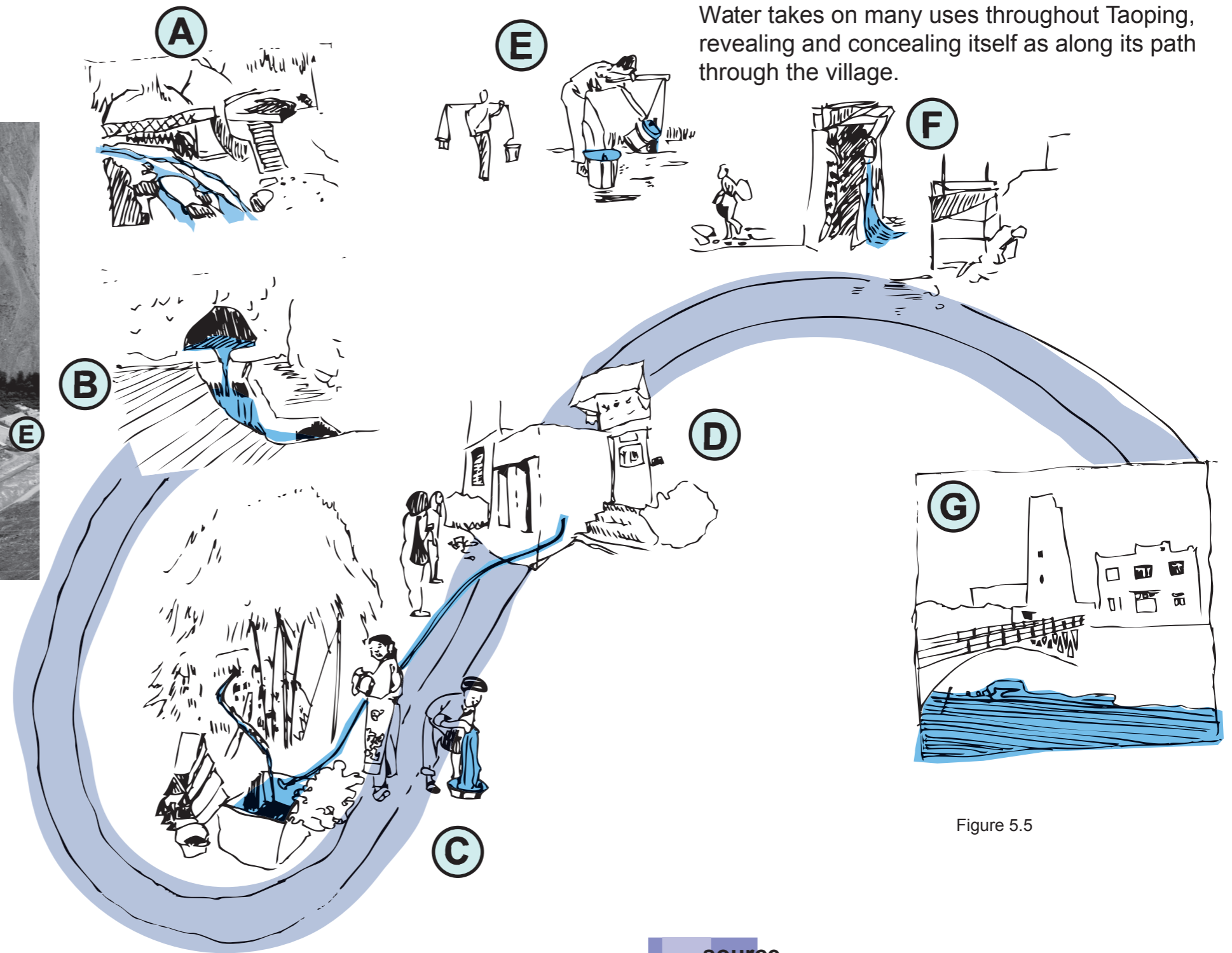


Figure 5.4

- A** The primary water source of Taoping is Zentou Creek, which comes from the mountains.
- B** The sacred spring old town is a secondard water source
- C** Water travels through and around the town via wooden pipes or stone canals.
- D** Because of the increased capacity need, many old buildings added new toilet facilities.
- E** People collect water from a sink installed at the public school when plumbing occasionally becomes silted.
- F** After the earthquake, temporary toilets constructed of wood, mats and blankets were constructed in the new town.
- G** Because of the increased capacity need, many old buildings added new toilet facilities.



Water takes on many uses throughout Taoping, revealing and concealing itself as along its path through the village.

Figure 5.5

As water moves through the village, it goes through several steps between its source, use, and reintroduction into the environment. This diagram will serve in conjunction with the graphic on the next page to orient one through this proposal.

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修复生存环境的自然功能： 桃坪的水

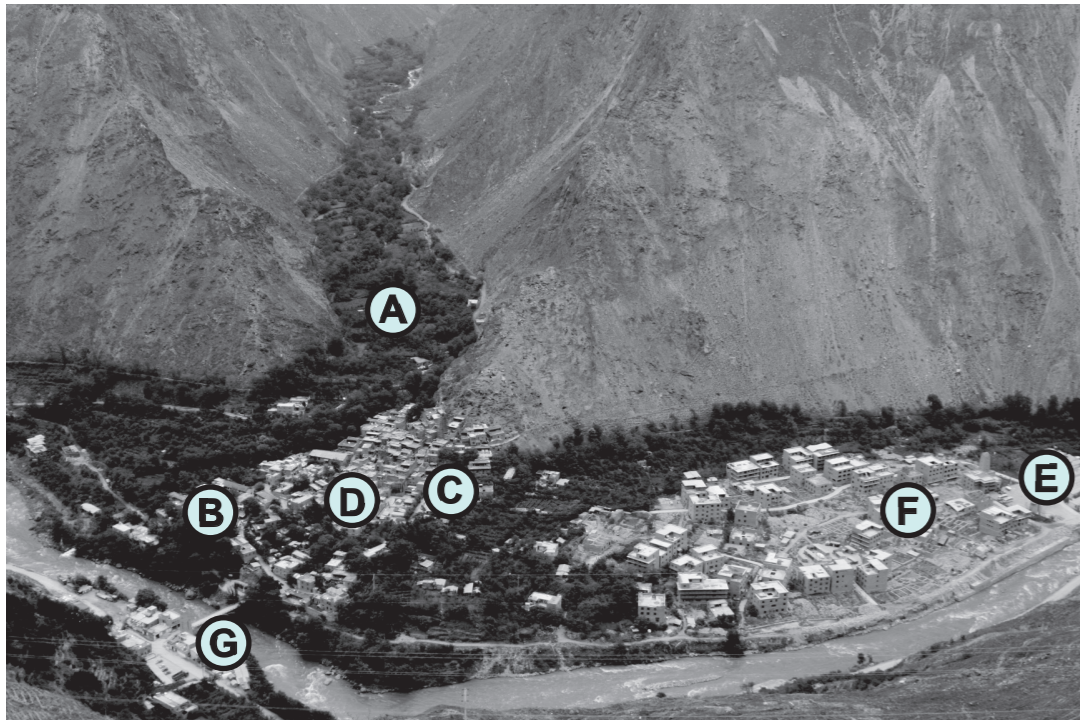


图 5.4

- A** 桃坪的主要水源来自山区的曾头沟。
- B** 桃坪的圣水是一个次要水源
- C** 桃坪羌寨的溪水沿着寨中的石头或木头管道流过沟渠。
- D** 因为空间扩张的需求,许多古老的建筑物新增了卫生间。
- E** 当水管堵塞时,村民在公立学校安装了水池来收集雨水。
- F** 在地震发生后,村寨用木材,垫子和毯子新建了一些临时厕所。
- G** 道路沿水流而行,基建破坏了原生的土壤和植被。

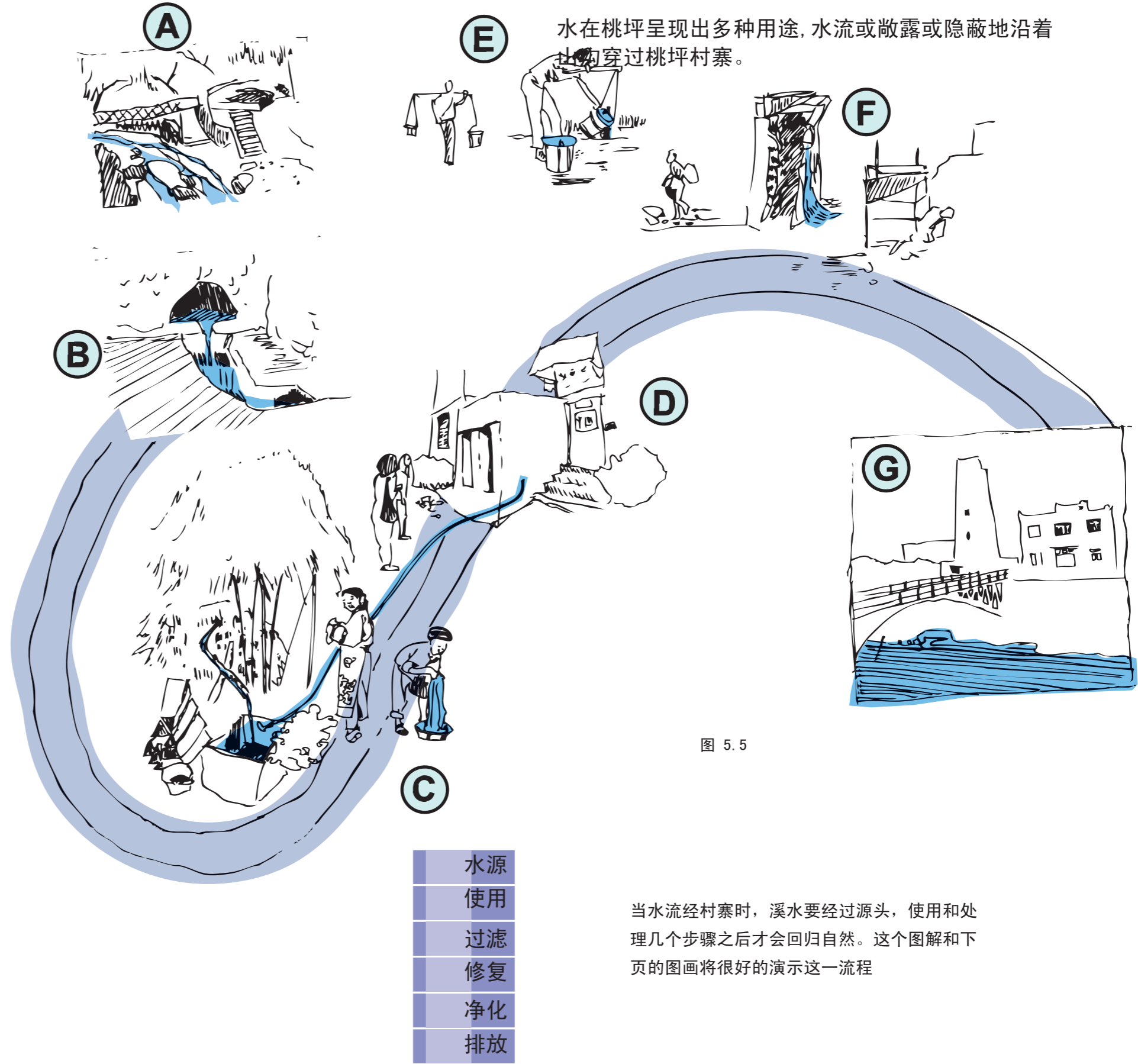


图 5.5

当水流经村寨时,溪水要经过源头,使用和处理几个步骤之后才会回归自然。这个图解和下页的图画将很好的演示这一流程

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Bioremediation: Site Map

Interpretive Center

Living Canal Network

Bioremediated Agriculture

Softened River Edges

Constructed Wetland

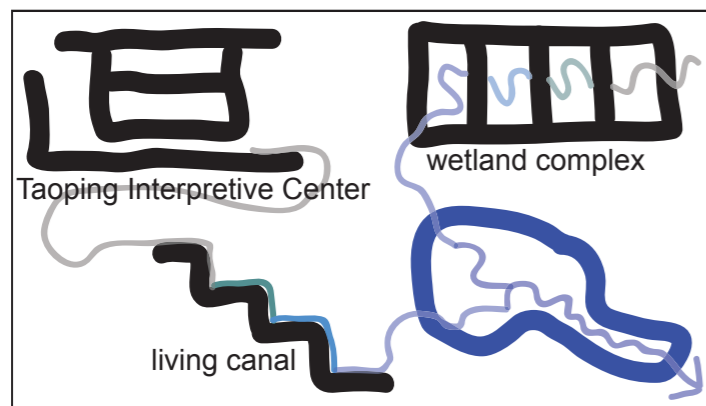


Figure 5.6

This graphic simplifies the path of water in Taoping to orient you as you consider this series of interventions. There are three main parts to this proposal. This document describes each in sequence as if to a visitor to Taoping for the first time. In this case, one would start at the Wetland Complex, move up the living canal, and arrive at the Taoping Interpretive Center.

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修复生存环境的自然功能： 村寨总图

桃坪科学教育中心

生态运河

生态修复功能的农业

软性的河流边界

人工湿地

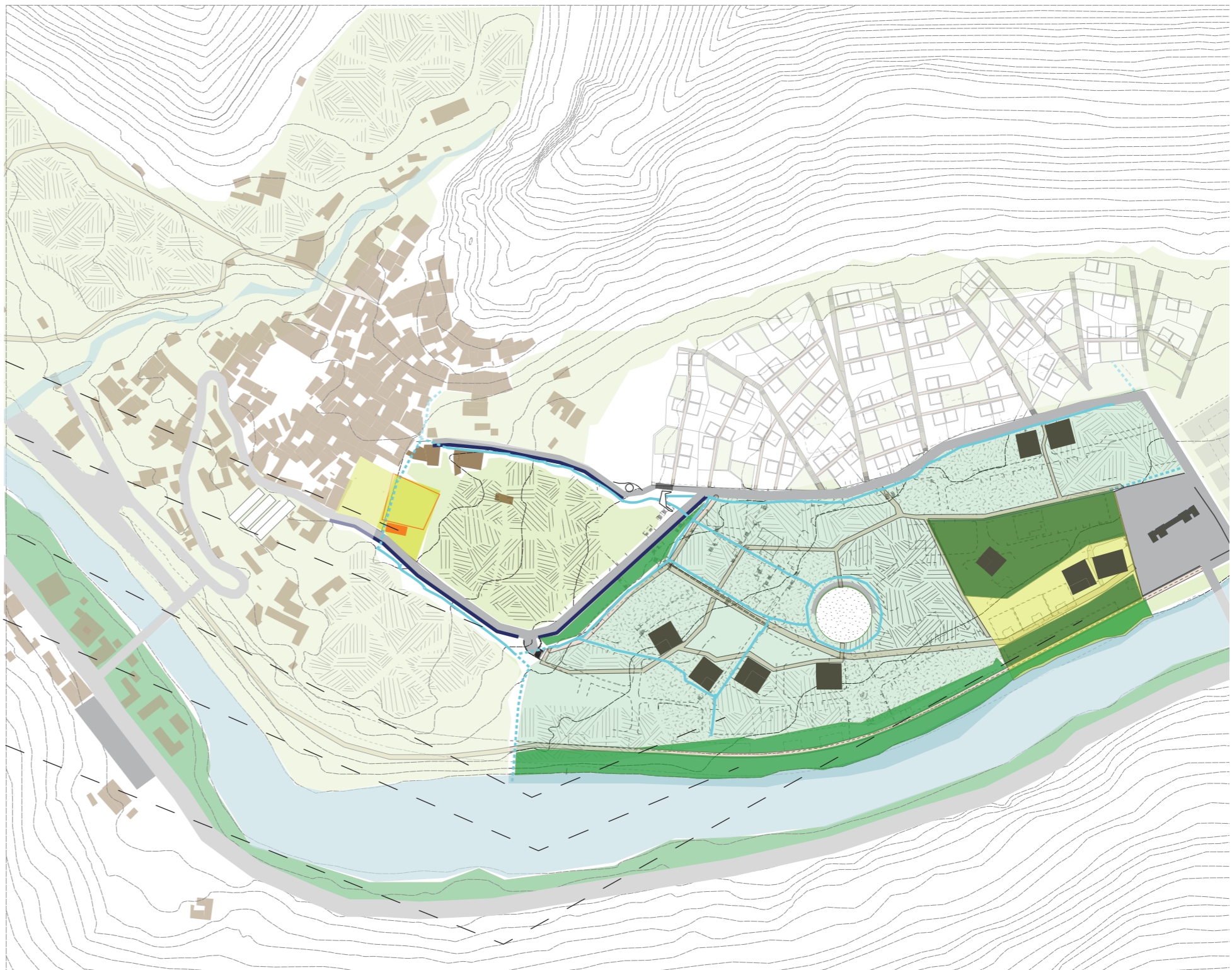
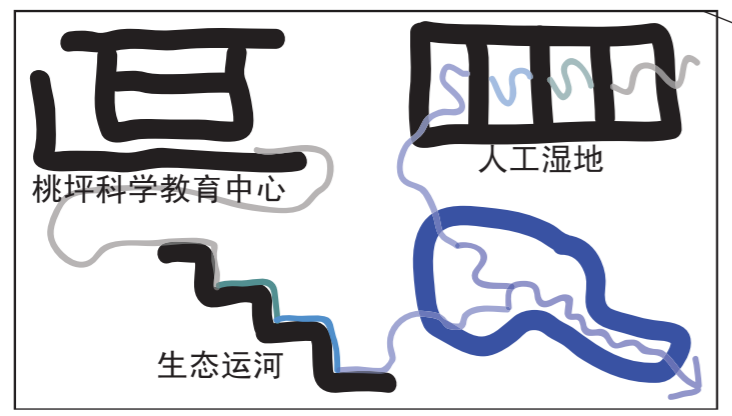


图 5.6

这个图形简化了水在一系列干预措施中的运用。这一措施包括三个主要部分。我们通过一个第一次到桃坪的参观者所经历的来描述这三个部分。首先，参观者会先到达湿地，而后向上走到生态运河，最后参观桃坪科学教育中心。

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Figure 5.7

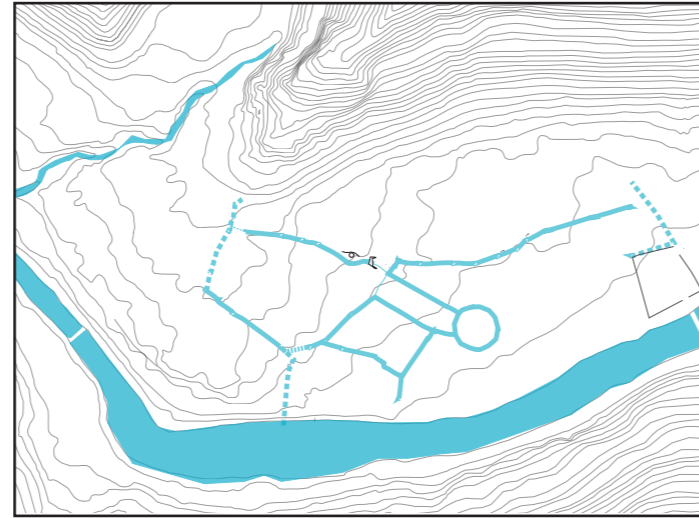


Figure 5.8

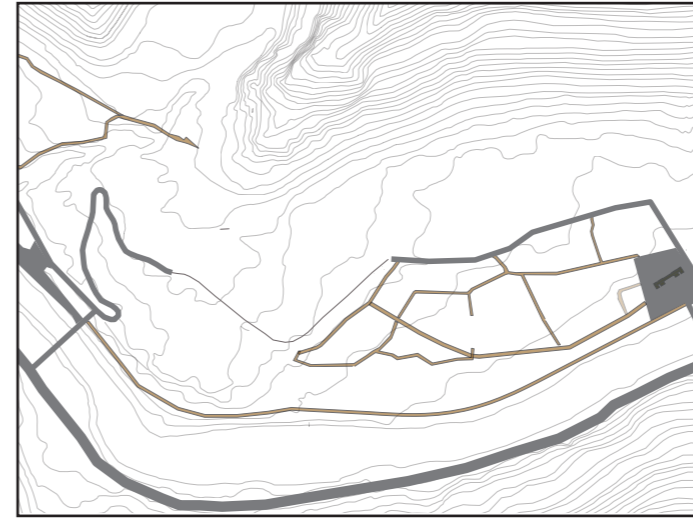


Figure 5.9

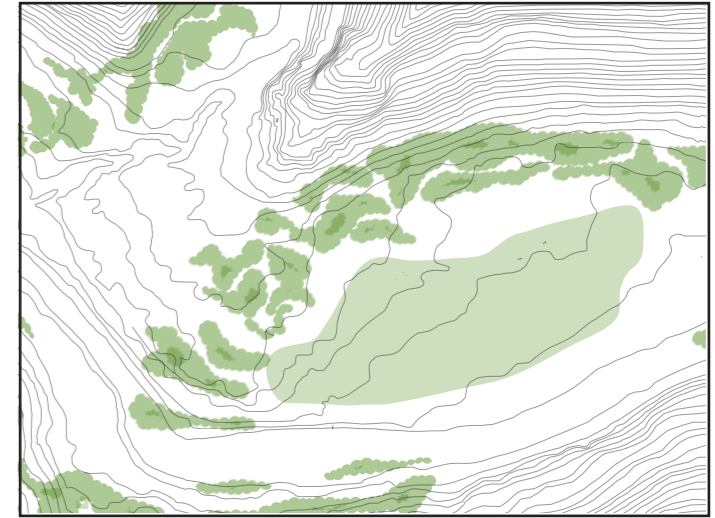


Figure 5.10

The village of Taoping is created through numerous layers. One's experience is shaped by these discrete and enforcing aspects of the town. Some predominant layers readily seen include the fabric of the old town, the water networks, the foot and circulation paths, and the vegetation and agriculture, all depicted in simplified graphic form, from left to right, above. Of course there are many other layers: layers of history, layers of culture, layers of people and time. This proposal seeks to celebrate some of the layers of Taoping in order to serve the functions that include water management, regional networking and tourism, and allow for the poetic interpretation of the village. A town-scale project that uses three interrelated interventions work towards this goal.

- (A)** A constructed wetland system purifies water from the new town prior to its reintroduction into the Zagunao River.
- (B)** A living canal is used to transport and infiltrate water from within the town for irrigation and bioremediation purposes.
- (C)** A new interpretive center provides education about the water system and culture of Taoping, creating a threshold through which the visitor passes upon arriving in the Old Town.
- (D)** This proposal also strives to re-green the river's edge with increased vegetation that would mitigate against erosion and sedimentation of the Zagunao.

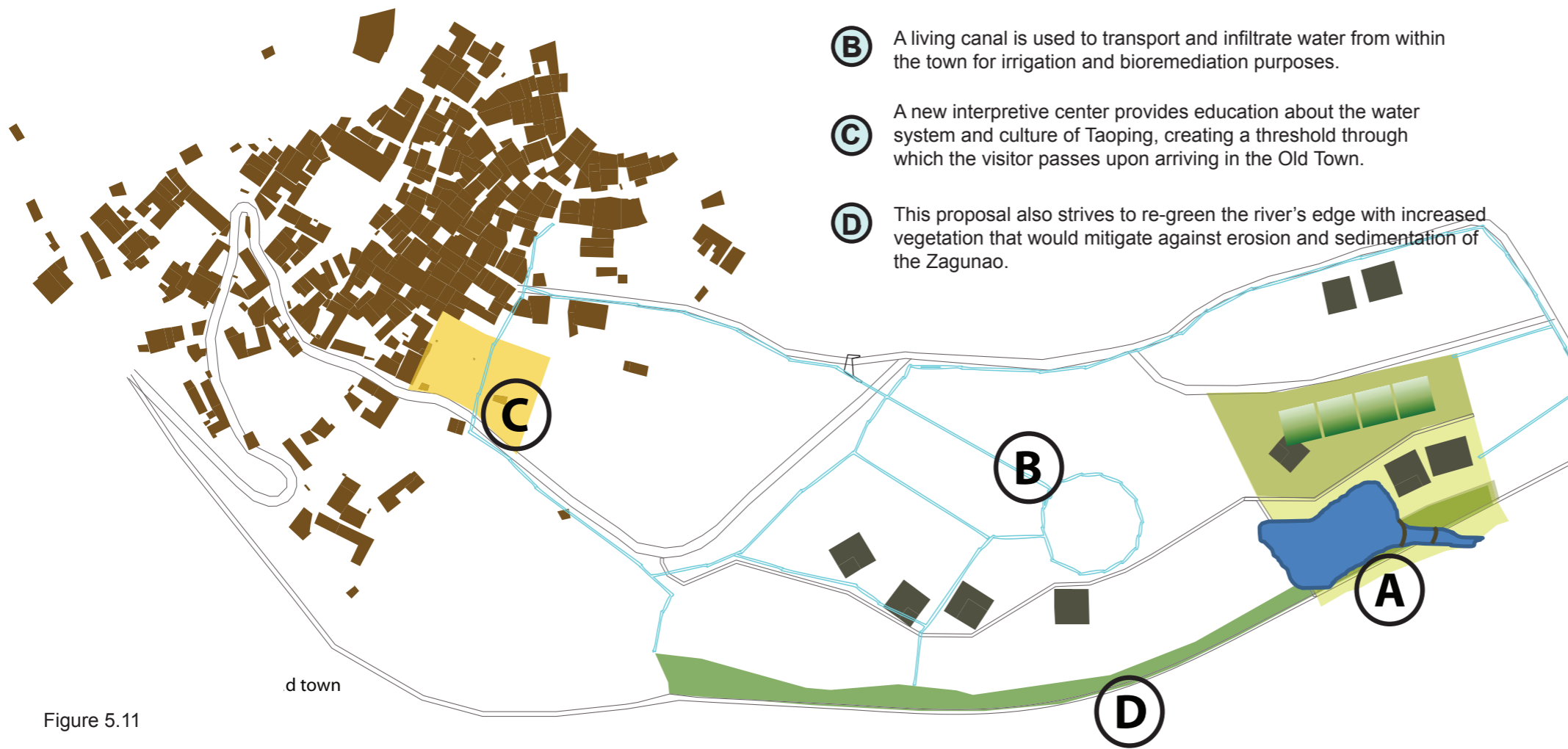


Figure 5.11

Sizing Calculations

living canal width calculation:

The old town channel flows at a mean rate of 1,992,202 L/day
 The living canal requires .000634 sq m/L treated/Day

in an average scenario, if each canal can function simultaneously in processing greywater for entire old town, we need **1263 sq m** of canal surface area. making the canal **4.3 m** wide

if each canal is oversized for a storm scenario, but we assume that they always function simultaneously, we need **2526 sq m** of canal surface area. making the canal **8.7 m** wide

wetland system area calculation:
 The new town can house 500 people.
 The wetland can support 1 person/ 3.8 sq m

The wetlands require **1900 sq m** of total processing surface area, and extra area for access roads.

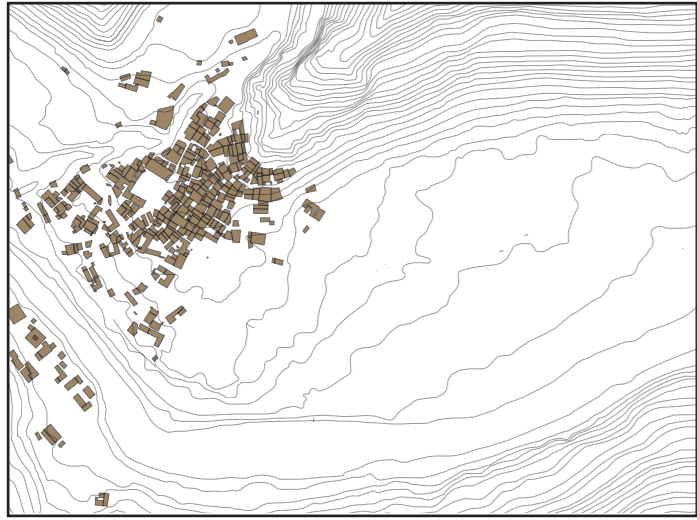


图 5.7

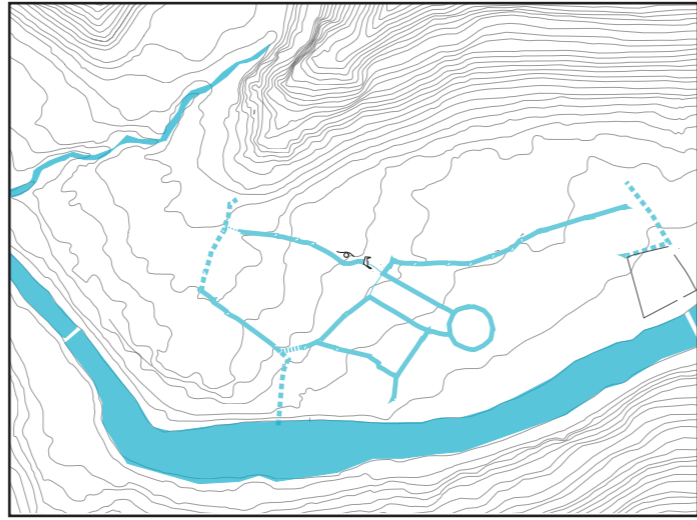


图 5.8

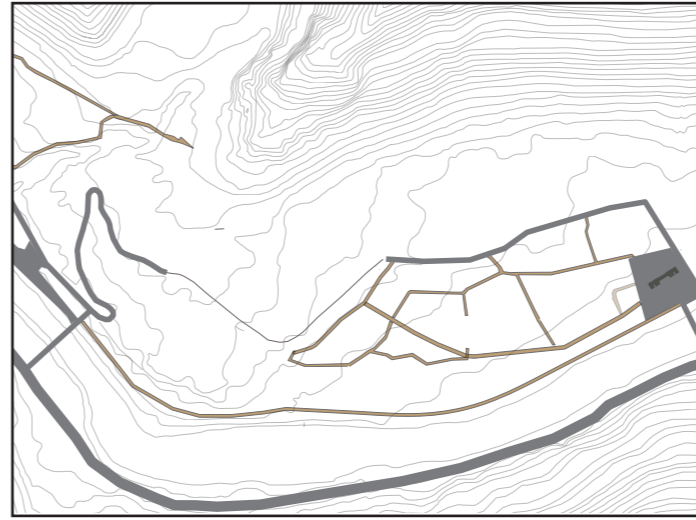


图 5.9

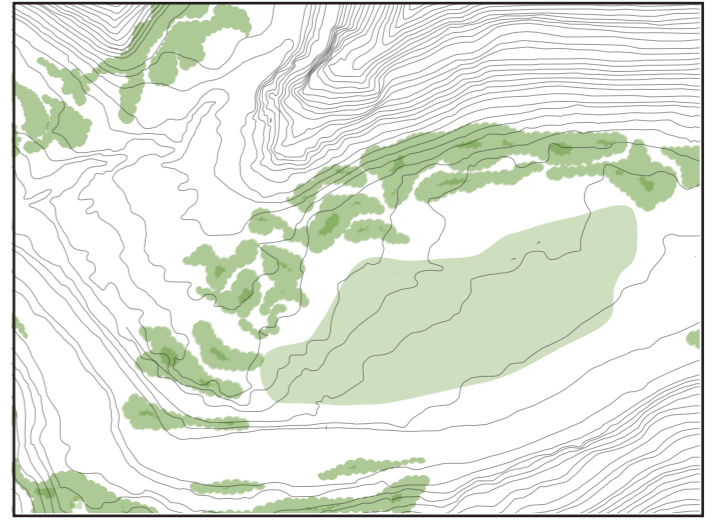


图 5.10

桃坪村寨有很多的层次。人们的经验在村寨的这些精细的分层中形成。一些决定性的层次已被包括在老寨的肌理之中：水网、交通网、农田（如上图从左至右所示）。当然，村寨中还有其他的一些分层：历史层次、文化层次、人文和时间层次。我们的方案是要提升桃坪的一些层次，这样就能提升村寨的水处理、区域联络和旅游的功能并且建造有诗意的村落。所以，我们采用以下的方法来实现村寨改造的目标。

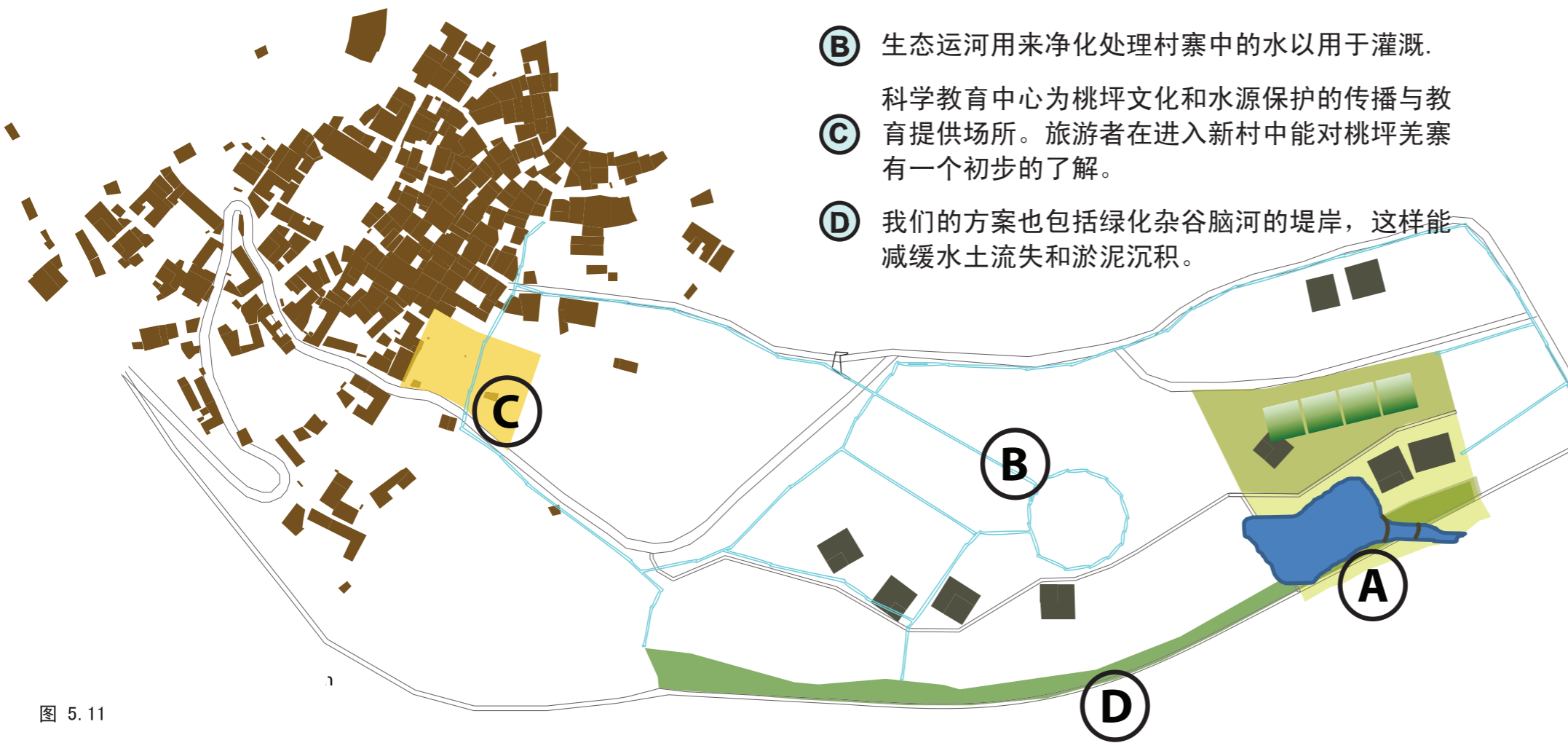


图 5.11

- Ⓐ 在新村中修建的人工湿地将水净化后再排入杂谷脑河中。
- Ⓑ 生态运河用来净化处理村寨中的水以用于灌溉。
- Ⓒ 科学教育中心为桃坪文化和水源保护的传播与教育提供场所。旅游者在进入新村中能对桃坪羌寨有一个初步的了解。
- Ⓓ 我们的方案也包括绿化杂谷脑河的堤岸，这样能减缓水土流失和淤泥沉积。

尺寸计算

生态运河的计算：

新村的平均水流量是1992202升/天

生态运河为提供每天的水处理需要0.000634 平米/升的容量。

在平均的情况下，如果每条运河都能同时处理整个老村的灰水，我们需要
1263平米 的运河面积 运河宽4.3米

在暴雨的情况下，如果每条运河都能同时运作，我们需要
2526平米 的运河面积 运河宽8.7米

湿地面积的计算：

新村能容纳500人。人工湿地能提供
1人/3.8平米

湿地需要1900平米的土地，
这不包括连接的道路面积。

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Bioremediation

Wetland Complex

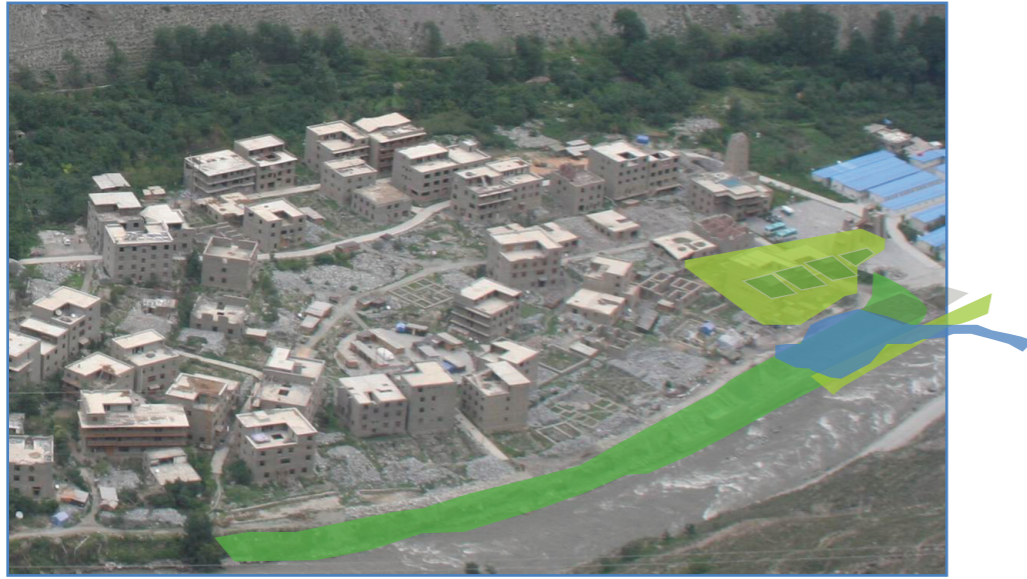


Figure 5.12

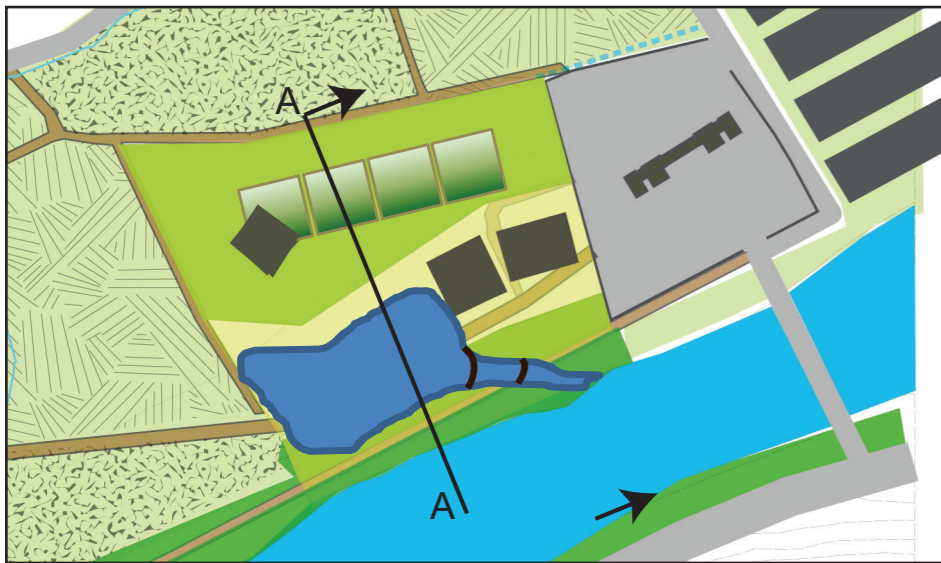
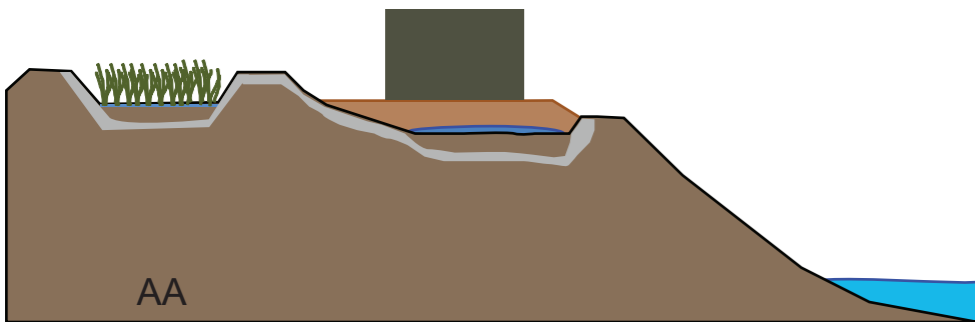













Figure 5.13



Taoping Wastewater Scenarios

Wastewater Treatment Scenarios*	Piping System	M ² / Person Days ¹
  Composting Toilet ² Constructed Wetland ³		3.8 M ²
  Centralized Treatment ^{4,5} Living Canal ³		.428 M ²
  Composting Toilet ² Living Canal ³		.128 M ²
 Centralized Treatment ^{4,5}		0.3 M ²

*Note: Final sizing was verified using United States EPA data⁶ and modified to process all flow through the old town channel.

References

- 1) Parker, D. B. & Gallagher, S. K. 1998. Distribution of Human Waste Samples in Relation to Sizing Waste Processing in Space. *Abstracts of papers presented to the Second Conference on Lunar Bases and Space Activities of the 21st Century*. Houston, Texas. P. 188.
- 2) <http://www.envirolet.com/enwatsel.html>
- 3) Case studies of constructed wetland in Ouray, Colorado, USA; and Baima Canal restoration project in Fuzhou, Fujian, China (http://toddecological.com/files/case-studies/Baima_Case_Study.pdf)
- 4) http://www.water.siemens.com/en/products/biological_treatment/membrane_biological_reactor_systems_mbr/Pages/envirex_mbr_xpress_pack_aged_plant.aspx
- 5) Based off of calculations for a sequence batch reactor from: Kivaisi, A. K. 2001. The potential for constructed wetlands for wastewater treatment and reuse in developing countries: a review. *Ecological Engineering*. 16 (4), 545.
- 6) United States. 1993. *Constructed wetlands for wastewater treatment and wildlife habitat: 17 case studies*. [Washington, DC]: U.S. Environmental Protection Agency.

Science and Design Inspiration

As the bioremediation group, the question we sought to answer was: how can the people of Taoping restore basic sanitation that supports both the tourist and agricultural economy, but that does not sacrifice the long-term health of Taoping's people or its landscape?

After analyzing wastewater treatment options, we decided that an ecological sanitation method would provide a healing infusion of multi-functional habitat to a village devastated by an earthquake and a landscape scarred by a decade of unrestrained development.

Space should be allotted for ecological sanitation that responds to a low water use lifestyle, including both traditional and modernized waterless composting toilets and greywater recycling system. In this model, greywater is discharged through a wetland complex designed to filter pollutants by using plants and the sun's energy. Once the water has been intensively cleaned in wetland cells, it flows in to a large wetland, inspired by the back-water pools found in many of the world's rivers. This wetland is an important element on the Taoping riverfront, because the greenery it provides is unique within the lower Zaguanao valley. Water from this wetland then flows through a series of weirs, modeled after those in Jiuziagou, China, and then out through a back-water channel, which provides critical biological refuge.

Why would the people of Taoping care about this wastewater treatment method? In itself, the conspicuous presence of the wetland complex will be a magnet for tourism. In addition, the entire bioremediation system is carefully integrated to nurture the rehabilitation of Taoping's agricultural soils. In this way, the wetland complex is designed to balance long-term public health, with an attractive landscape, and critical habitat for Taoping.

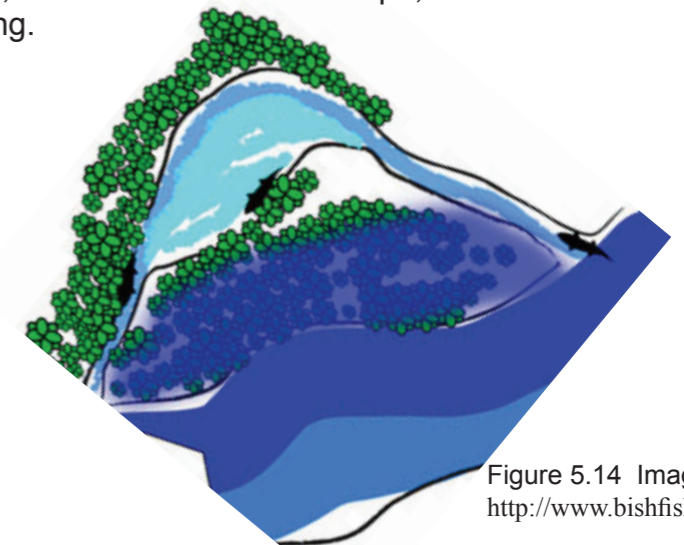


Figure 5.14 Image source: <http://www.bishfish.co.nz>

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修复生存环境的自然功能： 人工湿地



图 5.12

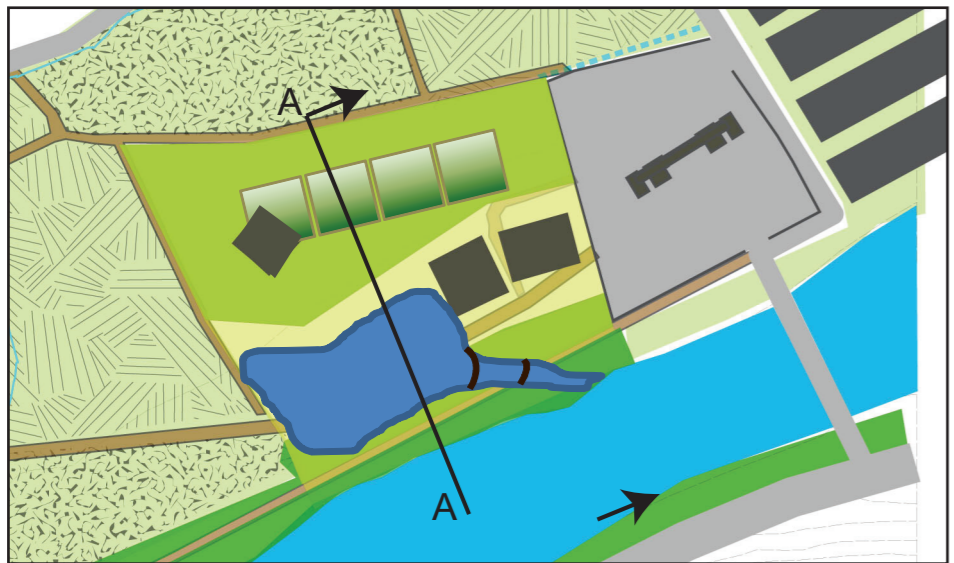
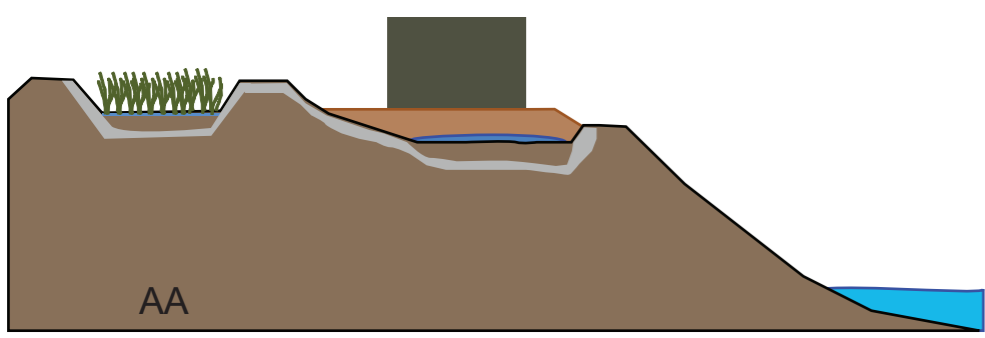


图 5.13



桃坪废水处理构思图

废水处理构思*	管道系统	M ² /天 ¹
 干式厕所 ²  人工湿地 ³		3.8 M ²
 集中式处理 ^{4,5}  生态运河 ³		.428 M ²
 干式厕所 ²  生态运河 ³		.128 M ²
 集中式处理 ^{4,5}		0.3 M ²

*注释：最终尺寸使用的是美国EPA数据⁶并经过修正以适应桃坪水流改造。

参考资料

- 1) Parker, D. B. & Gallagher, S. K. 1998. Distribution of Human Waste Samples in Relation to Sizing Waste Processing in Space. *Abstracts of papers presented to the Second Conference on Lunar Bases and Space Activities of the 21st Century*. Houston, Texas. P. 188.
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- 3) Case studies of constructed wetland in Ouray, Colorado, USA; and Baima Canal restoration project in Fuzhou, Fujian, China (http://toddecological.com/files/case-studies/Baima_Case_Study.pdf)
- 4) http://www.water.siemens.com/en/products/biological_treatment/membrane_biological_reactor_systems_mbr/Pages/envirex_mbr_xpress_pack_aged_plant.aspx
- 5) Based off of calculations for a sequence batch reactor from: Kivaisi, A. K. 2001. The potential for constructed wetlands for wastewater treatment and reuse in developing countries: a review. *Ecological Engineering*. 16 (4), 545.
- 6) United States. 1993. *Constructed wetlands for wastewater treatment and wildlife habitat: 17 case studies*. [Washington, DC]: U.S. Environmental Protection Agency.

科技与设计中的灵感

我们所试图回答的问题是：桃坪村民怎样才能恢复一种基本的环境卫生来满足旅游和农业经济的需求，但同时并不以牺牲村民和环境的长期健康为代价。

经过对多种污水处理方法的分析，我们决定采用生态卫生法来创造一个多功能的居住环境，并治愈被地震毁坏了的乡村和十年来无节制的开发所造成的伤害。

为生态卫生而采用的空间配置应该适应低用水的生活方式，这包括传统和现代化的无水堆肥厕所和灰水循环系统。在该（空间配置）模型中，灰水首先排入到湿地中用植物和太阳能来过滤掉污染物。当灰水在一系列小的湿地中被清理后，再流入到一个大的湿地中继续被过滤。这一方法已被用于世界上很多河流污染（黑水）治理。湿地的设计为桃坪的水流域提供了一个重要的元素，这是因为它为杂谷脑山谷提供了一种独特的绿色环保的模式。正像都江堰的设计一样，水从湿地流出后再流经一系列的堰，最终通过一个采用生物法处理黑水的渠道来达到被净化的目的。

也许你会问：为什么村民会关心废水处理方法？一方面的原因是这种湿地处理的方式也是一种吸引旅游的模式。此外，整个的生态法恢复系统也有益于桃坪农业土壤的保护。在这种方式中，湿地保持了长期的公共健康，迷人的自然景观和宜人的人居环境这三方面的平衡。

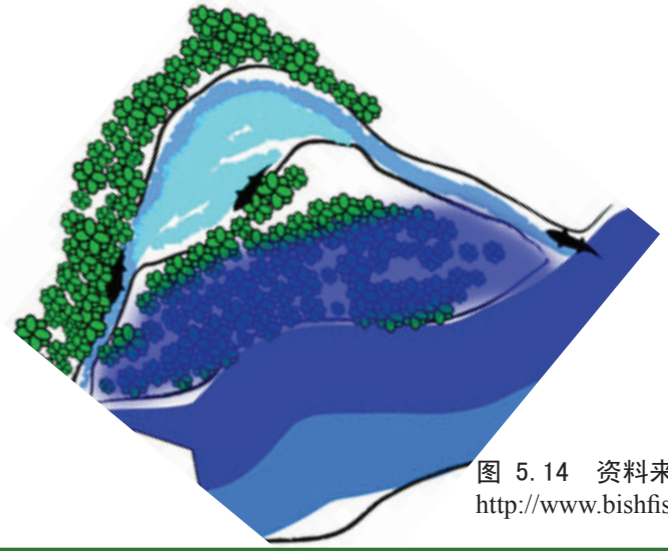
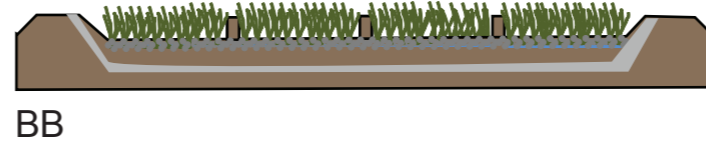
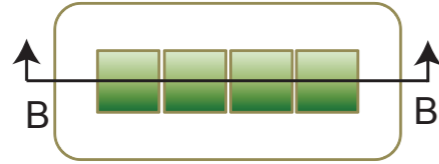


图 5.14 资料来源：
<http://www.bishfish.co.nz>

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Wetland Complex

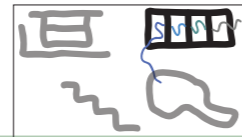
1 Wetland Cells



Engineered Wetland Cells:
Four 15m x 15m wetland cells provide **safe, low-cost treatment** of greywater from the new town. **Subsurface Water** is passed slowly from right to left in the diagram. Microorganisms in the roots of emergent plants **break down harmful pollutants**.



Figure 5.15



2 Large Wetland

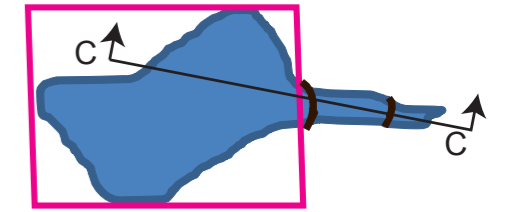


Figure 5.16

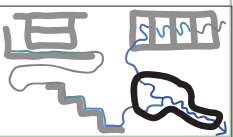
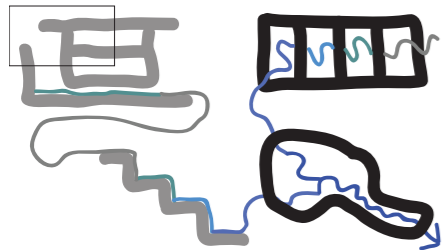


Figure 5.19

- source
- use
- filtration
- remediation
- purification**
- outflow



3 Habitat Channel

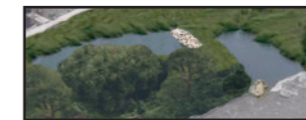


Figure 5.17

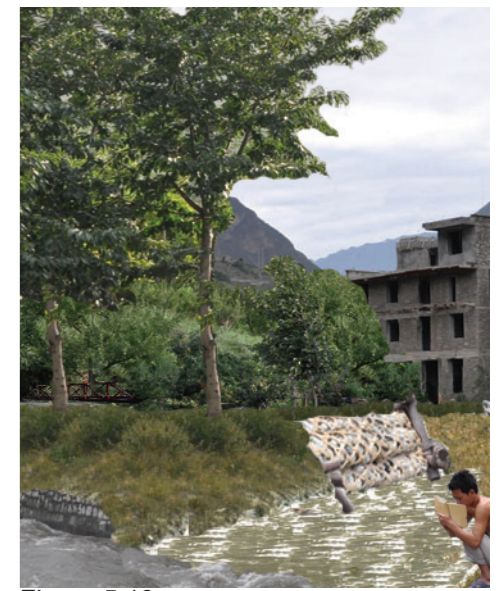
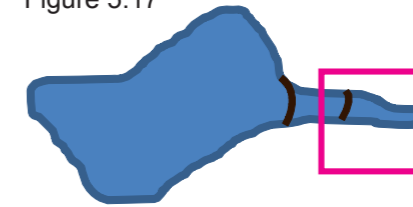
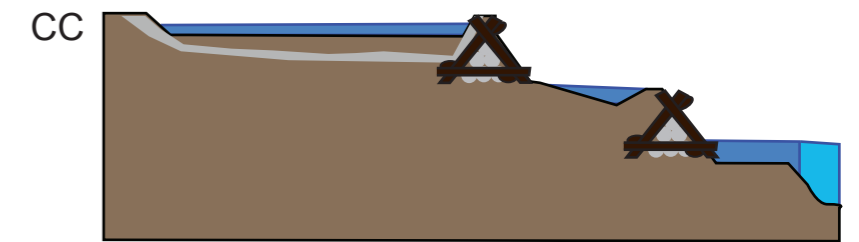


Figure 5.18



Large Wetland and Habitat Channel:
Outflow from the engineered wetland cells empties into a 1,000 m² constructed wetland. The wetland **infuses ecological function** into a scarred landscape. In addition to providing an **attractive landscape** to residents and tourists, the wetland and channel **provide water, habitat, and treat remaining pollutants**.

人工湿地

1 小块湿地

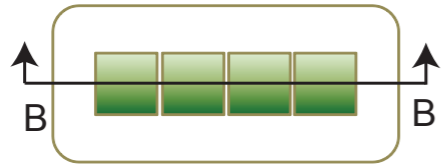
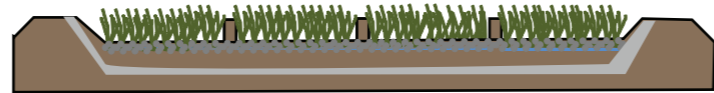
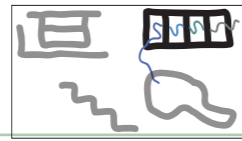


图 5.15



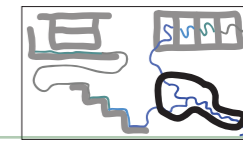
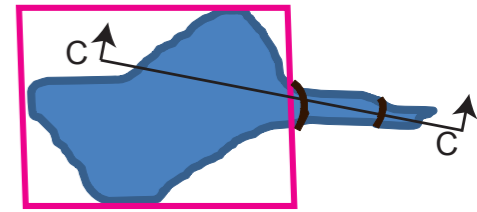
BB

科学设计的小块湿地：
我们设计了4块小块湿地，每块大约15m x 15m。它们能提供安全，低成本的污水处理方式。在图示中，底层水缓慢的从图的右面流向左面。这样的话，植物根部的微生物便将污染物分解了。

2 大块湿地



图 5.16



3 可栖息的沟渠



图 5.17

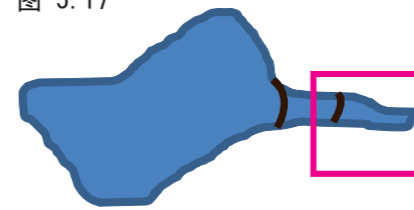
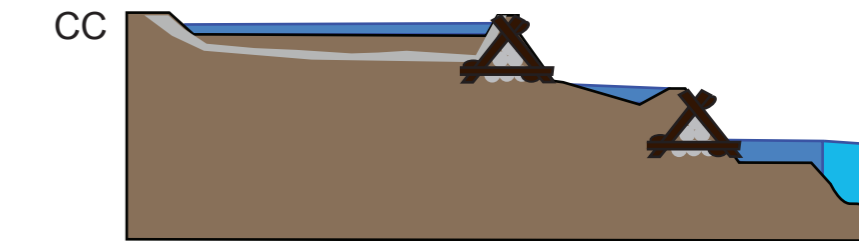
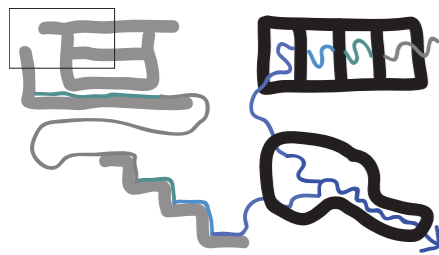


图 5.18



图 5.19

- 水源
- 使用
- 过滤
- 修复
- 净化
- 排放



大块湿地与可栖息的沟渠：
水流从人工小块湿地排放到1000平方米的大块湿地中。湿地设计将生态净化功能和景观欣赏相结合，进一步地提供水、栖息地和治理剩余的污染物。

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Bioremediation: Living Canal

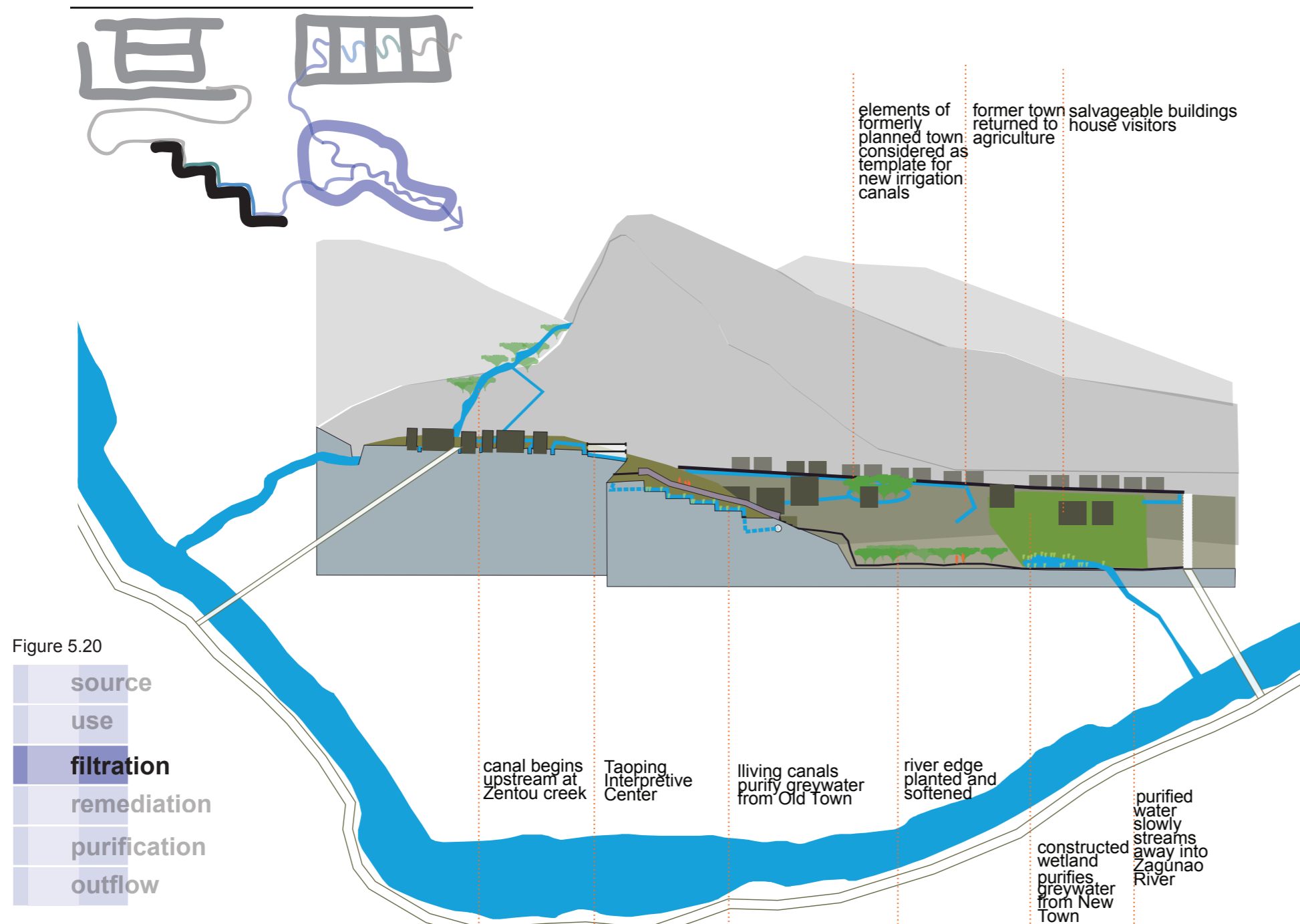


Figure 5.20

Can we use this diagram to help Taoping?
The section at near right illustrates schematically the way water is proposed to flow through Taoping. Channels along an existing path, to the north, and along a proposed path, to the south, are improved, using a diagram of water purification derived from Du Jiang Yan and applied to this site (see far right column).

The channels connect Zengtou Creek with agricultural fields, proposed to replace the existing New Town. The channels link with the plumbing lines already installed in the existing New Town, so that a trace of that construction cycle can continue to mark the landscape, although other evidence goes away.

The diagrams below illustrate how we can use the ideas behind Du Jiang Yan to help Taoping.

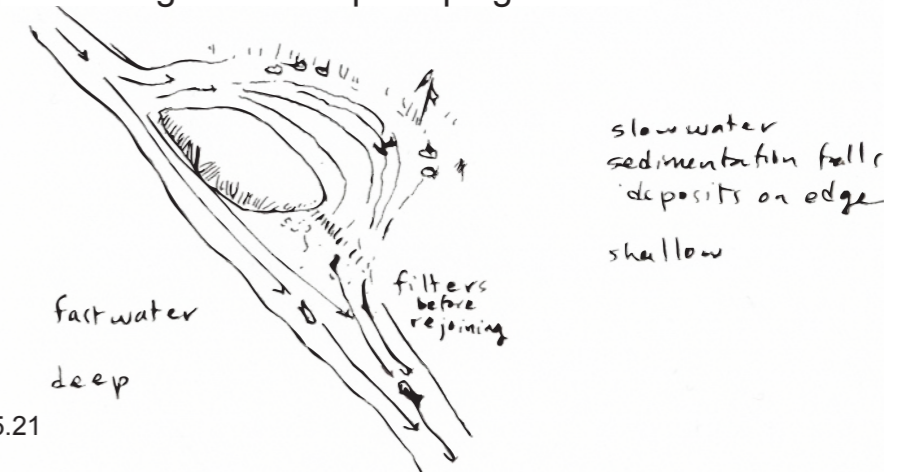


Figure 5.21

At Du Jiang Yan, an impediment diverts a stream, allowing one branch to move quickly, and the other to move slowly, sediment dropping to the edge.

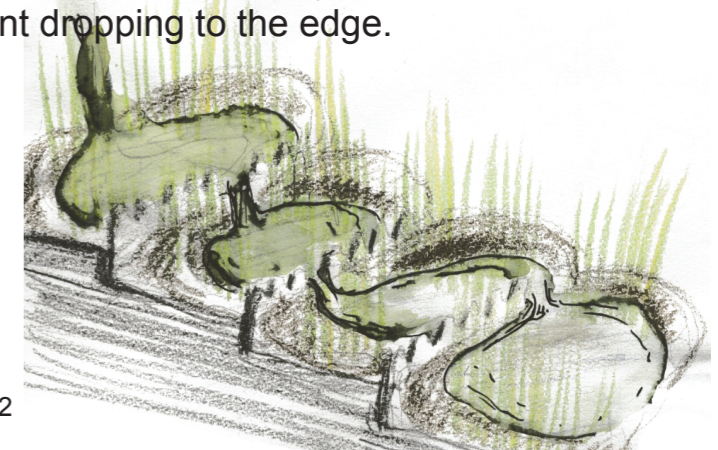


Figure 5.22

In this diagram, the idea behind Du Jiang Yan is adjusted to accommodate the topography of Taoping, but retains the basic principle: sometimes the stream goes quickly, aerating the water, and sometimes it goes slowly, allowing sediment to fall.

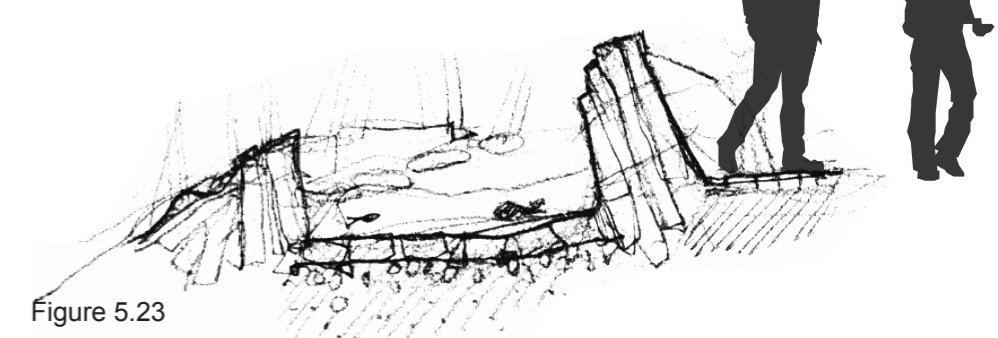


Figure 5.23

The channel can be made of recovered building materials, and the edge can be planted with reeds or rice plants, which will purify the water from the Old Town before it reaches the crops.

修复生存环境的自然功能： 生态运河

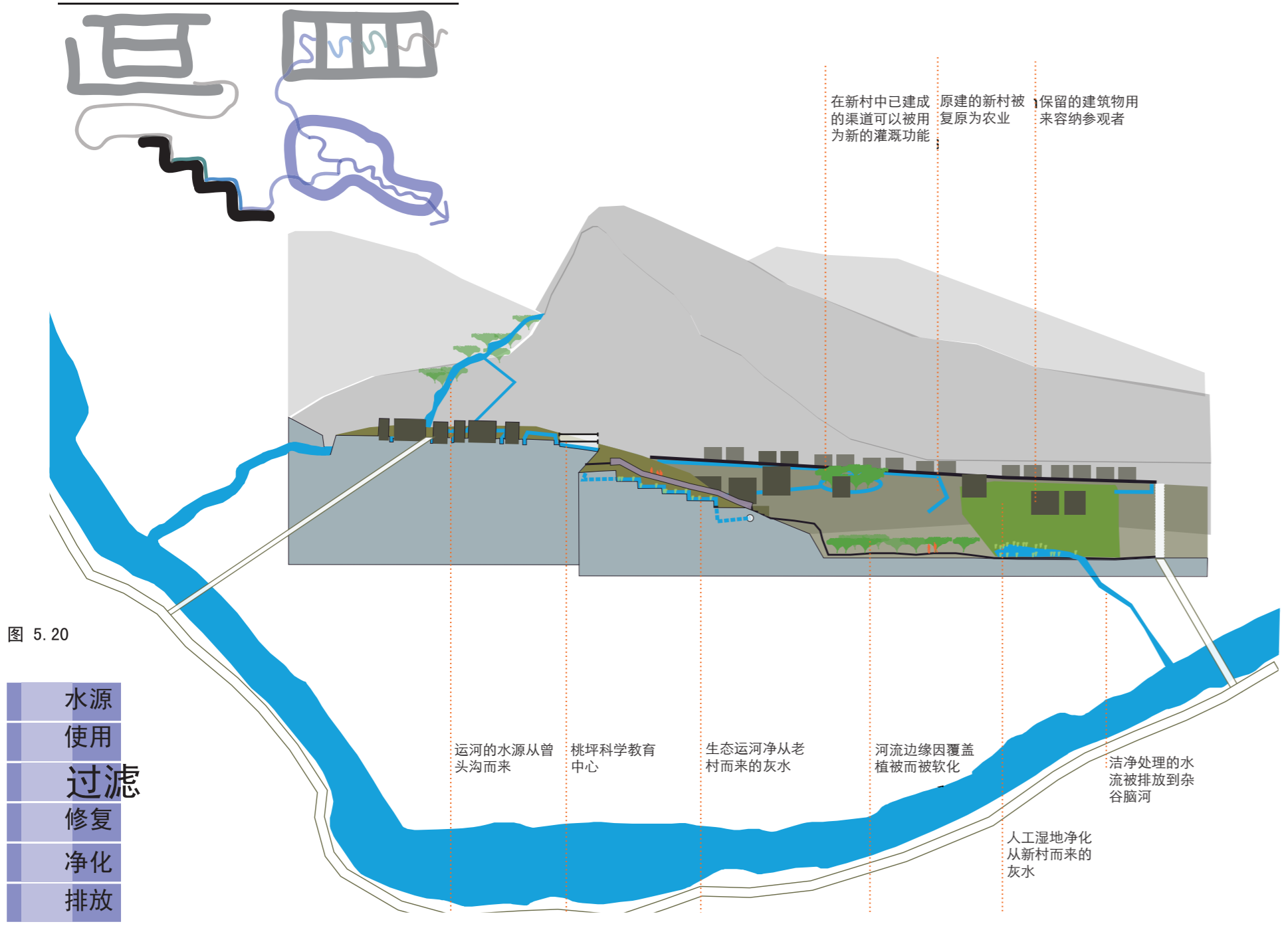


图 5.20

那么，我们可以用这张图解来帮助桃坪吗？

在右边的剖面显示了水是如何流经桃坪的。采用都江堰的方法，我们改造并增进了数条沟渠。这些沟渠是沿着一条现存的路径向北延伸，而后向南拓展的(见最右栏)。

这些沟渠连接曾头沟与未来替代新村的农业领域。而且，这些沟渠已经在新村中建成，在这基础上的改进能提升景观的作用。

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下面的图解能说明我们如何使用都江堰这个例子来帮助桃坪。



图 5.21

在都江堰的例子中，岷江中部人造的堰使得江水分流，一条流速较快，另一种流速较慢，因此水中的泥沙便沉淀在江的边缘。

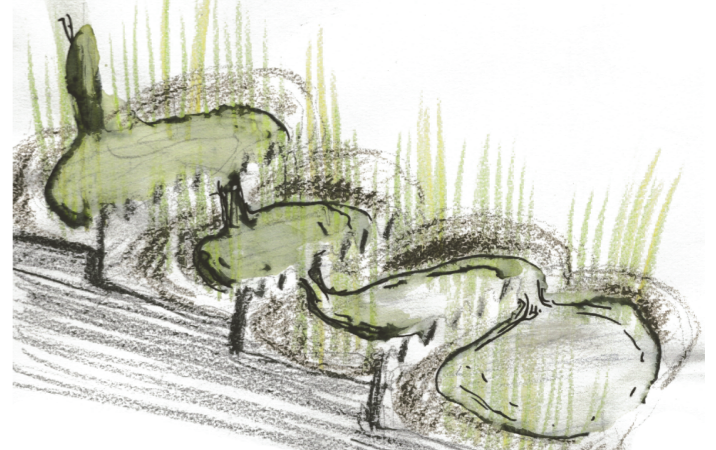


图 5.22

在这个图解中，我们将都江堰使用的方法经过了调整，但仍保持了最基本的设计原则：将水分流为流速不同的水流，流速快的水起到输送洁净水的作用，流速慢的水让沉淀分离出来。

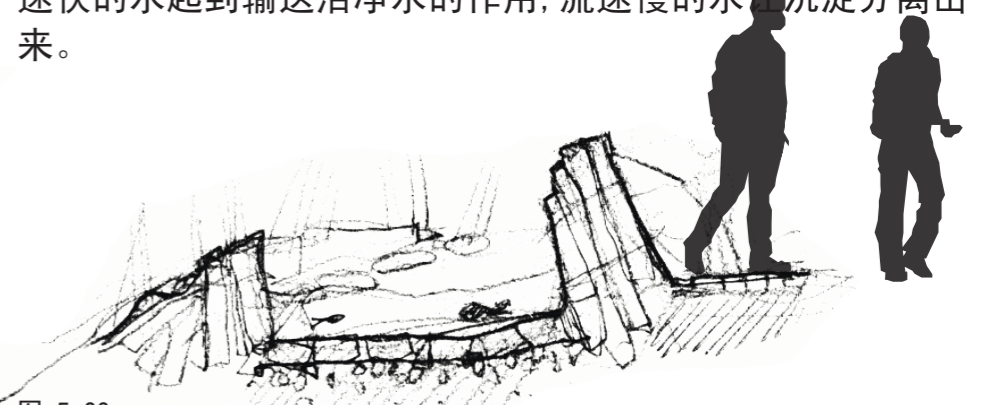


图 5.23

我们可以用回收的建筑材料来建造这些沟渠，在边沿上种植芦苇或水稻。这些植物能起到净化溪水的作用。

Bioremediation: Linking Old and New

The Living Canal will purify the wastewater from the Old Town before it enters the agricultural fields. Black water will be collected in composting toilets, so the canal will only hold water from bathing and washing.

The Living Canal will link to the old canal system in the Old town and run down the slope to the newly remediated agricultural fields, and to the New Town, where one of the canals runs adjacent to the main road. In this way, the three main sites of Taoping (Old Town, New Town, and remediated agriculture) will be linked for the travel of water.

But these sites need to be linked for people as well as emergency vehicles. A sturdy road, paved with materials that allow for drainage, could link the New Town and the Old Town, so that occasionally cars can pass all the way through the site, increasing safety.

A secondary road, which already exists, could be improved through re-paving, and by building a low wall to separate the road from the canal. This wall, wide enough for seating, could accommodate walkers resting or visiting with each other.



Figure 5.24

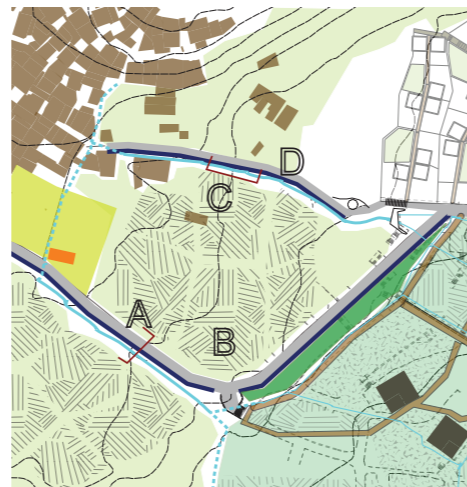


Figure 5.25

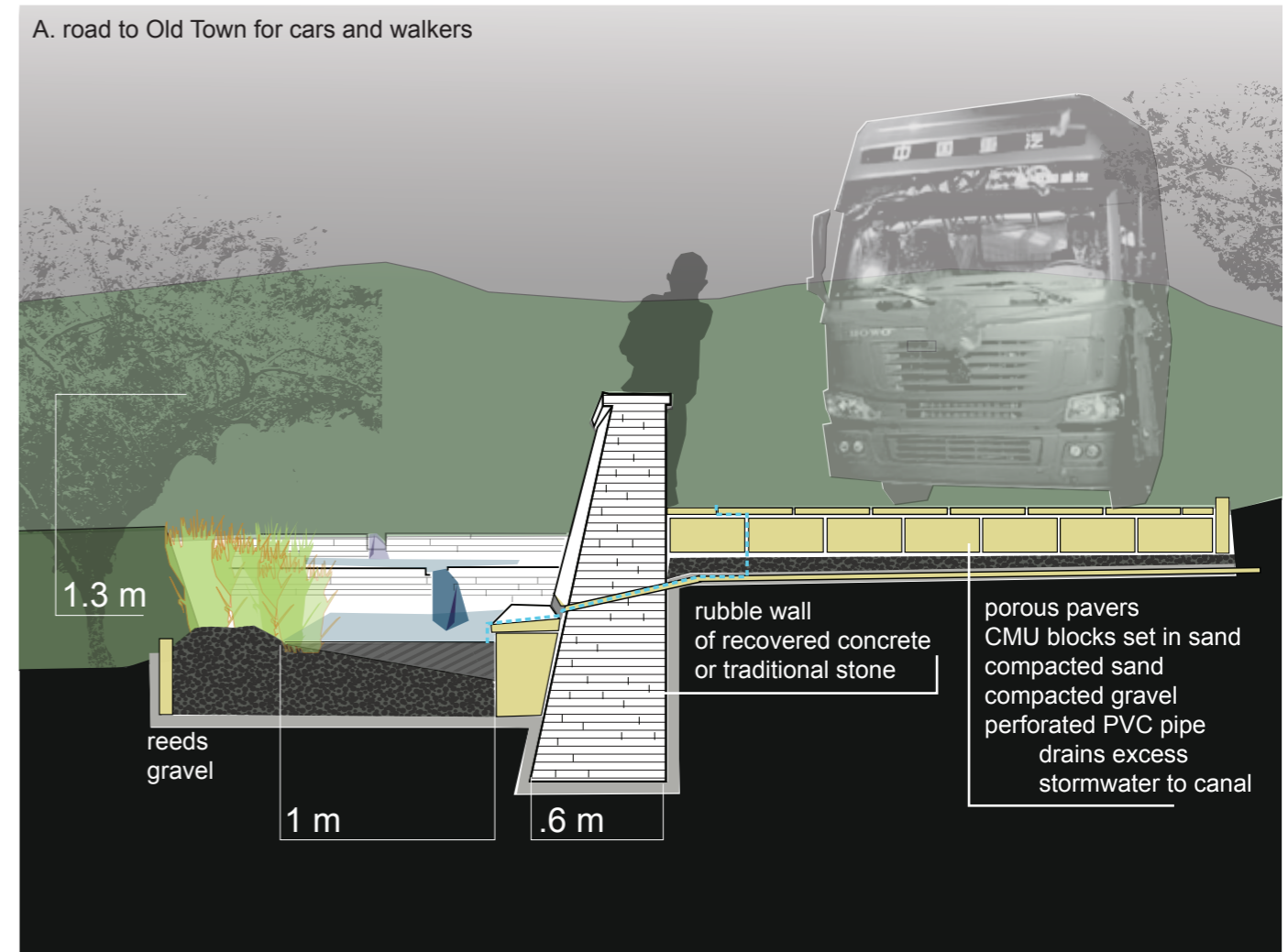


Figure 5.26

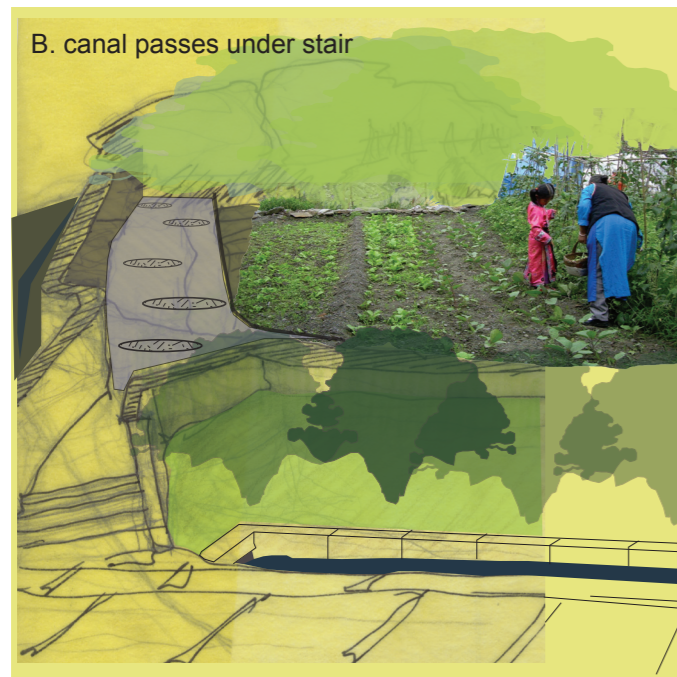


Figure 5.27

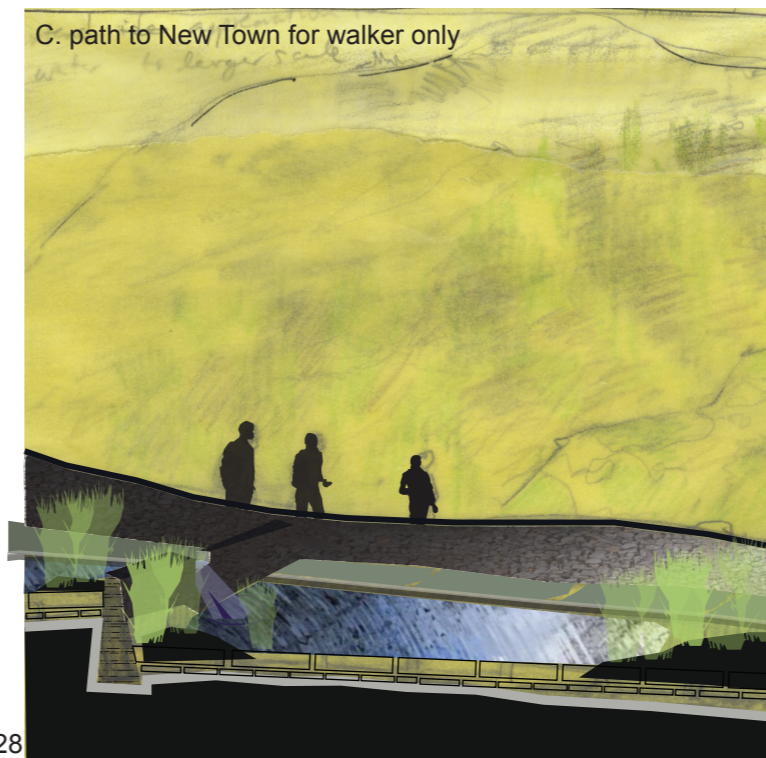


Figure 5.28

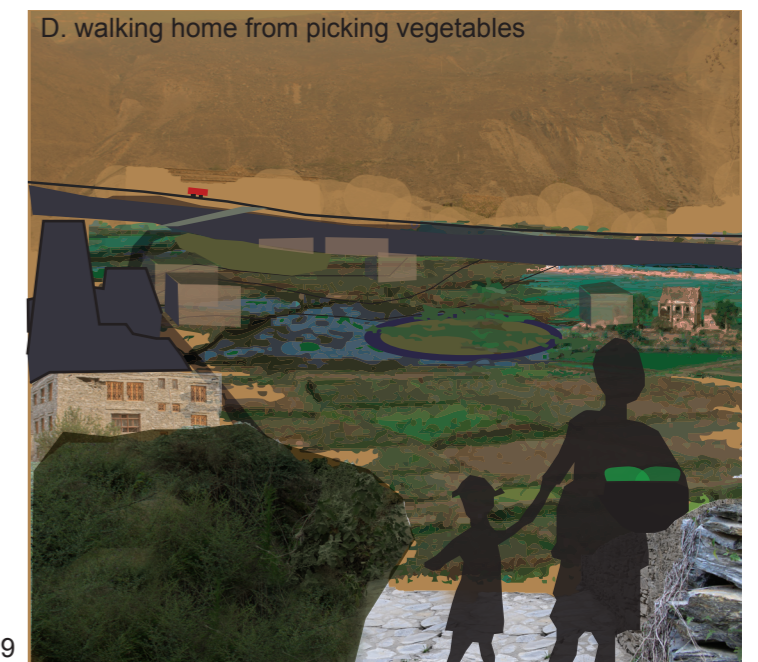


Figure 5.29

Draft 30 March 2010

修复生存环境的自然功能： 联系新与旧

废水在进入农业区域之前将被生态运河净化掉。黑水将被收集在干式堆肥厕所中，所以这条运河将只净化从沐浴、洗涤而来的水。

生态运河连接在旧村中古老的水网，而后从山坡上留下进入新近恢复的农田。并且，生态运河的一条分支沿着主要道路分布。在这种方式中，桃坪的三个主要部位(老村、新村和恢复的农业区)将都将与生态旅游的水系统相联。

但这些部分需要将人与应急车辆联系起来。我们设计了一条坚实的有着良好排水系统的道路将新村和老村联系起来，所以汽车可以通过所有地点，这提高了村寨的安全性。

在村寨中已经修建了一条次要的道路。我们可以改善道路的铺装，并且通过修建一堵矮墙来隔开马路和运河。这堵墙有着一定的宽度可以容纳步行者休息或者交流。



图 5.24

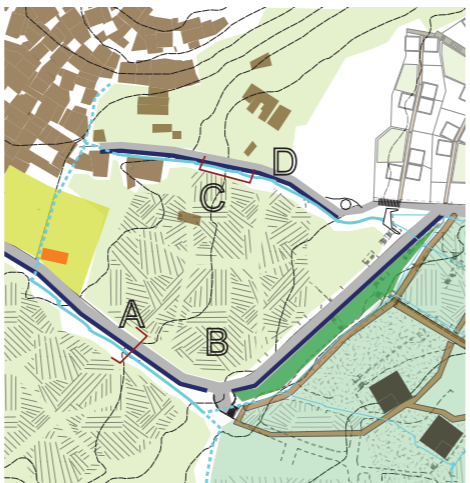


图 5.25

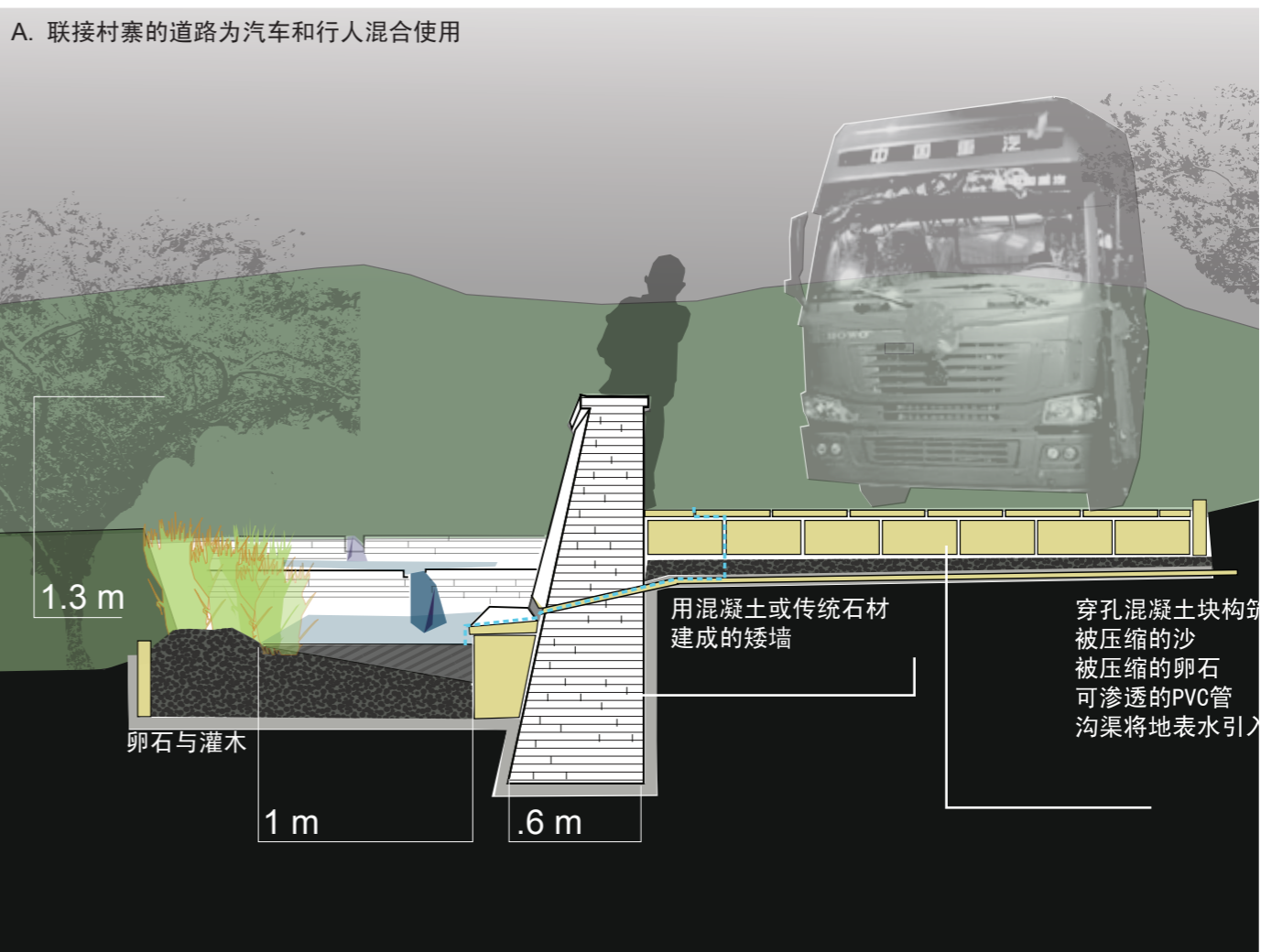


图 5.26

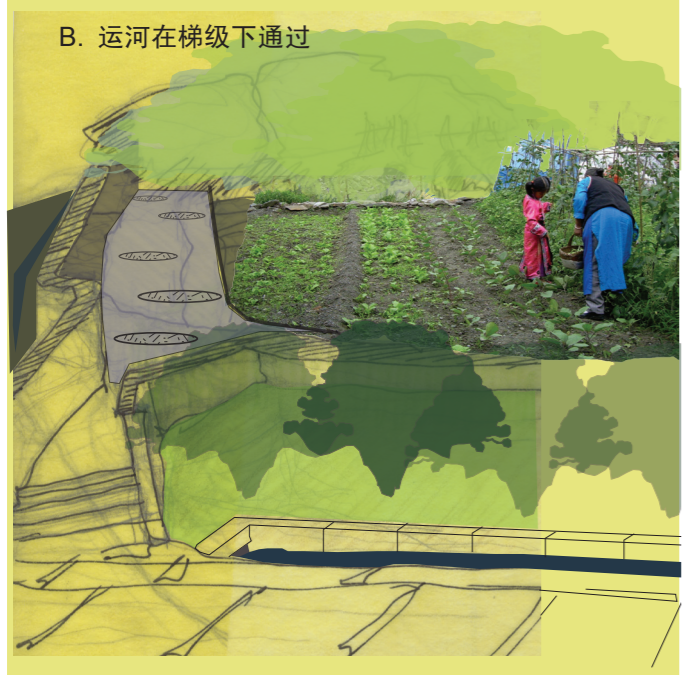


图 5.27

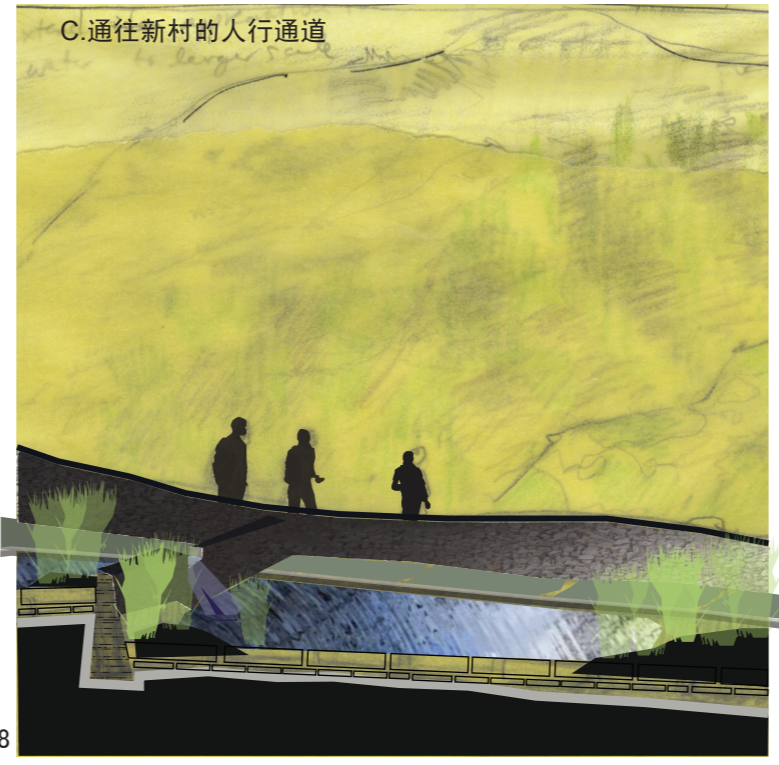


图5.28

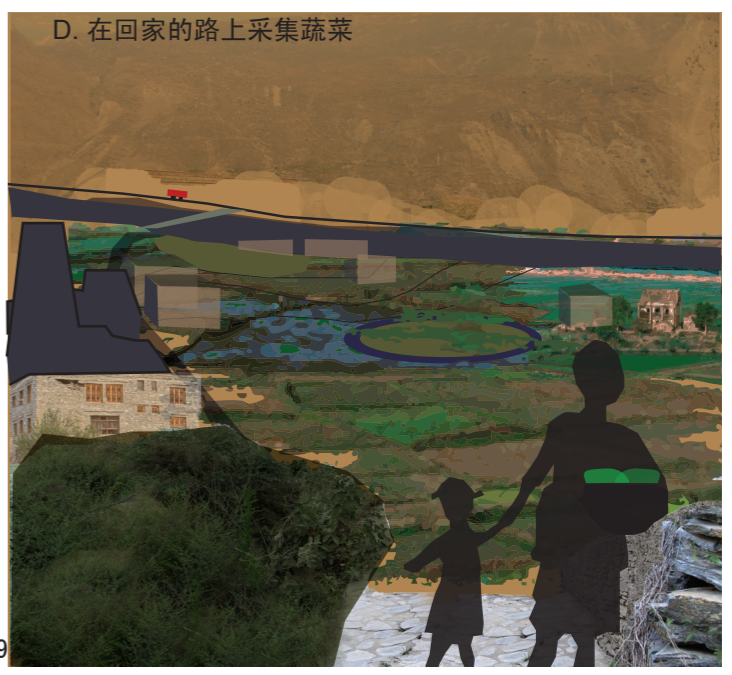


图 5.29

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Bioremediation: Interpretive Center



Figure 5.30



Figure 5.31

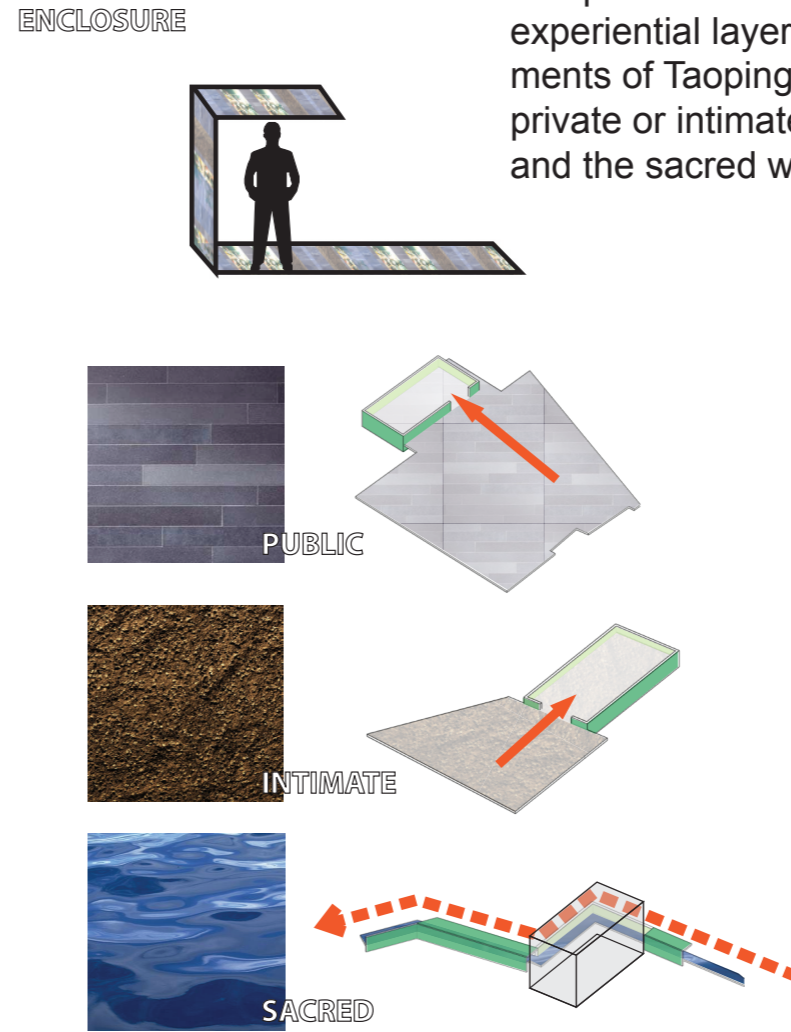


Figure 5.32

Layering plays out most literally in the information and interpretive center. The building starts with the notion of experiential layering and seeks to highlight the various elements of Taoping life, such as the public aspects, the more private or intimate parts, the people who carry on in either and the sacred water system.

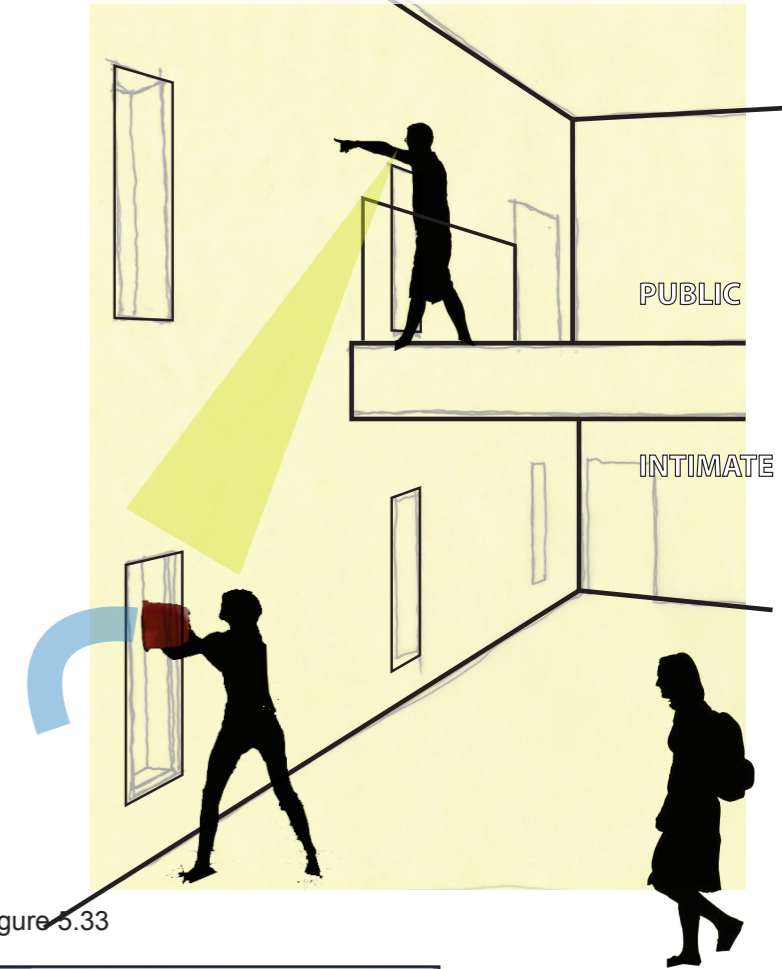


Figure 5.33



Figure 5.34



Figure 5.35



Figure 5.36

- source
- use
- filtration
- remediation
- purification
- outflow

Draft 30 March 2010

科学教育中心 Interpretive Center

科学教育中心的诠释着信息的分层。这栋建筑从概念入手，旨在强调生活与经验分层的各种要素，例如在公众方面，建筑中有着更私人或亲密的部分：讲解员通过运用圣水的流动来讲解水的系统。



图 5.31

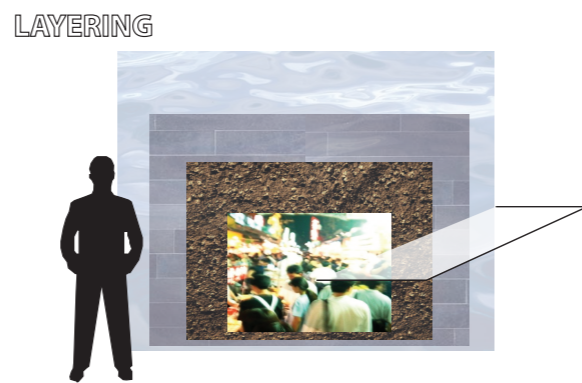
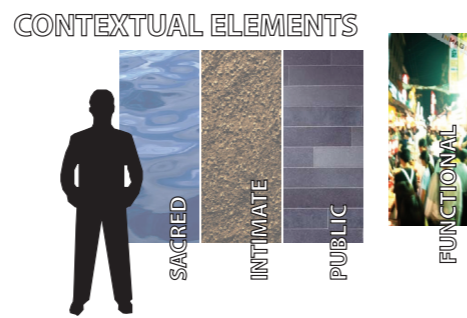


图 5.32

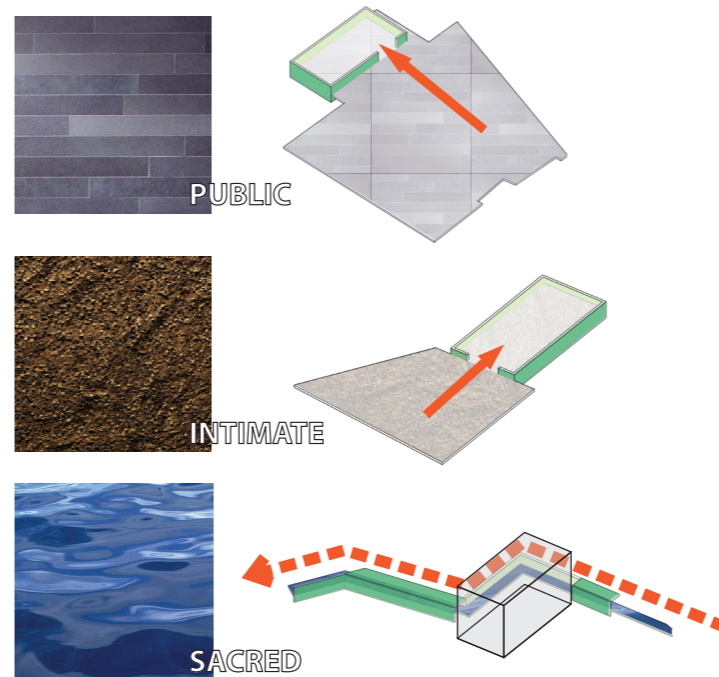
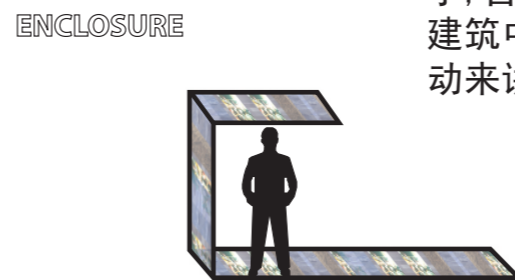


图 5.33

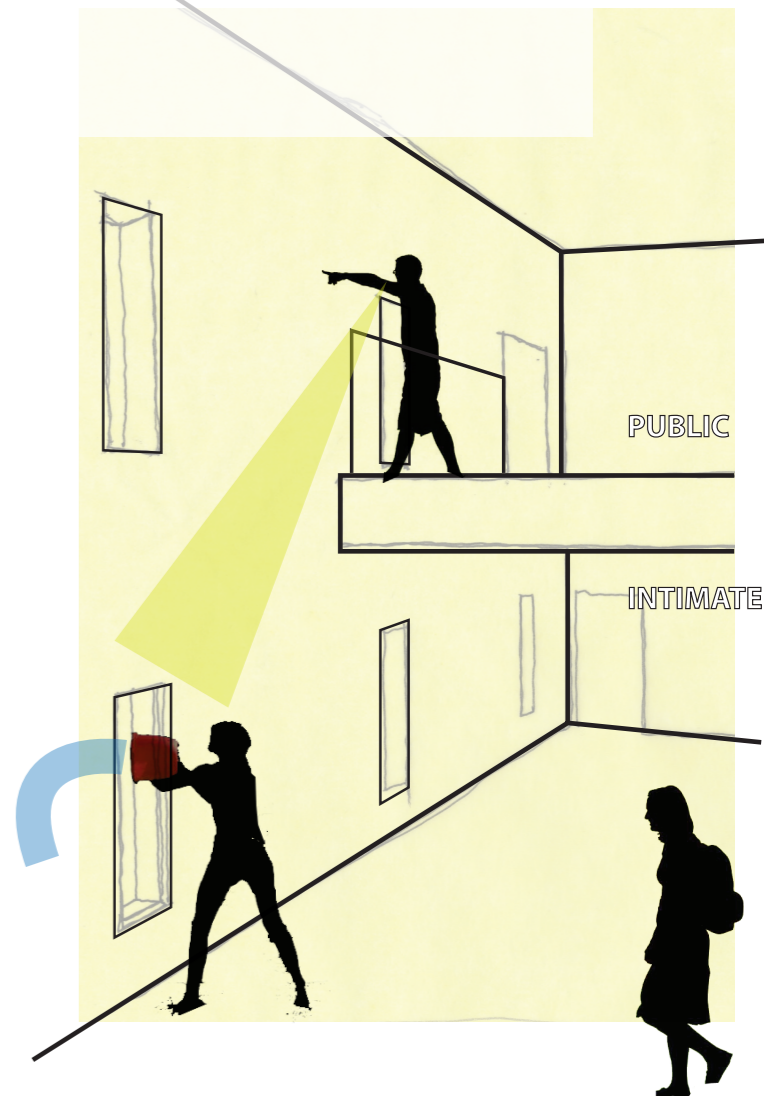


图 5.30

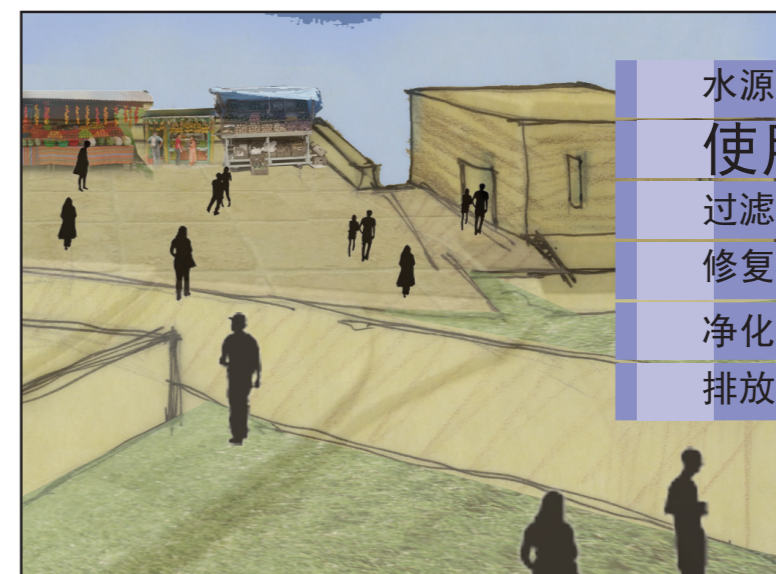


图 5.34



图 5.35

图 5.36



水源
使用
过滤
修复
净化
排放

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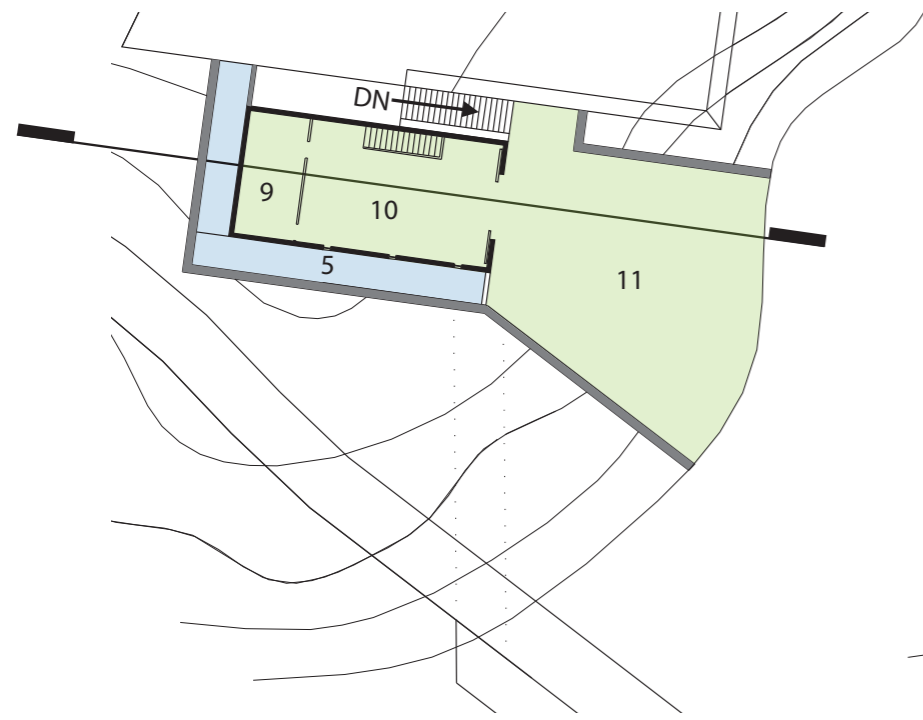


Figure 5.36
lower level floor plan
scale 1:200

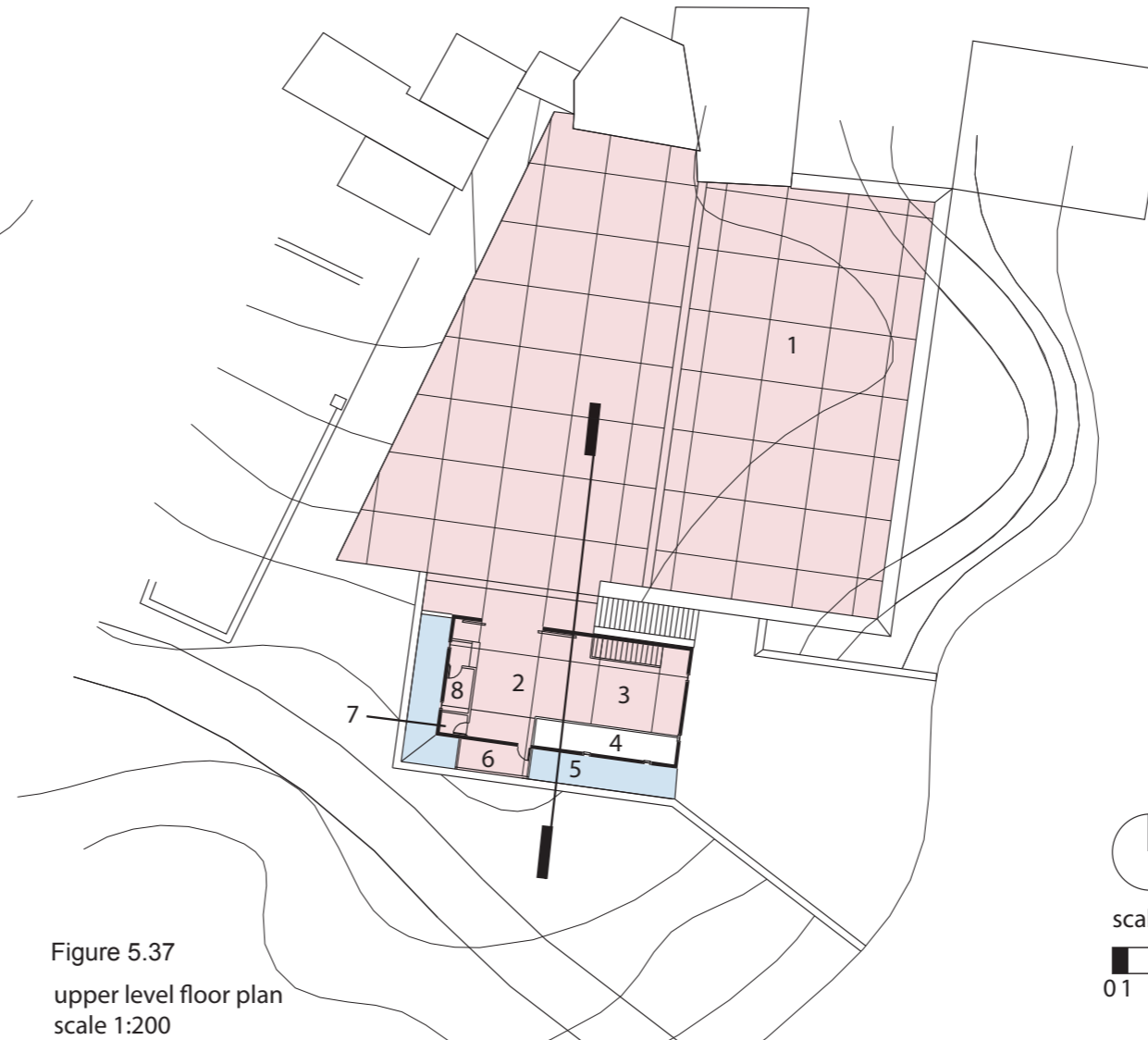
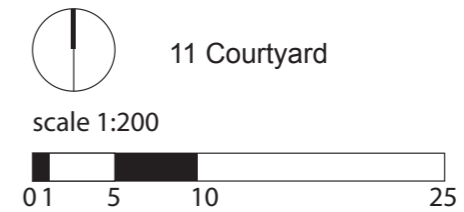


Figure 5.37
upper level floor plan
scale 1:200

- 1 Existing open space to be retiled and reprogrammed for open market scenario
- 2 Information - Taoping tourism, market information regional information
- 3 Open gallery/display space with flexible programming
- 4 Open to below
- 5 Exposed water channel diverts grey water to channel system
- 6 Balcony
- 7 Lavatory
- 8 Office
- 9 Storage
- 10 Educational kitchen with open floor plan kitchen counter tops tbd
- 11 Courtyard



The building centers on two or three simple moves. Using the public square as a catalyst after it is reprogrammed as a farmers' market, the upper floor draws in the public space and encloses it. The lower floor, traditionally used as a heart, draws in the more primal earth and both floors use the flooring of their respectively adjacent spaces. The water system, which is concealed and revealed interacts with both spaces, again through enclosure, exposing itself after travelling under the market as a channel surrounding the building that visitors interact with, visually and practically. Visitors also interact through the layering, tying the parts together as players in the space, viewing and engaging each other.

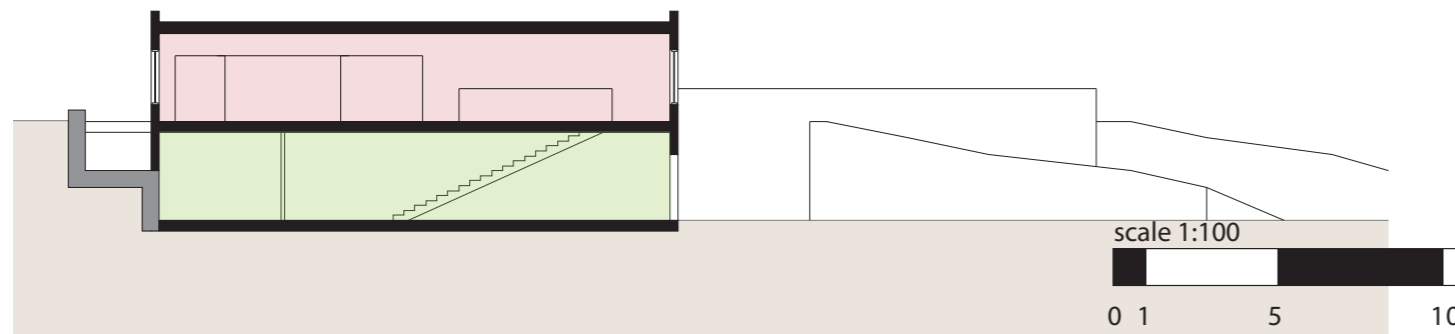


Figure 5.38

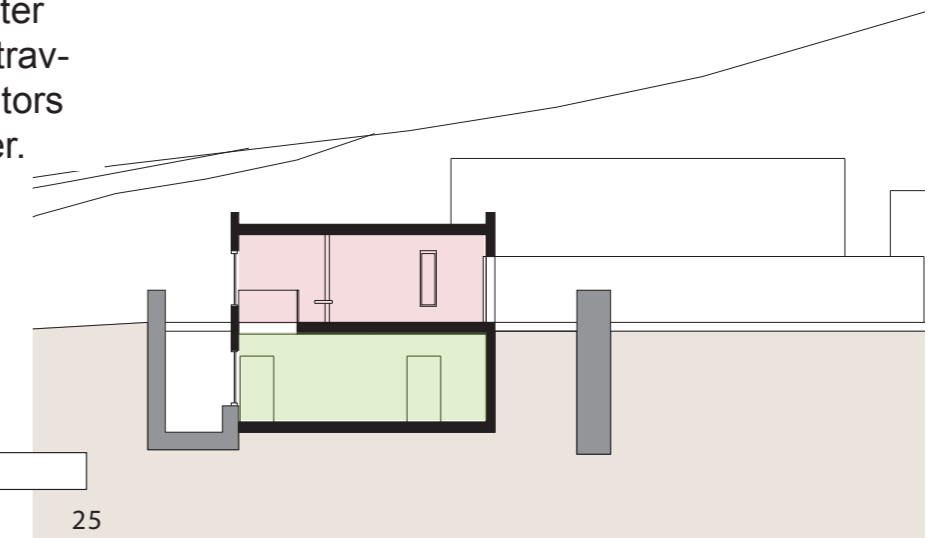


Figure 5.39

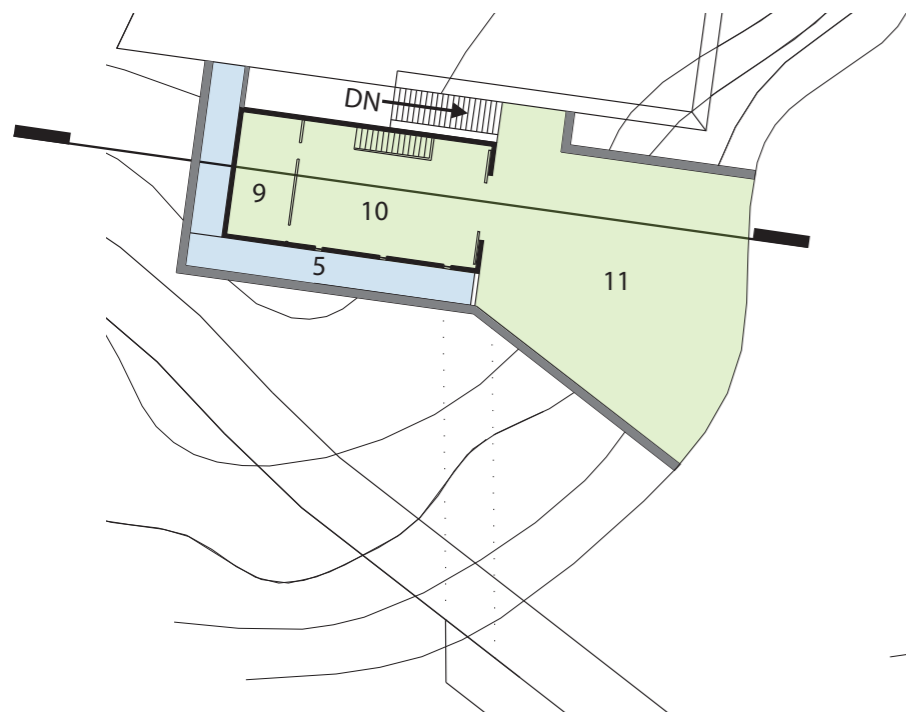


图 5.36
首层平面
比例 1:200

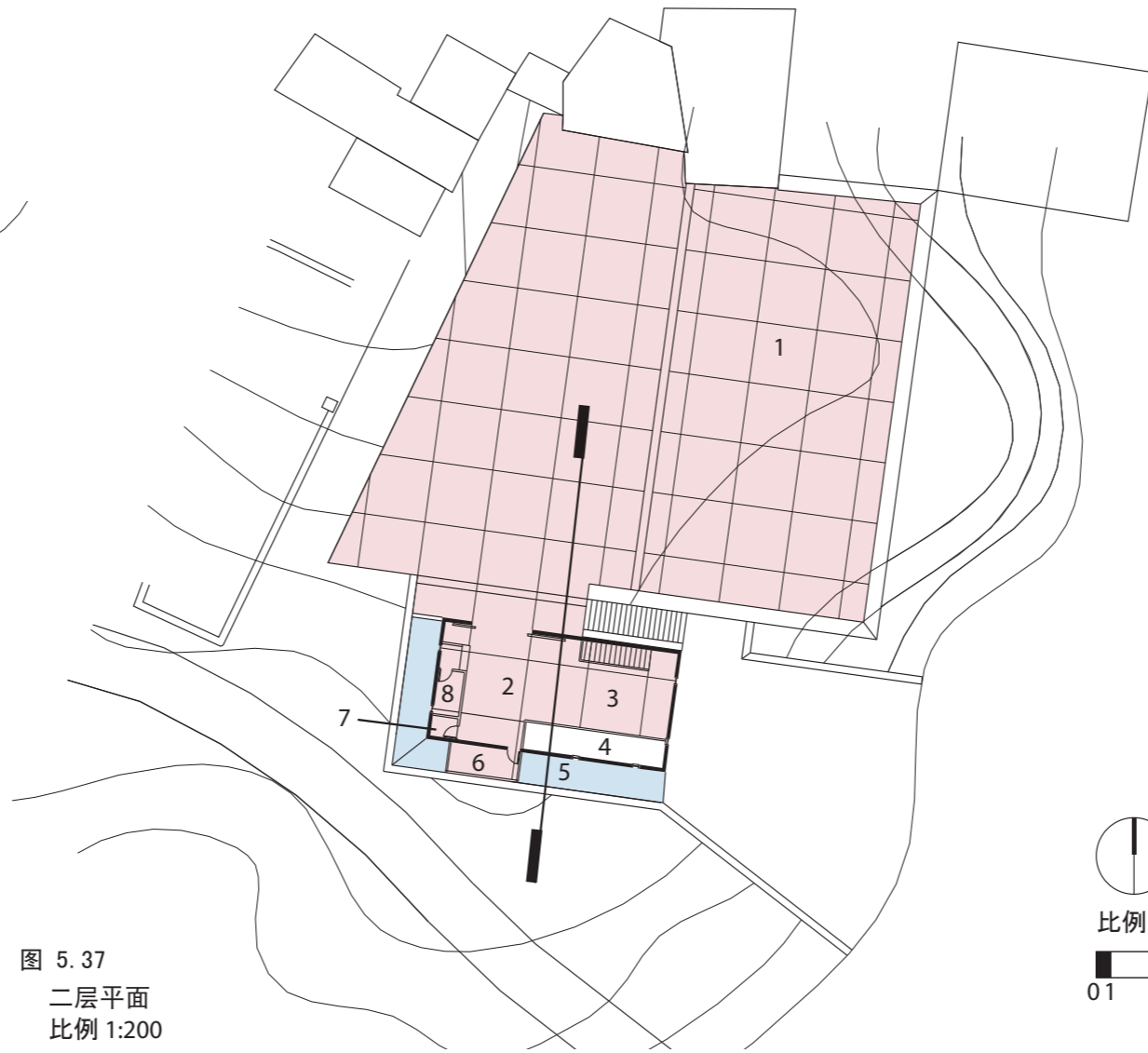
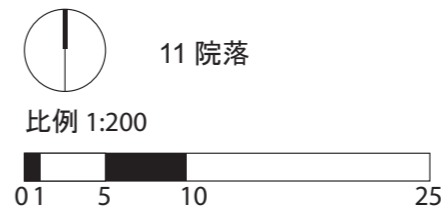


图 5.37
二层平面
比例 1:200

- 1 现有的开敞空间被改造为小商店和开放的市场
- 2 信息 —— 桃坪旅游业, 市场信息, 区域信息
- 3 灵活使用的展览室和开放空间
- 4 下空
- 5 开放的水渠将灰水引入水网
- 6 露台
- 7 卫生间
- 8 办公室
- 9 储藏
- 10 教学用厨房
- 11 院落



桃坪科学教育中心集中了两到三项功能。公共广场被重组为农贸市场后（对普及科教）具有一种催化剂的功能。中心的二层与公共空间相连并将其包含在中心之内。较低的楼层是中心楼的核心。水系统是时而隐蔽，时而敞露，与空间相互作用，穿过农贸市场并环绕科学教育中心。游客在这些相互作用的空间中穿行，学习，同时接受一定的环保教育。

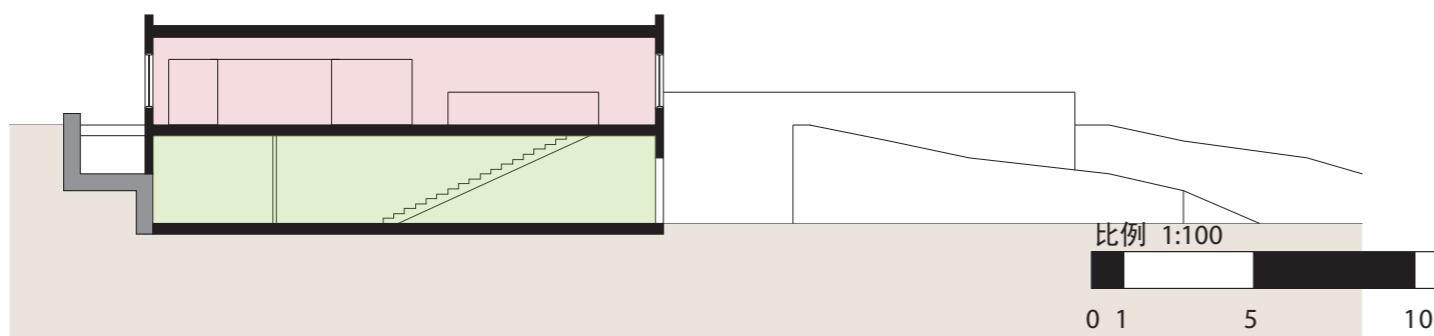


图 5.38

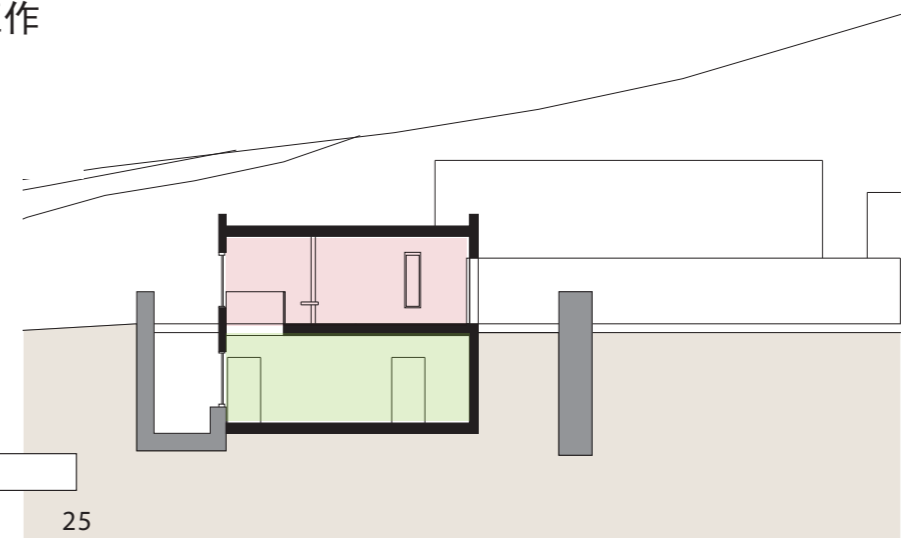
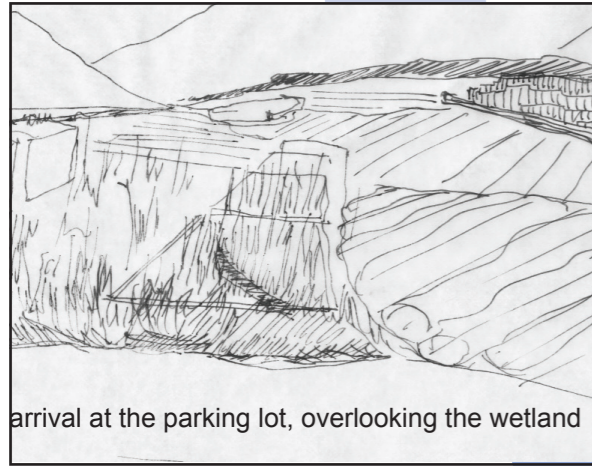


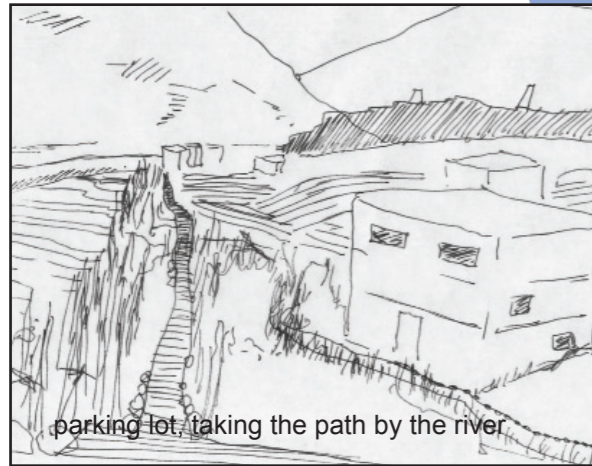
图 5.39

2010年3月30日草稿



arrival at the parking lot, overlooking the wetland

Figure 5.40



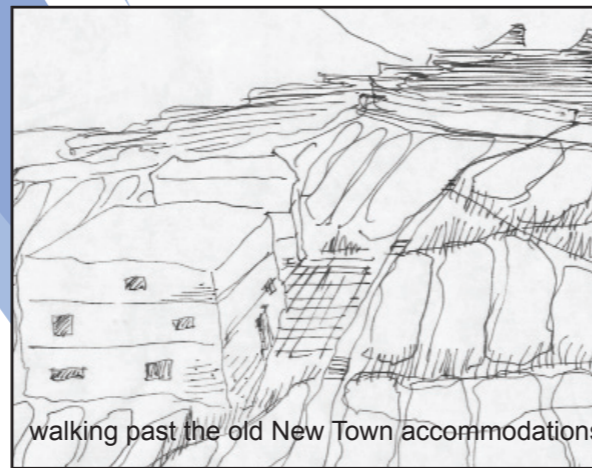
parking lot, taking the path by the river

Figure 5.41

Experiential Sequence

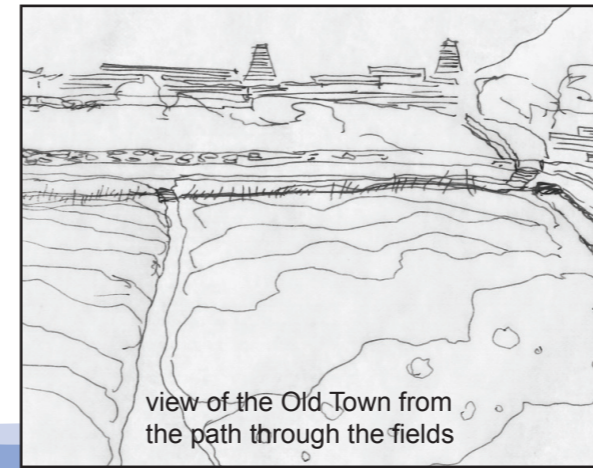
This proposal seeks to provide a number of opportunities by which one can engage and experience the village of Taoping. Through a series of interventions the path by which one is exposed to the numerous layers of the town is constructed to provide a multiplicity of moments.

As one moves from the entry of the series of interventions (whether one starts from the old village or the parking lot) and progresses through, he or she is exposed to various conditions. One may start at the constructed wetland, travel along side the channels and conclude at the interpretive center. At this culmination - a gentle addition to the fabric of the town - the visitor can look back over the path he or she has taken and reflect on the history and culture that is linked to the Qiang and Taoping, compelling him or her to further engage as he or she enters the old town.



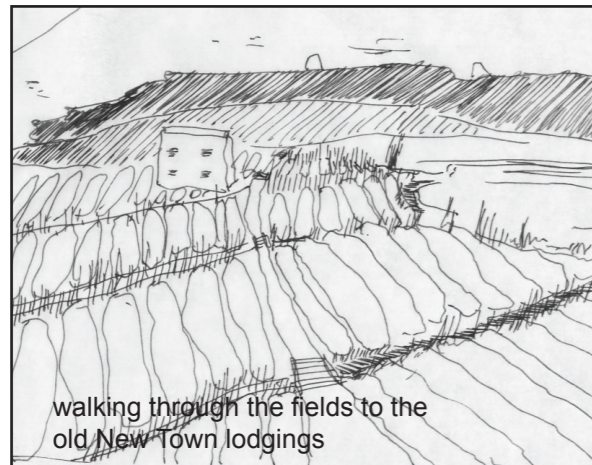
walking past the old New Town accommodations

Figure 5.43



view of the Old Town from the path through the fields

Figure 5.44



walking through the fields to the old New Town lodgings

Figure 5.42



arrival at the Visitor's Center

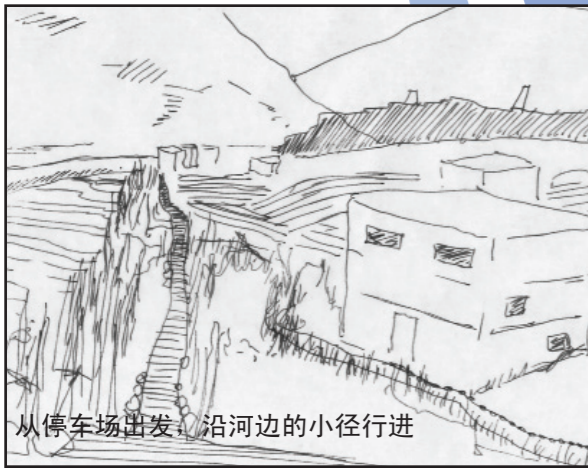
Figure 5.45

Draft 30 March 2010



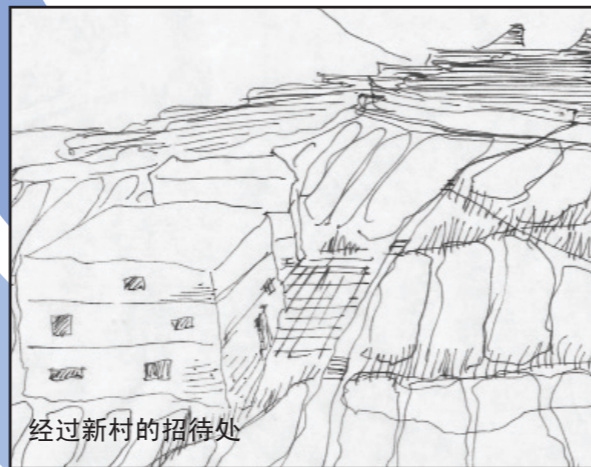
到达停车场，远眺湿地

图 5.40



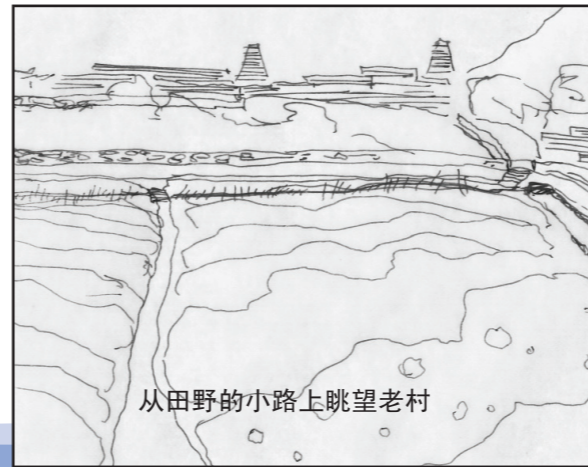
从停车场出发，沿河边的小径行进

图 5.41



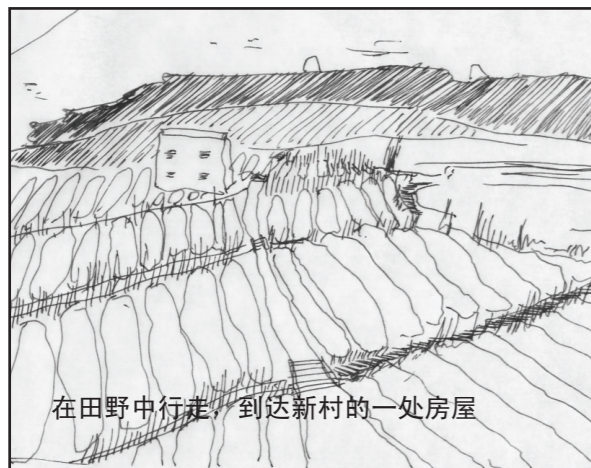
经过新村的招待处

图 5.43



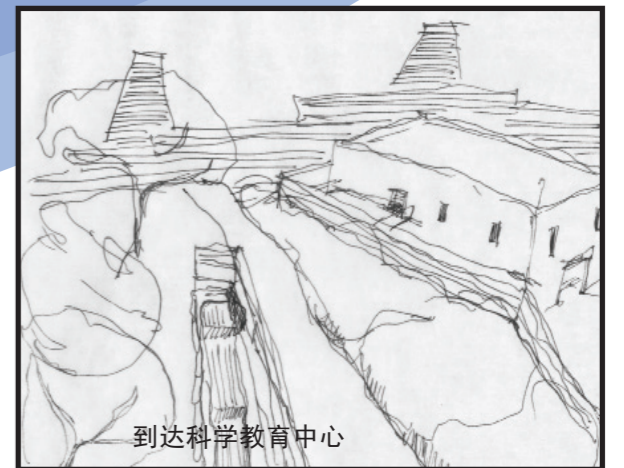
从田野的小路上眺望老村

图 5.44



在田野中行走，到达新村的一处房屋

图 5.42



到达科学教育中心

图 5.45

体验的过程

我们的方案旨在给参观者提供大量的机会体验桃坪羌寨。通过一系列设计好的路径，参观者能在许多不同的时刻在羌寨体验到相互交错的（科技，文化，历史）层面。

（无论从古老的乡村或停车场）的任何一个入口的进入，参观者都会体验到各种环保的理念。一种旅游路线是先参观人工湿地，再沿着生态运河前行，最后到达科学教育中心。在最后的高潮-体验桃坪羌寨的肌理时，游客可以回想他们的参观经历，反思与桃坪相关联的历史和文化。这有助于人们更好地认识与保护桃坪。

Bioremediation: Case Studies and Sources

Experiential Layer: Parc de la Villette

This avant-garde mixture of landscape and architecture by Bernard Tschumi considers built interventions in three distinct layers: surfaces, points, and lines. In the park, the three layers converge on a single plane. Similarly, in Taoping, layers of history converge on a single plane, and the visitor must mitigate various kinds of information, in the form of built interventions, to understand the place.

Regional Network, Memorization: The Confluence Project

This long project conducted by Maya Lin creates light, self-conscious interventions along the Columbia River Confluence, which descends through our state, Washington, to create the border between Washington and Oregon. The interventions include boardwalks with poetic inscriptions and benches for sitting and contemplating the vast river.

Ecological Sanitation: Shaxi Rehabilitation Project

This project addresses the sanitation needs of the small community of Shaxi, which is larger than Taoping. Like the Bioremediation proposed here, the Shaxi Rehabilitation Project constructs a long, thin wetland in several stages to process the greywater of this community. It is not only a practical improvement to the health of the Shaxi community, but it is also a groundbreaking sustainable development pilot project in China.

Although not pictured here, the sizes for the Living Canal were derived from the **Fuzhou Living Canal**, as presented in a case study by Matt Pilcher, urban planner.

Experiential Layers
Parc de la Villette

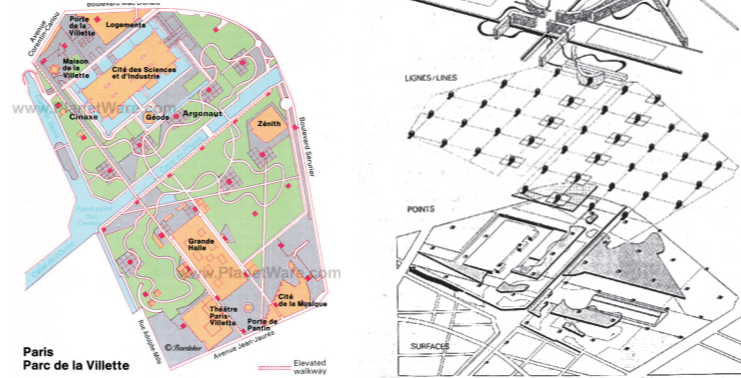


Figure 5.46

Regional Network Memorization
The Confluence Project



Figure 5.47

Ecological Sanitation



Figure 5.48

Location: Sideng Village, Shaxi Township, Jianchuan County, Yunnan Province, P.R. China

生物法修复： 实例分析

经验的分层：拉·维莱特公园

图5.46 这种前卫的景观和建筑设计是由屈米设计。公园包含三个不同的层次：表面，点和线。在公园的设计中，这三个层次汇聚在单一的平面上。同样，桃坪不同的历史层面汇聚在单一的平面上，游客必须汇聚不同的信息，以了解桃坪。

可体验的分层
拉·维莱特公园

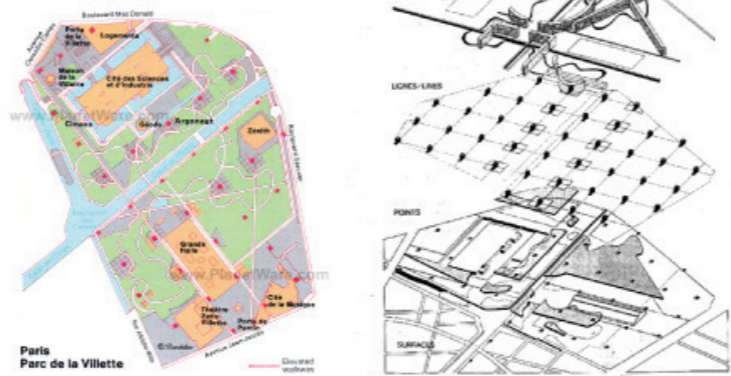


图 5.46

区域网路，纪念与回忆： Confluence项目

图5.47 这个项目由玛雅·林设计。项目位于美国华盛顿州和俄勒冈州交界的哥伦比亚河的汇聚处。在作品中，设计者使用光和人们的互动，创造了一条分隔两州的边界。人们的互动包括在人行道上的有诗意的铭刻和供休憩并引人思考的座椅。

区域网路，纪念与回忆：
Confluence项目



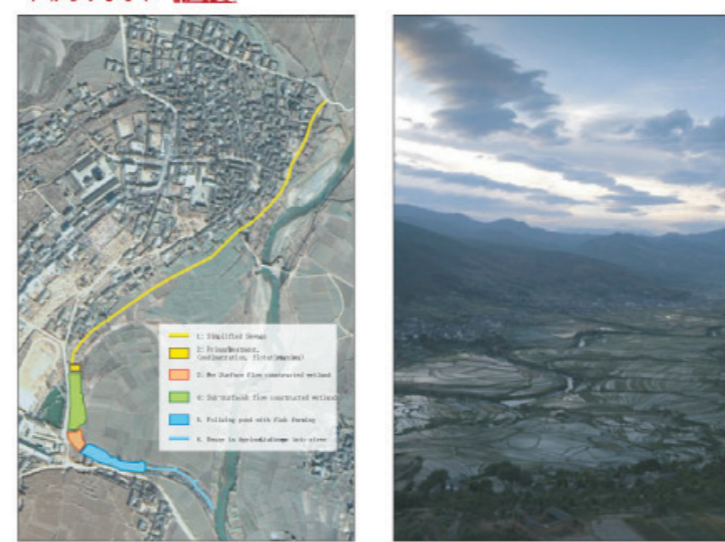
图 5.47

生态卫生：沙溪康复项目

图5.48 这个项目是有关于沙溪的社区卫生需求。像桃坪的生物修复技术一样，沙溪修复工程构建了一条细长的湿地，通过几个阶段来清洁这个社区的灰水。它不仅是一种实用的改善健康的项目，而且在中国也是一个突破性的可持续发展的试点项目。

虽然没有图片解释，我们的生态运河设计取材于福州的生态运河，是由Matt. Pilcher城市规划师规划的。

生态卫生：沙溪康复项目



Location: Sideng Village, Shaxi Township, Jianchuan County, Yunnan Province, P.R. China

图 5.48

2010年3月30日草稿