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DESIGN

# Santa Gilla

A New Landscape for the Metropolitan Lagoon of Cagliari


Christophe Girot  
Isabelle Duner  
Alexandre Kapellos  
Frédéric Rossano

Institut für Landschaftsarchitektur  
Professur Christophe Girot  
gta Verlag

Pamphlet

12





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## Santa Gilla

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## FOREWORD

by Christophe Girot

The Santa Gilla experiment was organized jointly by the Institute of Landscape Architecture of ETH in Switzerland, under my direction, and the Faculty of Architecture UNICA of Cagliari, Italy, under the direction of Professor Cesarina Siddi. The studio was organized in three stages. The first stage was a preparatory seminar held in Zurich to analyze the historic and existing site conditions of the 5000 hectare lagoon located in front of Cagliari. The second stage was a one week international design workshop on the Santa Gilla Lagoon hosted by the Faculty of Architecture of the University of Cagliari. The third stage was the synthesis and production of a landscape proposal for the Santa Gilla Lagoon back in Zurich. The result was produced within a single semester by a core team of seven ETH students: Bianca Brici, Jung Min Choi, Anne Femmer, Kirstyn Lindsay, Olivia Martin, Marc Pancera and Jasna Strukelj, with the active support of three teaching assistants of the ILA Design Lab: Isabelle Duner, Alexandre Kapellos and Frédéric Rossano. The result demonstrates what practical applications a large-scale approach to landscape architecture can have on sustainable environmental design. The Santa Gilla Lagoon is a very flat and difficult area with a topographic variation remaining under one meter over the 5000-hectare site. Because of the full southern exposure to the dry Sirocco winds coming from North Africa, the Romans created a salt industry on the flats that prevails to this day. The salt marshes of Santa Gilla have become the home of the largest colony of pink flamingos in Europe. The birds have also become the main emblem of Cagliari. After the War an industrial port was built at the heart of the lagoon, disrupting

the entire local economy and an ecosystem that had been in balance over millennia. It is this mix of both social and environmental considerations that defined the special appeal of working on the Santa Gilla Design Studio. Could the ecological and economical challenges be brought together under a single landscape vision for the future? Students of the ETH worked on a preparatory analysis of the site to develop the basis of a design hypothesis. In this hypothesis, the existing site conditions and dysfunctions of the Santa Gilla Lagoon were questioned and prioritized in terms of long-term sustainability, diversity, as well as urban economic and recreational potential. The hypothesis was formulated based on the postulate that the industrial port had not only produced a major obstruction in the lagoon, but that it was no longer economically viable to maintain. It was now necessary to reconsider the future role of this industrial infrastructure within the broader context of the lagoon and city, looking both at its river and its beach. The challenge of the workshop was to bring a large number of students from various cultural and educational backgrounds together. After an intensive week of teamwork, difficult multilingual discussions and choices, each team produced a clear design hypothesis. Despite the great differences between the teams, the design results of the Santa Gilla workshop were very clear and synthetic. Each project stood on its own merit as an example of large-scale landscape design, using microtopography and hydraulics as the basis of landscape design thinking. The precise level of landscape design and observation resulted in an extraordinary palette of possibilities for the Santa Gilla Lagoon.

Upon returning to Zurich, seven ETH students continued the task and discussed aspects of each of the proposals developed during the workshop at Cagliari. A sketch proposal of the definitive landscape project for Santa Gilla was finally established. The project was phased over the next 25 years, with the main priorities being the treatment of waters of the Mannu River in phytoremedial ponds and the rehabilitation of the entire beachfront. Attention was also given to the industrial port, changing it into a new water-based city at the heart of an exceptional natural environment. Can a single landscape design studio solve the planning problems of the Santa Gilla Lagoon in Cagliari? This is doubtful, but the precision and seriousness of the work achieved with advanced landscape visualizing and modeling techniques, makes the debate over the priority of a large-scale landscape initiative for this area very credible. After showing the public of Cagliari the extraordinary economic and ecologic potential of the Santa Gilla Lagoon, it will be difficult for local authorities to ignore the pressing need for an overall landscape vision and plan any longer.

## A PARADIGMATIC BEGINNING FOR A NEW LANDSCAPE APPROACH

by Cesarina Siddi

The workshop Santa Gilla 08 arose from the opportunities offered by the Visiting Professorship for Internationalization, financed by Regione Autonoma della Sardegna, which is directed to improve the scientific and didactic quality of the University of Cagliari by activating relationships with professors and experts that can encourage the university's methodological innovation and competitiveness. The scientific and didactic program with Professor Christophe Girot was activated as a part of the "Architecture of Open Spaces" course, and special emphasis was given to an intensive design workshop as the most effective framework for sharing theoretical and practical methodologies.

At a time in which the European Landscape Convention (Firenze, 2000) and Cultural and Landscape Heritage Code (DLgs 22/01/2004, N. 42) are being put into effect, landscape has gained prominence in regional planning with the Regional Landscape Plan (Piano Paesaggistico Regionale) defining landscape as the first resource to strengthen regional identity through the improvement of cultural, natural and productive heritage. In this context, it is important that we understand how we can transform general policies into real opportunities for territorial development. In this sense some topics become very important by virtue of their ability to clarify complex connections between nature and culture as well as the main role of landscape design. Moreover some places, due to their position, values, potential and/or critical state, can be considered as paradigmatic examples for explaining the contemporary meaning of landscape architecture and the importance of a clear and structured design method. Sardinia does

not have a solid landscape culture and the subject is relatively new in academic program throughout Italy, but the values of regional landscape force everyone to acquire a rapid awareness for creating new modus operandi that avert the danger of irreversible damage.

Santa Gilla lagoon contains the complexities, contradictions, and unrealized potential necessary for a very interesting experimental design: the site is a strategic part of metropolitan Cagliari, with strong landscape and cultural values that have made it extremely attractive since ancient times. During the last century the area has acted as a magnet for important infrastructures and production facilities, which nonetheless have not yet created a landscape with which communities can identify themselves. Today, Santa Gilla does not belong to the common imagery of the city, except for fragments: notwithstanding various environmental regulations, we lack efficacious policy tools for improving its livability and overall quality.

As ecology teaches us, there is more complexity, more potential, but also more fragility in edges or transition areas, and this also holds true when we speak about landscape. Along the edges of the lagoon we can find all the essential elements for a thorough reflection upon its future. Along the eastern edge are all of the important transportation infrastructures: the commercial and industrial harbor, regional bus station, railway station, Elmas airport, and the national road (SS 130) connecting Cagliari with Sulcis. Nowadays they appear self-referenced at the cost of intermodality and, above all, they have built a barrier that 'moves' the city away from the

water and leaves only residual spaces awaiting urban meaning. The industrial harbor is the most strategic element; oversized and underused, it could be one of the most attractive parts of Cagliari in the future. To the north are the estuaries of the Mannu and Cixerri rivers, now polluted and very close to the industrial area (CASIC) that characterizes the eastern side together with the Conti Vecchi salt pans. To the south we have another critical element, the national road (SS195) that connects Cagliari with southwest Sardinia and separates the salt pans from the sea. The concise reconstruction of these relationships helps to explain the necessity of rethinking the lagoon at the appropriate scale: reclaiming the water's edge and creating a new balance between nature and city, a healthy landscape where people are not only able to move around but, above all, where there are inviting places for people to stay.

These remarks make our expectations and the probable spin-off clear: thanks to the choice of the topic, and especially to the choice of the site, the workshop can produce an interesting basis for long-term research work through which it will be possible to modulate and modify the actions on the Sardinian landscape, theoretically and in real terms, from the perspective of real sustainable development.



DESIGN STUDIO METHODOLOGY



The Santa Gilla Design Studio was a landscape architecture course organized by the Institute of Landscape Architecture for architecture students of the ETH Zurich, held in collaboration with the Facoltà di Architettura UNICA in Sardinia. Students from both schools could either complete the standard elective course, or they could broaden their studies in landscape architecture in the form of an elective research project. The varying levels of student participation – fluctuating from 7 up to 48 students – as well as the great variety in student expertise regarding the design task at hand, led us to develop a string of intense and interrelated workshops as part of an overall design teaching methodology. Three main working phases were established: the first involved preparation workshops, the second an on-site workshop and the third a design proposal workshop. The first phase had the primary goal of acquainting the 13 ETH students with the island of Sardinia as well as the historical context of the site itself. At the

same time the intention was to raise the students' awareness of the design potential for the Santa Gilla waterscape. These preliminary tutorials prepared the students for the workshop in Cagliari, the second and main phase of the design studio. In Cagliari, the 13 students from the ETH mixed with 35 students from Italy and formed 6 different teams. The introductory seminar day and the site visit were followed by an intense design workshop, which concluded in the presentation of 6 different design proposals for Santa Gilla. Back in Zurich an overview was conducted of the work done on site. This offered a point of closure on the one hand and a starting point for the third phase. In the last workshop, 7 highly dedicated and motivated students were able to develop one common design proposal and a complete documentation of the design argumentation and proposal itself.

Preparation Workshops

The preparation workshops, held in Zurich on two Saturdays, introduced the students to the site through a series of analyses, map reading exercises, and intuitive conceptual designs.

Santa Gilla On-Site Workshop

The on-site workshop consisted of acquiring supplementary knowledge of the site through various lectures and a thorough site visit, serving as an introduction to 6 days of intense group work.

Design Proposal Workshop

With the knowledge acquired on site, 7 students pushed the brief one step further, working on a single design proposal over a 2-week period.

WORKSHOP 1  
History of the Site

WORKSHOP 2  
Water Landscape

WORKSHOP 3  
Santa Gilla

WORKSHOP 4  
Design Proposal

Publication



September 2008

October 2008

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April 2009





## HISTORY OF THE SITE

# The Lagoon The City of Cagliari The Land Use of Santa Gilla



### **September 2008**

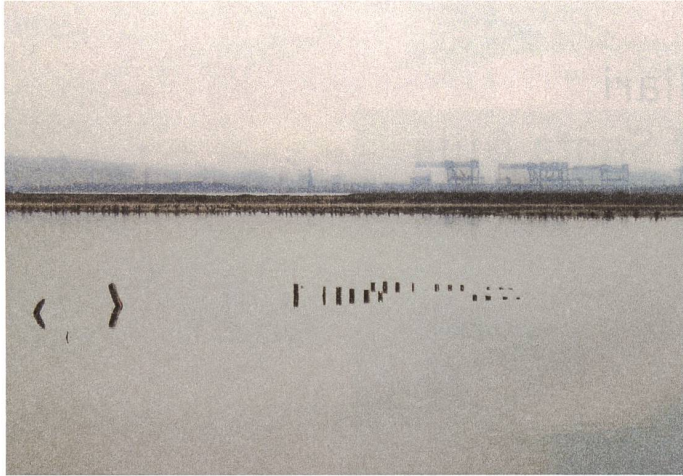
Prof. Christophe Girod, Isabelle Duner,  
Alexandre Kapellos, Frédéric Rossano.

### **14 students:**

Bianca Brici, Adrian Chan, Zichao Chen,  
Jung Min Choi, Giuseppe Gaudente, Anne Femmer,  
Kirstyn Lindsay, Olivia Martin, Marc Pancera,  
Jasna Struckelj, Thomas Summermatter,  
Hong Guan Tan, Ren Tian, James Yeo.

This first chapter talks about the preliminary investigations during the preparation workshop. A lecture was held to inform the students from the ETH about the geography, history, culture, geology and vegetation of Sardinia. Then we shifted our focus to Cagliari, the capital of the island. We examined the development of the city's urban growth, the history of the Santa Gilla lagoon as well as the development of infrastructure on Santa Gilla.

## THE LAGOON



A current view of the vast waterscape at the lagoon of Santa Gilla

The lagoon at the bay of Santa Gilla is formed by the mixing of river water, which flows from the Mannu River, the longest river in Sardinia, towards the sea, and the sea water which enters the lagoon from the Gulf of Cagliari. There are a number of small islands in the lagoon and the larger island of Sa Illetta.

As we can see on the map from 1890, there is much less land in proportion to the size of the lagoon. Moving forward in history we can also see that the size of the lagoon has decreased with the success of the salt industry. The steadily expanding salt industry began to divide up the lagoon area. This division was further emphasized by the expansion

of Sa Illetta Island to create the Porto Canale. As a result, the lagoon contained fresh water only from the river mouth to the sea along the coast of Cagliari until 1986 when, due to pollution from agriculture, the river water was channeled directly to the sea, avoiding contact with the lagoon completely. Today, the lagoon of Cagliari no longer functions as a lagoon with a mix of fresh and salt water, but is indeed only made up of salt water.



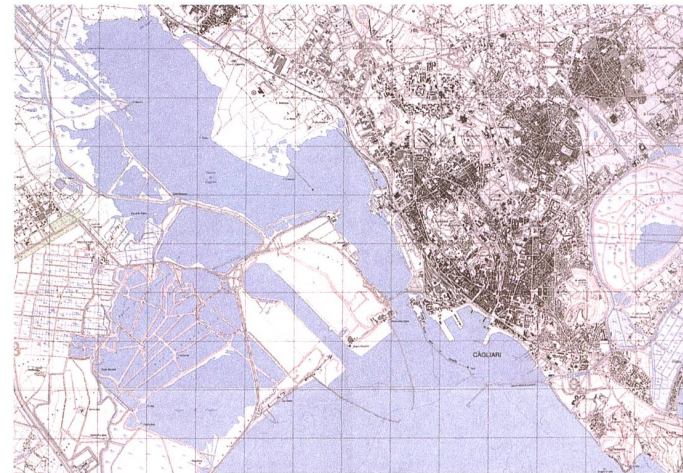
**1890**

The group of small islands and the main road linking them, connecting Cagliari to Capoterra with the lagoon on one side and the Gulf of Cagliari on the other





**1960**  
Land is reclaimed from the lagoon for the production of salt.



**1986**  
River water is channeled directly out to sea and the island of Sa Illetta is expanded through landfill to create the Porto Canale, further decreasing the surface area of the lagoon.



Current view of Cagliari looking towards the Molentargius nature reserve

## THE CITY OF CAGLIARI

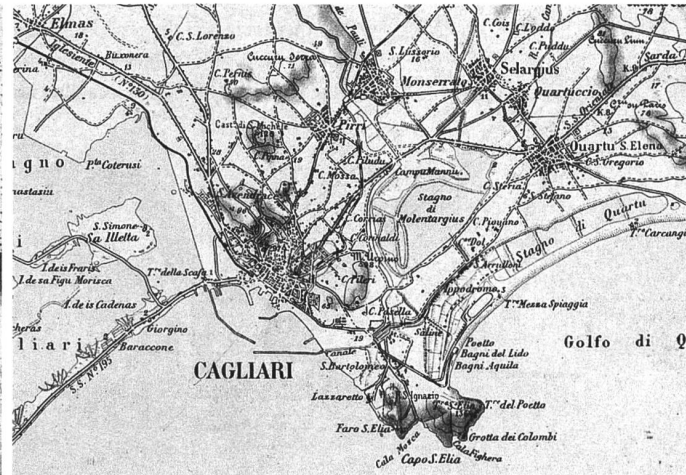
Cagliari is a fortified city on a hilltop with lookout towers that once guarded its historic harbor. Due to its central location in the Mediterranean, Cagliari was often under attack from other nations which meant that the city did not expand and remained contained within the fortified walls, including public administrative buildings. The city only expanded as infrastructure was introduced and smaller villages in the hinterland were established. Over time the smaller villages expanded and merged together in an unplanned fashion towards the city of Cagliari. A main road built along the shore line of the lagoon has hindered the development of the city towards the lagoon itself. Cagliari's ambivalent stance towards the bay of Santa Gilla has been compounded by

the airport built in the hinterland at the shore. The expansion of the salt industry in the lagoon and the expansion of the port at the Porto Canale has left this side of Cagliari most unattractive to develop, resulting in a vast wasteland, which actually has substantial potential. A small fishing village and monastery, created on the island of the Porto Canale, did not lead to further development, even though they were situated on the coast with a beach.



1792

The fortified city of Cagliari is located on a hilltop. Small villages develop along the infrastructure intersections in the hinterland.



1931

Cagliari grows on the shore side towards its harbor. The small villages in the hinterland begin to expand.



2008

Cagliari and the villages have merged.

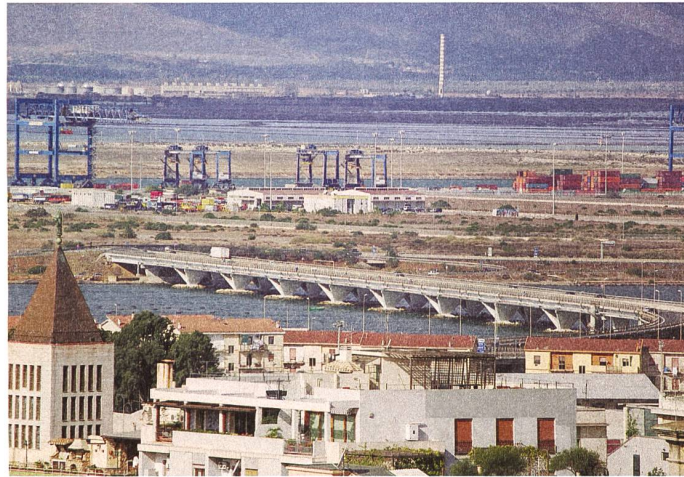


## THE LAND USE OF SANTA GILLA



1859

Lithograph of Cagliari and the salt industry



A current view towards the bay of Santa Gilla shows a landscape dominated by infrastructure and industry.

The land-water relationship around Santa Gilla bay was originally dominated by water, the main industry being fishing with minor agricultural land use. This changed dramatically with the establishment of the salt industry, whose expansion supplanted agriculture in the area, reclaiming land from the sea. The expansion towards the island of Sa Illetta, which created the Porto Canale, introduced another form of industry to the area and the success of the salt industry and surrounding infrastructure also led to the development of other heavy industries on land. The development of the airport and the NATO base further increased the predominantly industrial use of the land, all of which had a substantial impact on the landscape, the city of Cagliari and its inhabitants.

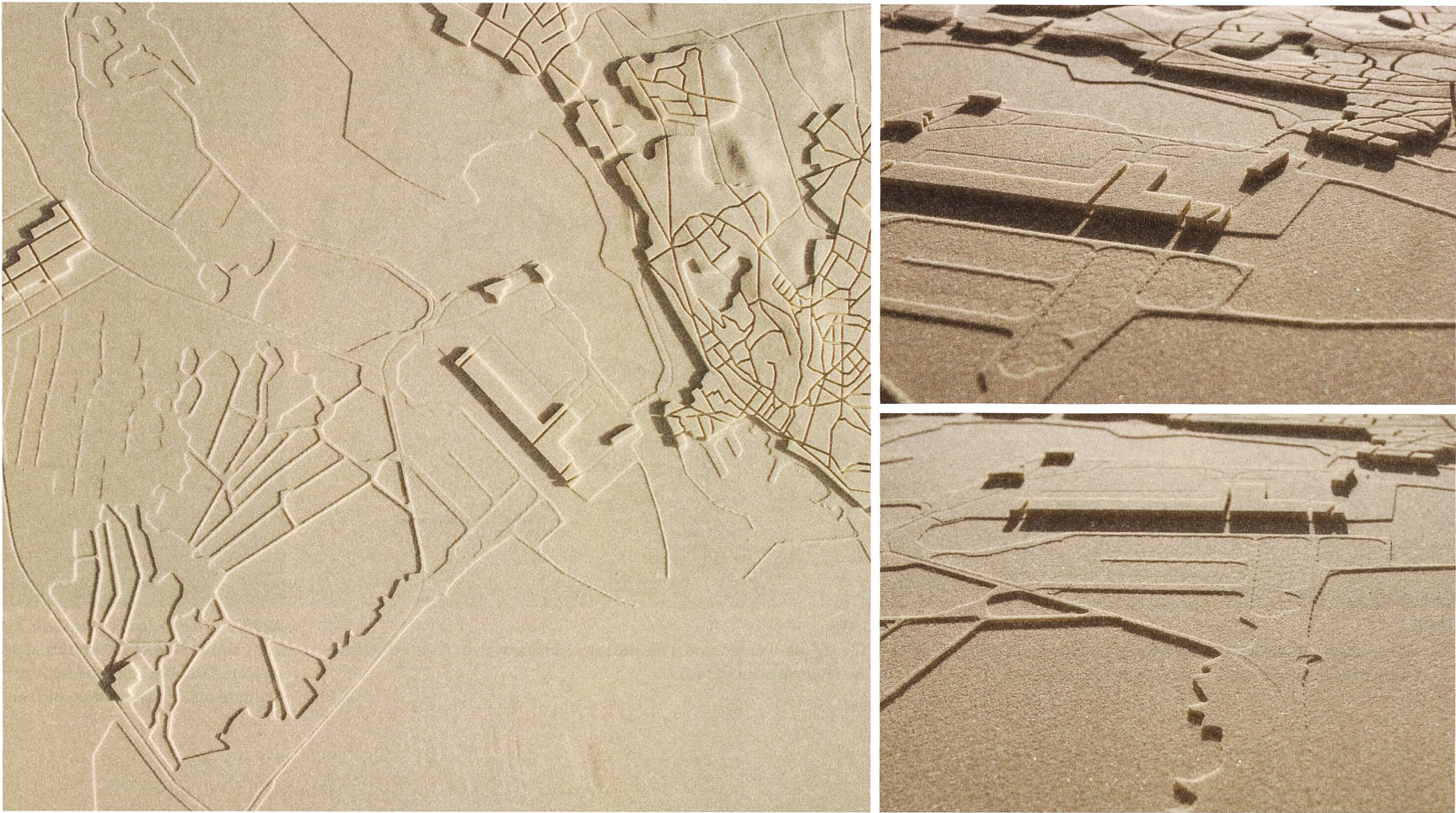
The bay of Santa Gilla appears to have been developed without much planning and consideration of its context, but rather with economic priorities in mind and without thinking about long-term problems that may arise from the total upheaval of the long-standing land-water equilibrium.







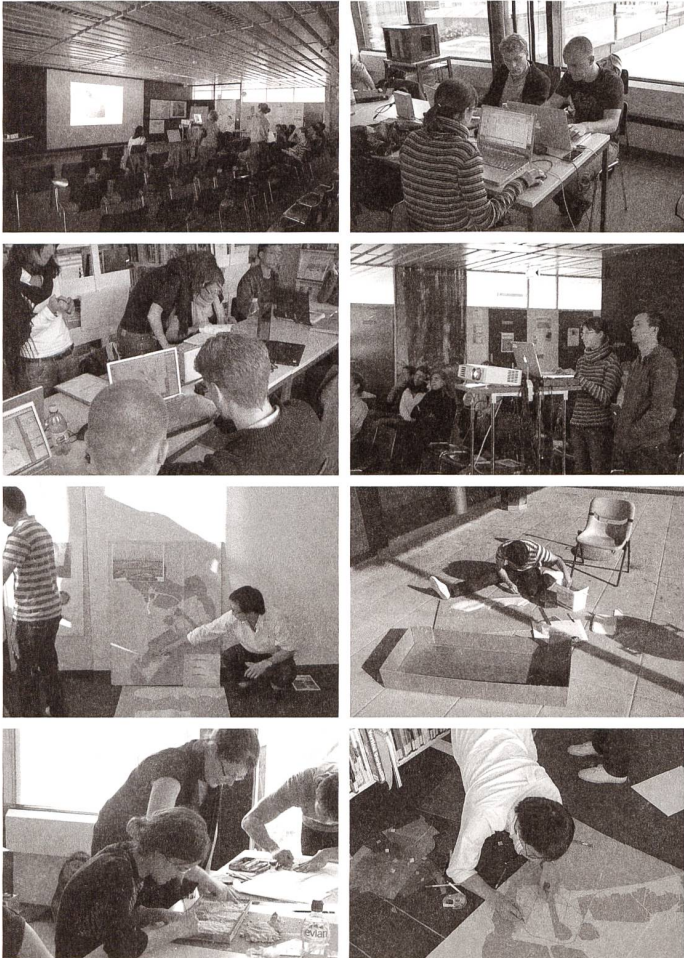
CNC model of the existing site





## POTENTIAL OF A WATERSCAPE

### Identity of Place Diverse Waters Urban Development



#### October 2008

Prof. Christophe Girot, Isabelle Duner,  
Alexandre Kapellos, Frédéric Rossano.

#### 14 students:

Bianca Brici, Adrian Chan, Zichao Chen, Jung  
Min Choi, Giuseppe Gaudente, Anne Femmer,  
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Still in the stage of preparation, we investigated the design potential of the vast water landscape of Santa Gilla. We focused on today's identity of place, where water is predominantly made to serve infrastructure. Pivotal questions which fed the design process included the following: How and in what manner can one rethink and redesign this water landscape? And how can it be brought back to a new way of living and working place for the community? Is it possible that this waterscape can accommodate more than one industrial use? Is water diversity a possible tool to enhance the atmosphere and quality of open space?



## IDENTITY OF PLACE

In order to be able to determine the potential of this landscape, we first identified the disconnected elements which make up Santa Gilla Bay as we know it today. These are the physical elements of the vast horizontal landscape and the man-made interventions which define the space and lend it its unique character. The interventions include the salt industry and the industrial port with its towering cranes at the Porto Canale, which dominate the skyline of Santa Gilla Bay from the city of Cagliari. The salt industry uses up a vast amount of this land and is only represented by a few salt mountains that can be seen in the distance from Cagliari. The process of refining salt requires many basins of slowly circulating salt water to allow for the extraction of sodium chloride. This has generated an ideal environment for various birds, animal species, and natural salt water vegetation, creating a home

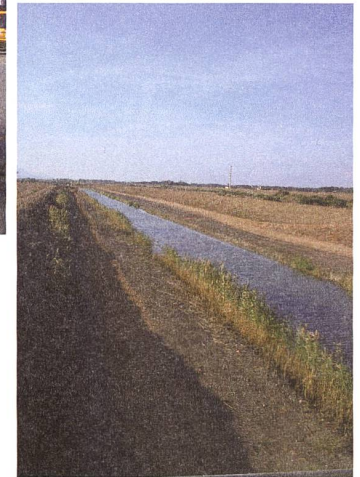
for the largest population of pink flamingos in Europe due to the shallow salty water. This vast and flourishing natural salt water vegetation now provides a very scenic waterscape whose great potential can be exploited by simply making more people aware of it. In contrast to this vast empty open landscape, the dense and raw character of the industrial port provides another element with huge potential for transformation and again, only by increasing its visibility. The strictly controlled water system, which prevents various water types from mixing, has the potential for expansion in order to create several diverse systems structuring the landscape. Although the people of Cagliari do not have direct access to this landscape in order to enjoy it to its full potential, they still have a visual connection to it, and a physical connection could be initiated.



Salt industry



Industrial port



Controlled water systems





The city of Cagliari  
at the estuary



Vernacular architecture along the shoreline



Natural salt water vegetation found in the  
vast horizontal landscape



View of Santa Gilla from the fortified city of Cagliari



## DIVERSE WATERS



The watershed in Sardinia of which the Mannu River is the longest at 93 kilometers

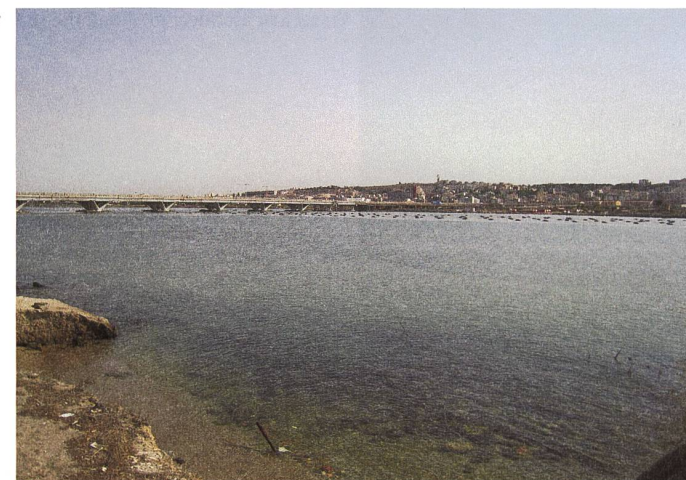
The current water palette consists of two water types with fresh water coming from the rivers, in particular the Mannu River, currently polluted, and sea water found both in the saline basins and the lagoon. Although there are currently only two water types in Santa Gilla Bay, they generate various conditions depending on salt concentrations, which allows the water to portray a different character in these situations. For example, in the lagoon we find only salt water suitable for fishing and boating activities. The salt water here is shallow but still has a slow moving current. The salt water of the saline basins is also shallow but has an even slower current, allowing vegetation to grow naturally. However, this water is polluted in the areas surrounding heavy industry and the recycling center, which prevents the growth of vegetation, promotes algal bloom and emits rather pungent, unattractive smells. Other seawater conditions can be found along the shoreline

where industrial infrastructure interrupts the water circulation, which has in turn led to an infestation of small potato-like sea vegetables. These organisms cover the coastline of the Gulf of Cagliari and do not make it very attractive to visitors. With only two water types, we find diverse water conditions which may either be maintained or expanded and modified to introduce more water types into the system. The widening of the water palette can be achieved by cleaning existing water types and mixing them in various concentrations to allow a more diverse vegetation system to develop.



A comparison between water and built environment

Existing lagoon water at the estuary to the Mediterranean

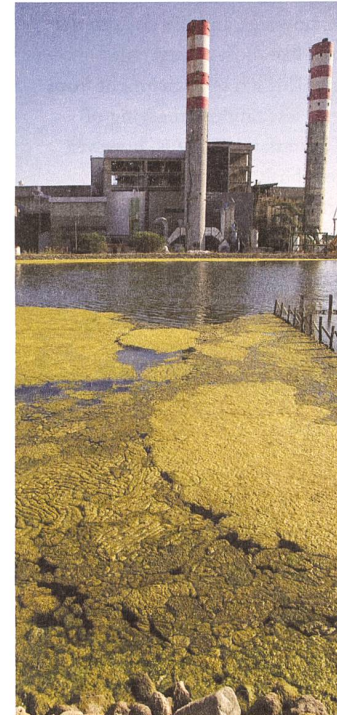
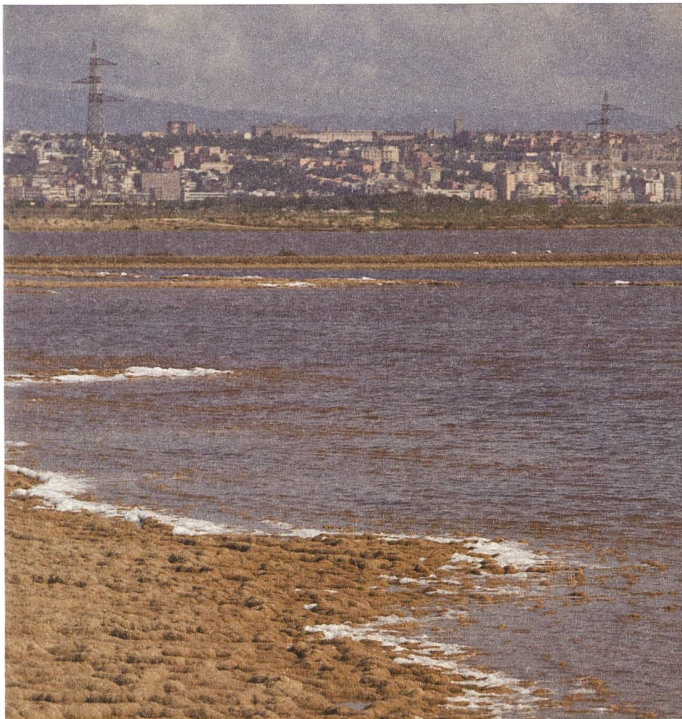




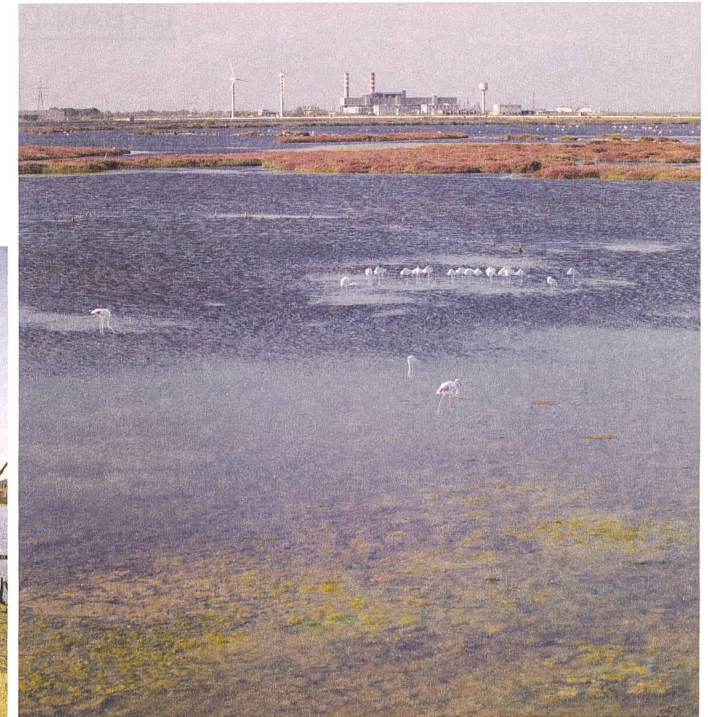
The channeled river water flowing to the lagoon is polluted from agriculture.



The circulation of water along the shore has been interrupted by industrial infrastructure, which creates pollution along the beach.



The lagoon water is also polluted through various types of industry, such as the recycling center.



The nature reserve that has evolved from the salt industry



## URBAN DEVELOPMENT



The location of the capital Cagliari on Sardinia

Cagliari, the capital of Sardinia, is located on the southern end of the island. It was initially founded here as the geographic center of Europe, and it was hoped that it would flourish due to its prime location. This was not the case, however, and the city did not develop along the coast like most coastal cities but towards the hinterland. This led to detachment from the coast and a more or less random merging of smaller towns in the hinterland. There is, however, an opportunity to reestablish the connection to the water and encourage development along the

coast. First, the vast amount of land abandoned on the reclaimed island would have to be made accessible to the public in order to change people's perception of it, and secondly urban development should be made possible. This would create a new urban area at the water's edge and provide the urban situation needed to sustain Cagliari's more positive and natural development over the next ten years.

An aerial view of the urban sprawl around Cagliari





The urban growth of Cagliari has shifted away from the bay of Santa Gilla into the hinterland.



There is vast potential for development along the shoreline of Santa Gilla Bay with its attractive water landscape and proximity to the city.





## WORKSHOP SANTA GILLA

### One Week – Six Projects



#### October 2008

Prof. Christophe Girot, Isabelle Duner,  
Alexandre Kapellos, Frédéric Rossano.  
Prof. Cesarina Siddi, Giovanni Battista Cocco,  
Francesco Cherchi, Sara Sorrentino,  
Fiammetta Sau, Elisa Serra.

Irene Asara, Bianca Brici, Paolo Cabras, Silvana  
Carbone, Patrizia Carta, Adrian Chan, Zichao Chen,  
Jung Min Choi, Rita Concas, Francesca Delunas,  
Giuseppe Gaudente, Francesca Etzi, Anne Femmer,  
Sara Fois, Barbara Ibba, Marco Lai, Kirstyn Lindsay,  
Olivia Martin, Giulia Melis, Silvia Melis,  
Simona Mereu, Elena Mura, Alessandra Murru,  
Frederico Mussetti, Silvia Ortu, Marc Pancera,  
Gloria Pessina, Matteo Pessini, Fabrizia Pistis,  
Antonio Raitano, Alina Sanna, Mariafrancesca Serra,  
Mario Scotto, Claudio Sirigu, Roberta Sisti,  
Jasna Struckelj, Thomas Summermatter,  
Hong Guan Tan, Elena Verdecchia, Mauro Vincis,  
James Yeo, Valentina Zucca.

In Cagliari, the 13 ETH students mixed with the  
35 students from Italy and formed 6 different  
teams. Two Design Perimeters were defined: *lungo  
il mare* (along the shoreline) and *lungo il fiume*  
(along the river). The introductory seminar day  
and the site visit were followed by an intensive  
design workshop, which concluded in the  
presentation and exhibition of 6 design proposals  
for Santa Gilla – 3 projects addressing *lungo il  
mare* and 3 projects addressing *lungo il fiume*.

## ONE WEEK – SIX PROJECTS

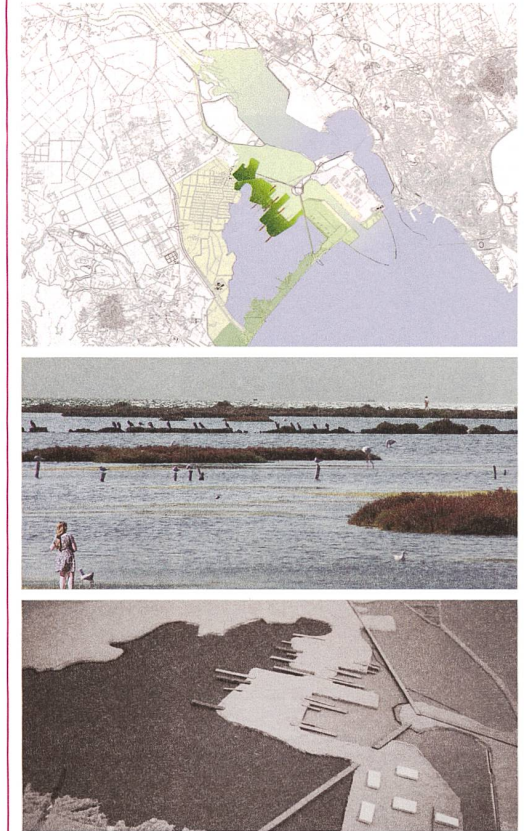
### cucitura



The aim of this project is to reconnect the lagoon along the shore and make it accessible with a series of small interventions.

Francesca Delunas, Marco Lai, Olivia Martin, Giulia Melis, Silvia Ortu, Mario Scotto, Jasna Struckelj

### polyhabitable

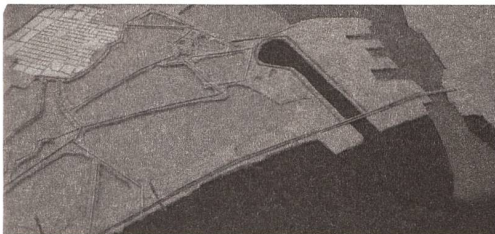


This project uses and transforms human interventions in the lagoon to establish a greater range of habitat.

Irene Asara, Patrizia Carta, Jung Min Choi, Silvia Melis, Antonio Raitano, Fabrizia Pistis, James Yeo



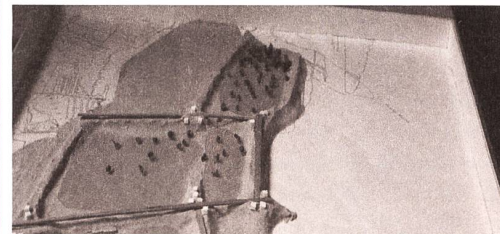
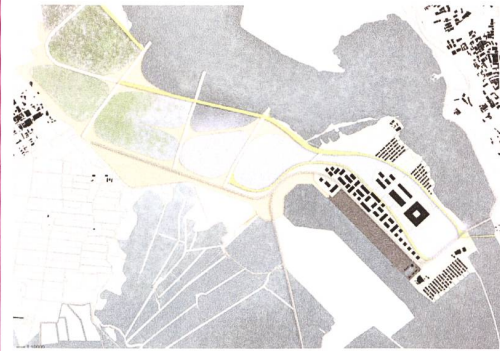
## walking on water



The ecosystem is the main focus of this project, which aims to strengthen the approach to the water.

Bianca Brici, Sara Fois, Simona Mereu,  
Frederico Mussetti, Matteo Pessini, Roberta Sisti,  
Hong Guan Tan

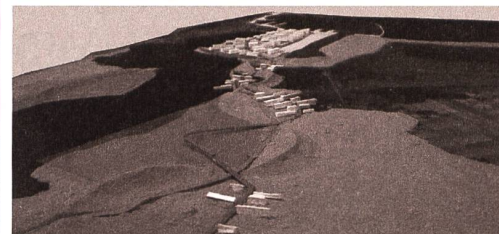
## stitchin'gilla



This project connects two main transition axes: polluted water to clean water and city to landscape.

Paolo Cabras, Silvana Carbone, Adrian Chan,  
Zichao Chen, Barbara Ibba, Alessandra Murru,  
Mauro Vincis

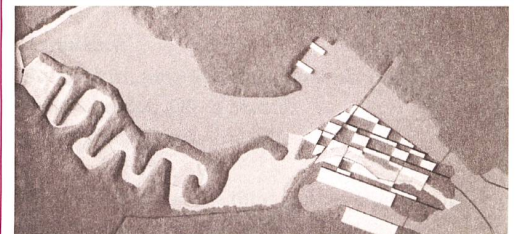
## DNA



A system of vegetation, water diversity, roads, and buildings allows this project to extend the city into the lagoon.

Rita Concas, Giuseppe Gaudente, Marc Pancera,  
Alina Sanna, Thomas Summermatter,  
Elena Verdecchia, Valentina Zucca

## gira gilla



Based on a natural process of water cleaning, this project provides a new water landscape that fosters a new urban environment.

Francesca Etzi, Anne Femmer, Kirstyn Lindsay,  
Elena Mura, Gloria Pessina, Mariafrancesca Serra,  
Claudio Sirigu





## DESIGN PROPOSAL FOR SANTA GILLA

Design Strategy

Master Plan

Urban Structure

Phasing

Section – Lungo il Fiume

Section – Attraverso il Stagno

Section – Lungo il Mare

Land and Water

Water System

Program

Circulation

Impressions

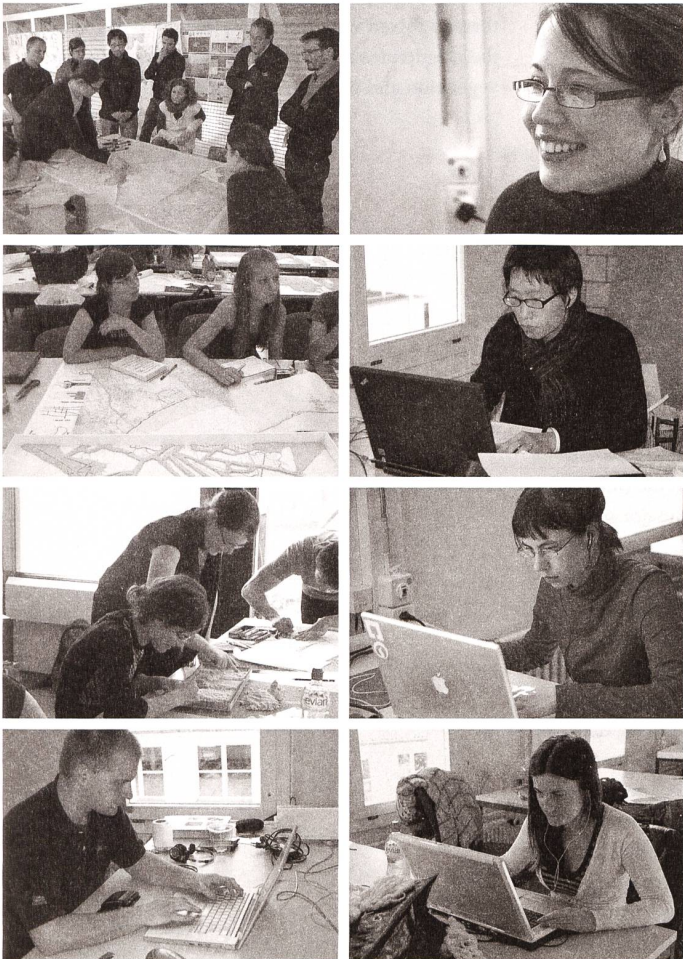
### January 2009

Prof. Christophe Girot, Isabelle Duner,  
Alexandre Kapellos, Frédéric Rossano.

### 7 students:

Bianca Brici, Jung Min Choi, Anne Femmer,  
Kirstyn Lindsay, Olivia Martin,  
Marc Pancera, Jasna Struckelj.

The transition into the third and last stage of the design studio gave an overview of the results from the preceding phase. Back in Zurich a review was conducted of the work done on site. This provided a conclusion to the work already conducted as well as a starting point for the final phase. In the last workshop, 7 highly dedicated and motivated students developed one common design proposal and a complete documentation of the design argumentation and proposal itself.



## DESIGN STRATEGY

Having experienced the vast horizontal landscape in Santa Gilla Bay, we were excited by the potential of its abundant qualities. The landscape is home to a wide range of wildlife, suited to the diverse types of water and the natural conditions. The diversity of the waters is, however, not used to its full potential in the bay, as the water types are separated and channeled directly into the sea, preventing them from mixing in the lagoon due to the problem of pollution. Industrial plants built on reclaimed land from the lagoon have made the landscape inaccessible to the public, so that it is unfamiliar to the people of Cagliari. This vast inaccessible space is also full of litter, which does not create an attractive image of the area and influences the way it is perceived by the people of Cagliari. The port at the Porto Canale also occupies a vast area on the reclaimed island, making it inaccessible to the public. The view from Cagliari is therefore one of a vast wasteland. The invasive and unplanned road network cutting across the bay and along the shoreline further divides the landscape and allows for through flow traffic, with no opportunities to stop and stay and enjoy the vast horizontal landscape. The contrast between negative and positive elements offers great potential for enhancing the experience of Santa Gilla Bay; these elements only need to be refined and reconnected.

We identified three main problem zones, which are also potential initiation points for development in this area. These are *Lungo il Mare* (along the sea), *Lungo il Fiume* (along the river), and *La Laguna* (the pools). Our design strategy aims to enhance and connect the given qualities through small interventions that can generate further development potential.

*Lungo il Mare:* The road along the sea links Cagliari with Capoterra by cutting across La Laguna and therefore preventing access to the lagoon. There is potential here to create subtle interventions, which would encourage people to stop and stay. The beach at Lungo il Mare is additionally polluted because the long pier that comes from Porto Canale keeps the sea water from circulating. Once again, minor interventions and basic maintenance of the beach could make it as attractive and usable as it used to be. These intervention points also give a starting point for a network connecting the Lungo il Mare with La Laguna.

*La Laguna:* In our opinion, the main problem of the lagoon is the invasive infrastructure cutting through the landscape, which provides efficient through traffic access but no real access to the landscape itself. By diverting through traffic around the bay, La Laguna could become a nature reserve open to the public. The salt industry in the lagoon, which is a major source of income for Cagliari, has allowed for the development of a unique ecosystem through the natural processes associated with the salt industry. We see this as a positive quality, which should be preserved and enhanced as the salt industry for this becomes smaller.

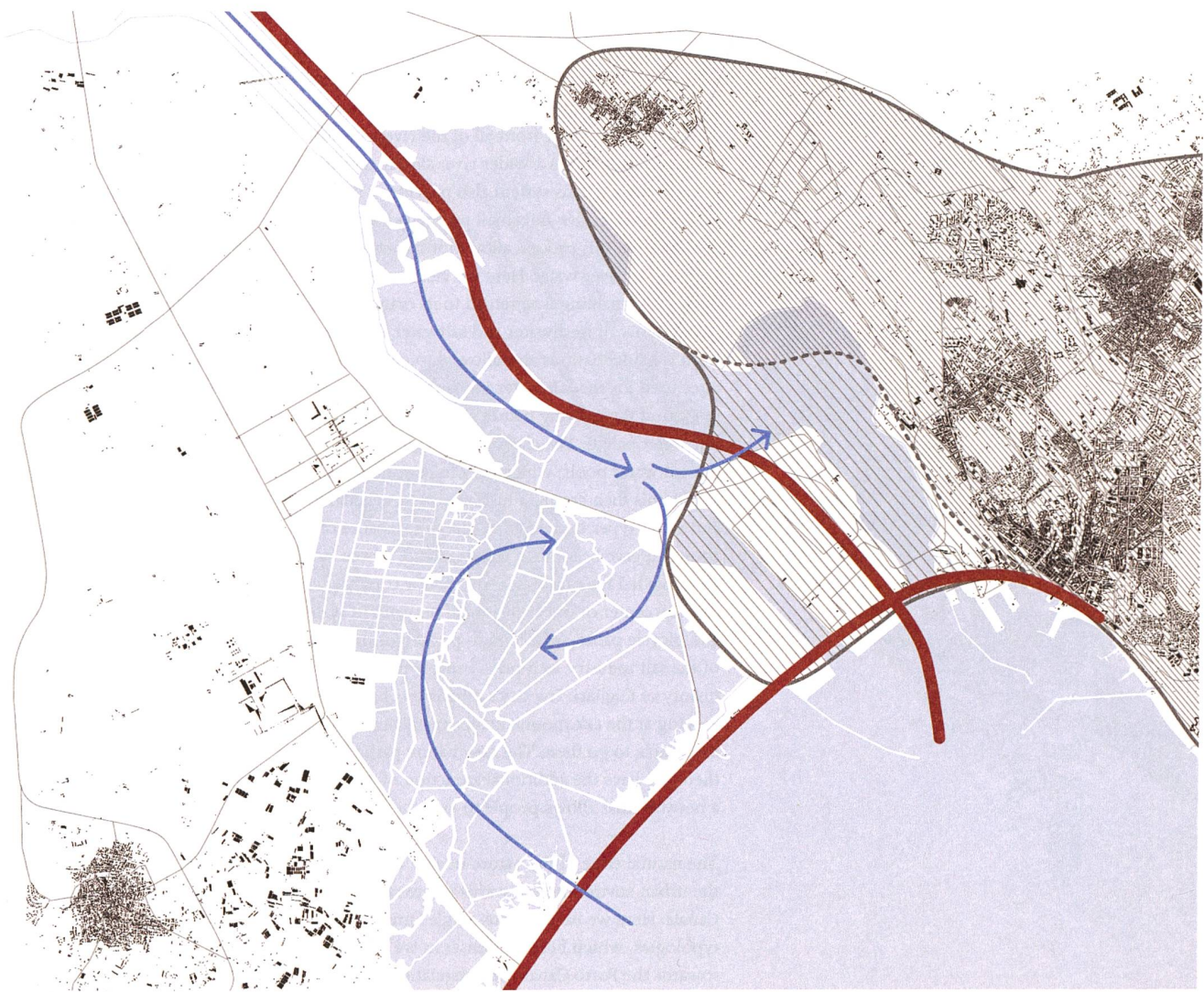
*Lungo il Fiume:* Current infrastructure along the river, consisting of a system of channels, aims to prevent pollution in the lagoon by diverting polluted water from agriculture directly to the sea. This system is currently not working as the dams have broken. In consequence, the lagoon with its brackish waters is not functioning properly as it should in a natural state; it is pure saltwater. We propose inserting gaps

in the network of channels to allow the river to flow through a new system, which would take over the shallow overflow pools and clean the water in a natural water purification system. This system could then be mixed with the pools, thereby increasing the palette of water types and allowing new types of vegetation and natural phenomena to flourish here.



Design Strategy

- Urban Intervention
- Water Intervention
- Intervention Axis



## MASTER PLAN

Our main intervention in Santa Gilla Bay is to increase the existing water palette and in doing so, to create a fusion of waters and urban situations. We propose cleaning the river water in a natural purification system that collects the water from all of the rivers in one basin and then forms a wider river slowly meandering towards the sea. This system also provides a new nature park with walkways and small promenades, while the final basin in this process allows for leisure activities in the clean river water. Here the clean water enters the lagoon enabling it to return to its original natural status, a mix of freshwater and saltwater. The water from the final basin is also allowed to enter the pools once used for the salt water industry. Here we intend to expand the existing nature park, which also widens our water palette. The clean water is introduced into the salt water pools, which vary in concentration and depth; this then creates a lush variety of vegetation and water types in the nature reserve. The core of the nature reserve becomes a leisure island, where facilities are provided for camping and outdoor concerts; it is also the center of our recreational network of walking and bicycle paths. We intend to preserve a small part of the salt industry, as it plays a major role in the history of Cagliari. The city's inhabitants have been looking at the salt mountains for many years without being able to go there. The new nature park will therefore have the additional attraction of providing a network that allows people to visit the area.

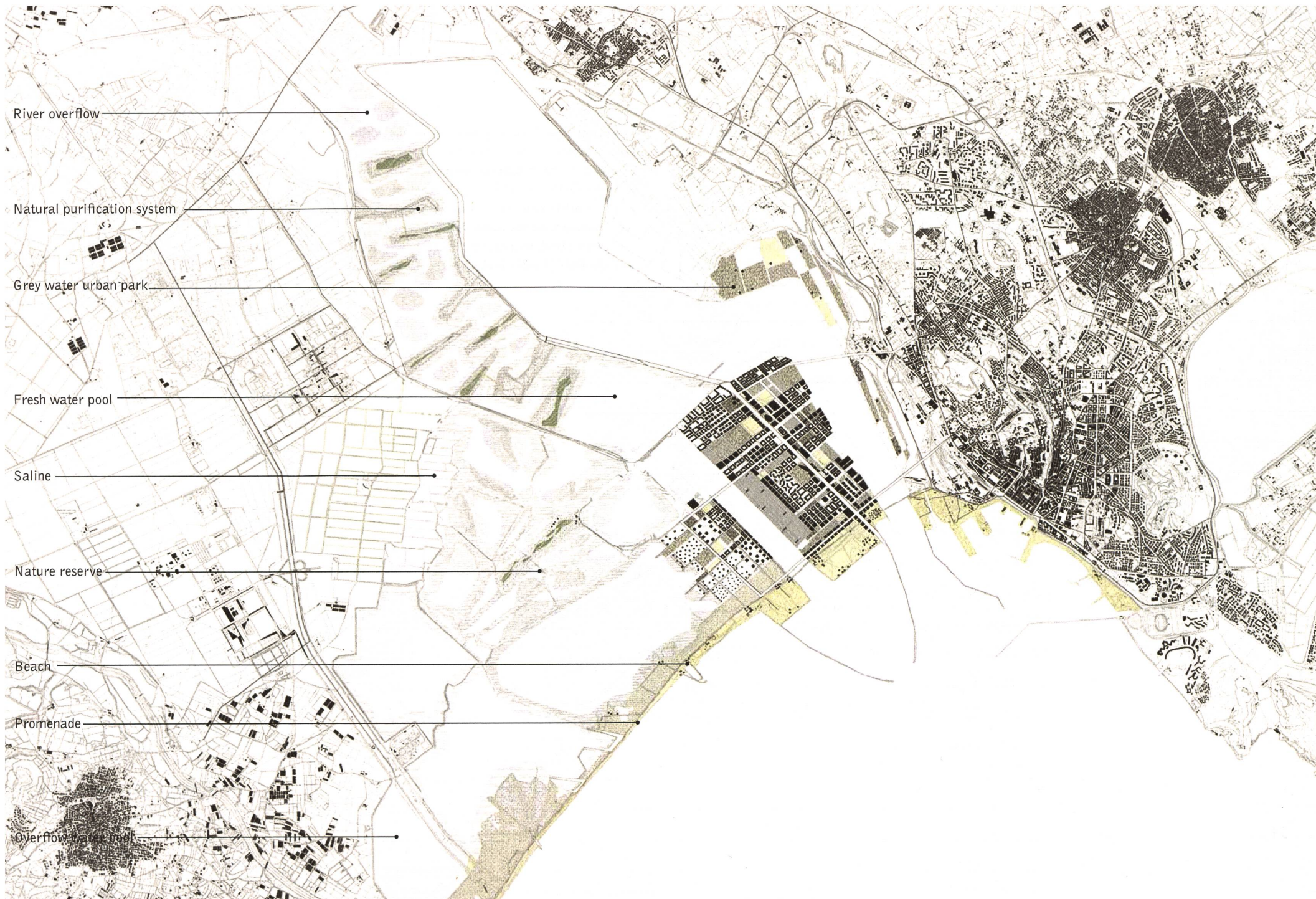
The natural edge of the nature reserve now fuses with the urban environment towards the west of the Porto Canale. Here we have various single family housing typologies, which become denser as we progress towards the Porto Canale. The vegetation and water of

the nature reserve filters into the urban environment, transforming it to create an urban park situation. Canals connect through to the core of the Porto Canale where the barges turn, and here we introduce a small harbor for private boats. The port at the Porto Canale remains intact and the surrounding land is built up with mixed-use structures providing residential, commercial, and cultural activities. We introduce a height limitation to keep building heights beneath that of the cranes, thereby preserving the skyline of Santa Gilla Bay and the importance of the industrial harbor. This area has a strong relationship to the port and its raw industrial character. The urban park filters through the urban environment, creating various urban park situations. Water is channeled through the urban environment and connects the water of the Porto Canale to the lagoon. The various housing typologies and relationship to urban park or water give each district a special character. The pathway on the dam of the natural water cleaning process runs through the urban environment and connects up with the jetty of Porto Canale to the south. The marginal area between the new urban island and the city of Cagliari also provides for various urban activities.

Directly across from the lagoon (*Lungo il Fiume*), we propose a new overflow water system for Cagliari so that water can be collected in times of heavy rainfall to feed the city's fountains and water the plants. This overflow system will be used as an urban park area, and we also propose an extension to the existing commercial industrial area of Cagliari. From Cagliari we propose a new connection to the urban island to link the shoreline of Santa Gilla to the city and further to Capoterra. This second east-west axis starts

in the city and meets the urban environment at the point of intersection with the dam pathway, our first main north-south axis. Here we have a further connection to our new beach area with cafes and restaurants to attract people to the area. This axis strip connects through the urban environment to the new beach area along the shoreline and further along to Capoterra and our new nature reserve.





River overflow

Natural purification system

Grey water urban park

Fresh water pool

Saline

Nature reserve

Beach

Promenade

Overflow water pool



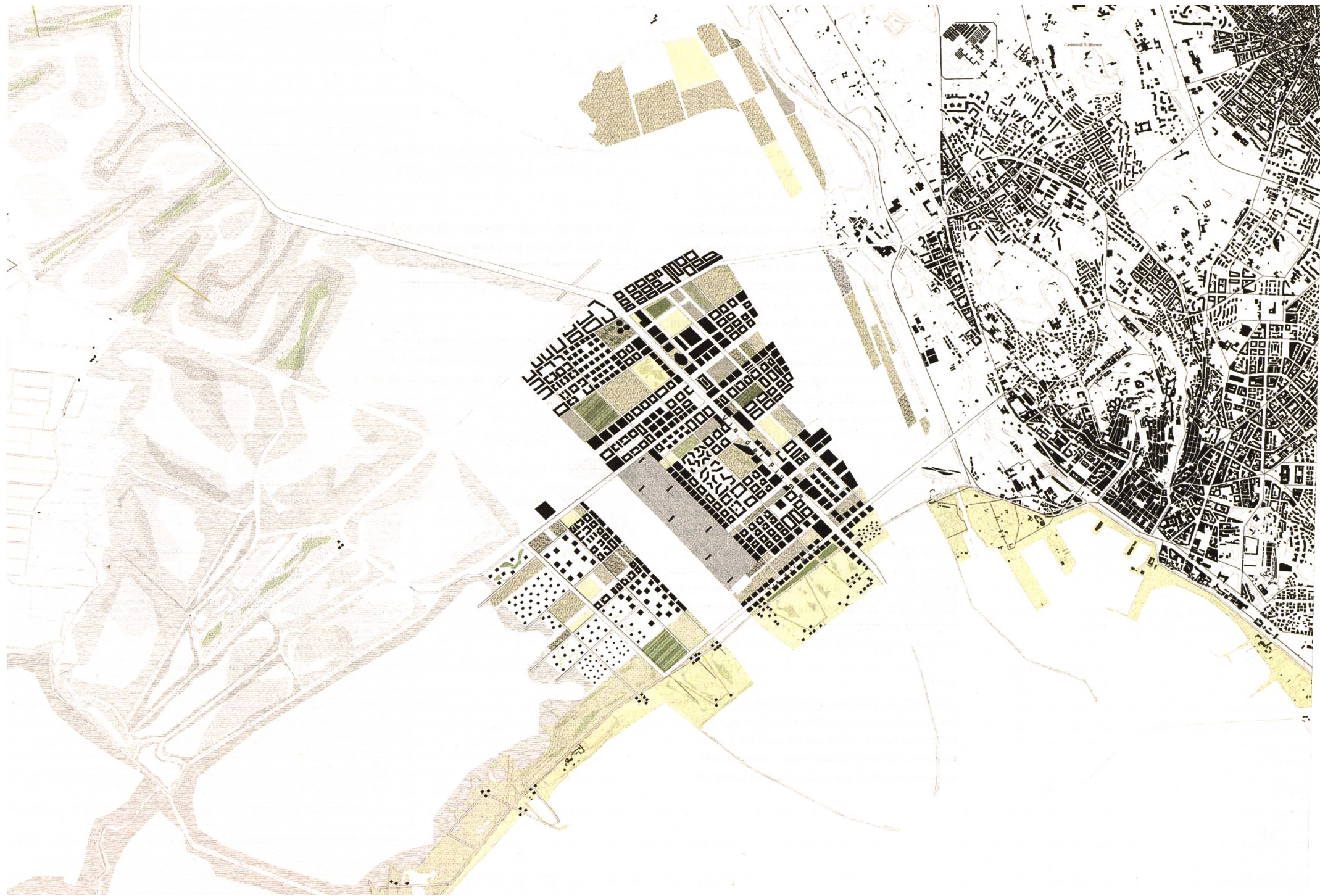
## URBAN STRUCTURE

Two axes intersect on the island, creating an urban center where commercial and cultural buildings are located. The east-west axis connects Cagliari to the shoreline, while the north-south axis prolongs the river dam and is the main artery of the new urban entity, accommodating public, retail and residential buildings.

The canal system brings water to the city from the lagoon and provides access for boats to the Porto Canale and further to the nature reserve. The open voids allow the urban environment to be infiltrated by its environment, lending each district a different character through its relationship to water and the urban park. We aim to enhance the raw character of

the port in the surrounding area, and on the northern coast we plan to create a city directly at the waterfront. We propose a direct relationship between the new urban development and the edge of Cagliari, in which the dense urban structure is contrasted with the urban park situation used to manage overflow waters. On the eastern island, we propose a much lower density of single-family houses leading to the nature reserve.

Detail of the urban structure 1:25 000 ►





## PHASING

### 2010

We reactivate Santa Gilla Bay with a number of smaller interventions in which we attempt to change the way in which the people of Cagliari perceive the bay. Our first intervention occurs beside the industrial port where one of the cranes forming part of the Santa Gilla skyline will be lit up in the evening and made accessible to the public. In the same area, we propose to use the existing conditions and set up a market to encourage people to go to the area. These interventions are intended to encourage urban development on this island. We will also reactivate the shoreline by constructing a new promenade connecting the city of Cagliari to Capoterra through our urban island and by providing facilities such as cafes, restaurants, and other amenities.

### 2015

In this phase we commence restructuring the landscape for the planned natural water purification system, which will also be initiated at the same time. Urban development starts to grow from the intersection line towards the dam system. Having already activated the shoreline in the previous stage, we also create a new walking and cycling network in La Laguna, supplementing existing infrastructure by providing information about the area and allowing people to walk freely around the dams.

### 2020

The water purification system expands and develops towards the urban development, creating a final fresh water pool which can be used for leisure activities. The clean fresh water is subsequently released into the lagoon. The channel system is

built into the urban environment to reactivate the area and allow for further development.

### 2025

The activity of the salt industry declines and we allow fresh water to gradually enter and mix in the salt pools, creating a new nature park that expands on the existing nature reserve.

### 2030

Urban development grows to the north of the urban island, and the island to the west of the Porto Canale develops. The nature park flourishes.



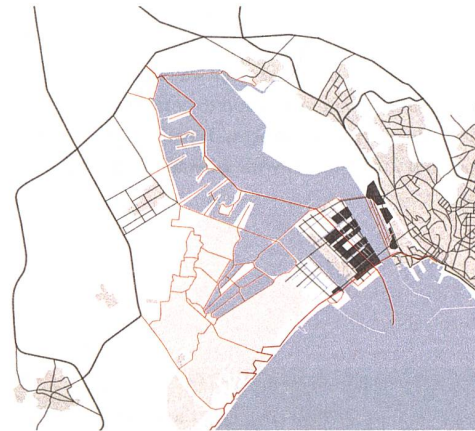
**2010**  
Reactivation interventions



**2015**  
Water purification system commences.  
Small urban district is established.



**2020**  
Water purification system and urban growth develop.



**2025**  
Water system expands to former saline industry.  
Urban growth continues to develop.



**2030**  
Nature park is established.  
Urban growth continues to develop.



SECTIONS – LUNGO IL FIUME

The sections give an overview of the natural water cleaning process and highlight a new relationship between landscape and water that benefits from the clean fresh water.

*Detail A* shows the new nature park. The different water pools at varying degrees of salinity and depth produce a variety of flora and fauna. People will discover the new landscape through an organized network of pathways.

*Section B* emphasizes the potential of outdoor activities taking place in close interaction with the diverse vegetation lining shallow saltwater banks.

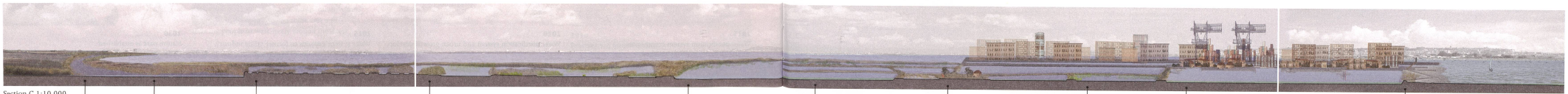
In *section C* the collected river water enters a pool with dense, robust vegetation to continue the meandering cleaning process. It enters a freshwater pool and finally mixes with saltwater in the nature park.



Detail A 1:200



Section B 1:500



Section C 1:10 000

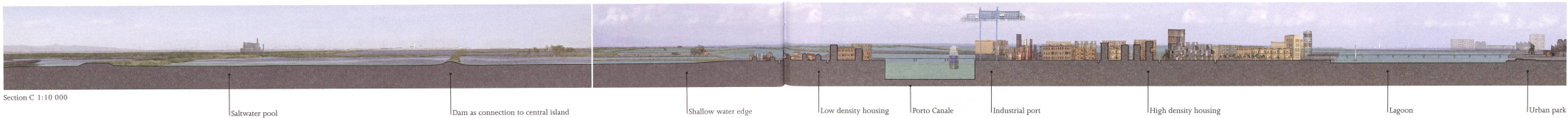
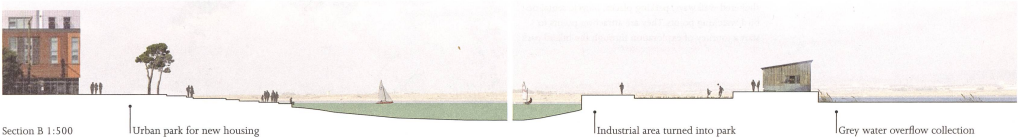
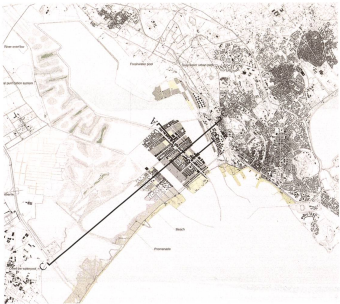
SECTIONS – ATTRAVERSO IL STAGNO

The sections visualize the cross-linking between the nature park, the urban extension and adjacent waters.

In *section A*, water-based living at the lagoon is suggested, profiting from the advantages of owning boats in a leisure harbor and other water activities.

*Section B* shows a public park for the new urban development facing the old city of Cagliari, which moves closer to the lagoon with the converting of the industrial area into public, open spaces for temporary events, spaces which can also be flooded in case of heavy rains.

In *Section C*, a network of paths spans the pools and links the landscape to the island. The urban development of the island increases toward the old city of Cagliari, facing it with a dense skyline. Open spaces and parks cut through housing blocks, allowing the environment to penetrate the island.





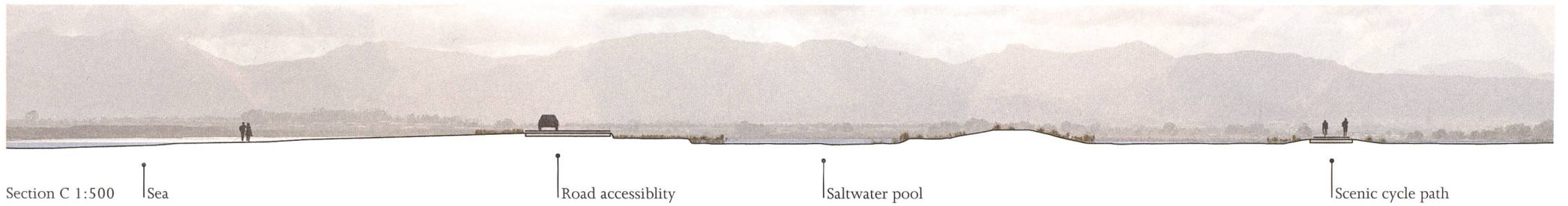
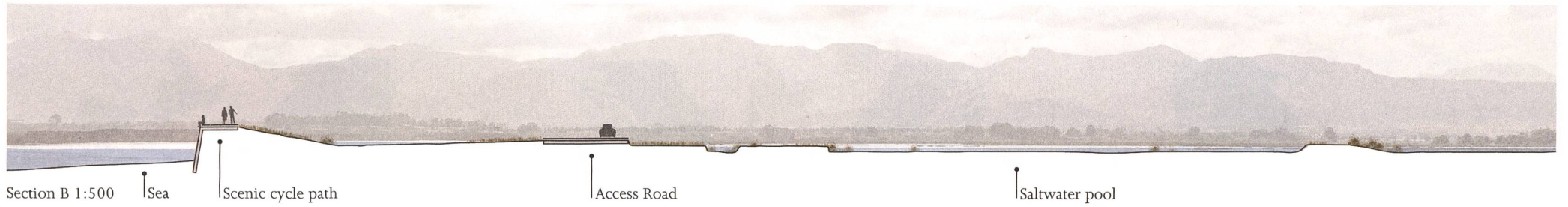
## SECTIONS – LUNGO IL MARE

Cutting through the promenade along the sea, the sections show how this connection, from the city of Cagliari to the new urban development, finally reaches the nature park and serves to revive the traditional, now neglected beach.

In *section A* the pathway provides a base for all evolving activities, providing access to cafés and bars along the beach of the new urban extension.

As shown in *sections B* and *C* the promenade reaching the nature park will host intervention points with sheltered walkways, parking places, bicycle rental or bird watching points. They are attraction points to start a journey of exploration through the inland park.







LAND AND WATER

The diagram shows the relationship of land to water in the existing landscape and in the proposed one, where we intend to use the large area of land on the island of the Porto Canale for urban development. We also intend to incorporate the existing dam structure in our proposal.



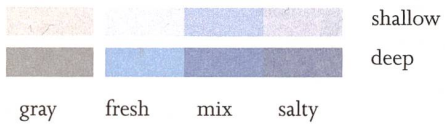
Existing land and water



Proposed land and water

## WATER SYSTEM

The existing water system diagram shows the domination of salt water in the area. The proposed water system shows the wide water palette that is introduced, with various water types: fresh, salt, mixed water and grey water.



Existing water system



Proposed water system





PROGRAM

In the existing program, industry clearly dominates the monofunctional uses in the bay. The situation will change through the expansion of the nature park and urban extension, which will initiate mixed uses.



Existing program



Proposed program

# CIRCULATION

In the current situation, the bay is divided by a motorway mainly for through traffic. We propose diverting this traffic and restricting the bay to local access.







## IMPRESSIONS



Traditional beach of Cagliari reactivated





Natural water cleaning process





Urban park at the lagoon shore for new housing





Nature park with saltwater and freshwater pools

## CONCLUSION

by Christophe Girod

Over the last four years the Institute of Landscape Architecture at the ETH Zurich has developed a precise topological design methodology applied to large-scale sites across the alpine territory. Seasonal floods due to climate change have seriously disrupted the summer activities of certain alpine regions, causing important material damage and endangering the population. Landscape topology has become a tool of environmental design, not only for the precise regulation of water flow across urbanized areas, but also to draw and qualify new limits to urban growth. The success of this method also lies in the precise reading of broader structures and systems that exist within the landscape and in the positive orchestration of these elements. We believe that a contemporary approach to landscape architecture must necessarily address this large scale of design, a scale situated between that of object design and regional planning. The areas corresponding to this scale range from several hundred to several thousand hectares. It actually fixes the limits of a comprehensive approach to an area. At the large scale the landscape can be looked at systematically and understood as a whole. We believe that it is precisely this scale and only this scale that will yield answers in matters of sustainable design in the future.

The main landscape structure of the Santa Gilla site follows three important principles: the first is to remodel vast areas of the lagoon, riverfront and beach to enable the natural purification of runoff water and river water, the second is to insure a new infrastructure of roads, canals and paths that would enable the uninterrupted flow of slow and pedestrian traffic across the site in all major directions, and the third is to attribute a new urban function

to the Porto Canale area as a green energy-efficient water-based city. The thorough conceptual outcome is able to transcend levels of design resolution from the 1/10,000 scale down to the 1/100 scale. The high precision of the CNC milled model shows quite realistically a beautiful landscape partition for the site resembling the wing of a butterfly. Although actual variations in height levels on the lagoon remain extremely minimal, the strength of the proposal lies precisely in the precision of the instruments and the adequacy of the response to intrinsic site conditions. Could it be that landscape architecture in the future will become a measured expression and response to given site conditions? Landscape architecture in this particular context answers the most pressing problems of the site both culturally and systemically. It can become the larger canvas of countless other interventions and works much more convincingly at the large territorial scale than as a smaller fragment.

It would be mistaken to believe that a single semester landscape design studio at the ETH could solve all the planning problems of a site as complex as the Santa Gilla Lagoon in Cagliari; but the precision and seriousness of this student proposal opens the debate amongst decision makers, planners, and engineers about the urgent necessity of such an integrated large-scale approach to the landscape architecture of a region. It shows us that by implementing tools of precision and a common computer language between disciplines, preliminary concepts can be developed that are then easily transferred to the fields of engineering, hydraulics, as well as urban and environmental planning. Restoring the primacy of large-scale landscape architecture is the fundamen-

tal premise of such a studio. The work that we have started at Cagliari has only just begun, and despite the recurrent cataclysms that happen there, it will probably take time for such an integrated approach to materialize into an invaluable project for the region. But one thing is certain, after showing to the public the extraordinary potential of such a comprehensive approach for the Santa Gilla Lagoon, it will be difficult for authorities to continue to ignore the question of environmental value and coherence for the lagoon.

This method of advanced topological design and modeling was developed five years ago at the ETH and the Santa Gilla experiment is the first attempt to apply the methodology outside an alpine context. It has clearly shown that the method of large-scale landscape architectural design is also transferable to the coastal areas of the globe, where the interface between saline waters and sweet waters will become a growing problem in years to come. The positive reception that the students received from architects, politicians, and engineers alike means that our approach was eminently transdisciplinary and understandable for all related fields of building, engineering, and design. It is our hope that the younger generation of designers that we have now trained at the ETH and in other schools will be able to engage actively in such vital scales of territorial design, thus ensuring a strong response to the future challenges facing landscape architecture.





CNC model  
of the project proposal

