

RESEARCH BY DESIGN: EXPLORING RESILIENCE

TEST SITE: OSUMI ISLAND IN BERAT, ALBANIA

PROJECT REPORT

DYNAMIC RESILIENCE

A Symbiotic Relationship between Nature and City



TEAM:



SITE
SPATIAL PROGRAM
OSUMI RIVER
OSUMI ISLAND

VISION
STRATEGIC OBJECTIVES

DESIGN CONCEPT:
LANDSCAPE FROM ABOVE
1001 WINDOWS FRAMING THE LANDSCAPE
LINKING ISLANDS
DYNAMIC EDGES
BERAT ISLAND
A REFUGE FOR BIODIVERSITY
FUNCTIONAL ASPECTS
MANAGING RESILIENCE
THE RISE AND FALL OF THE RIVER

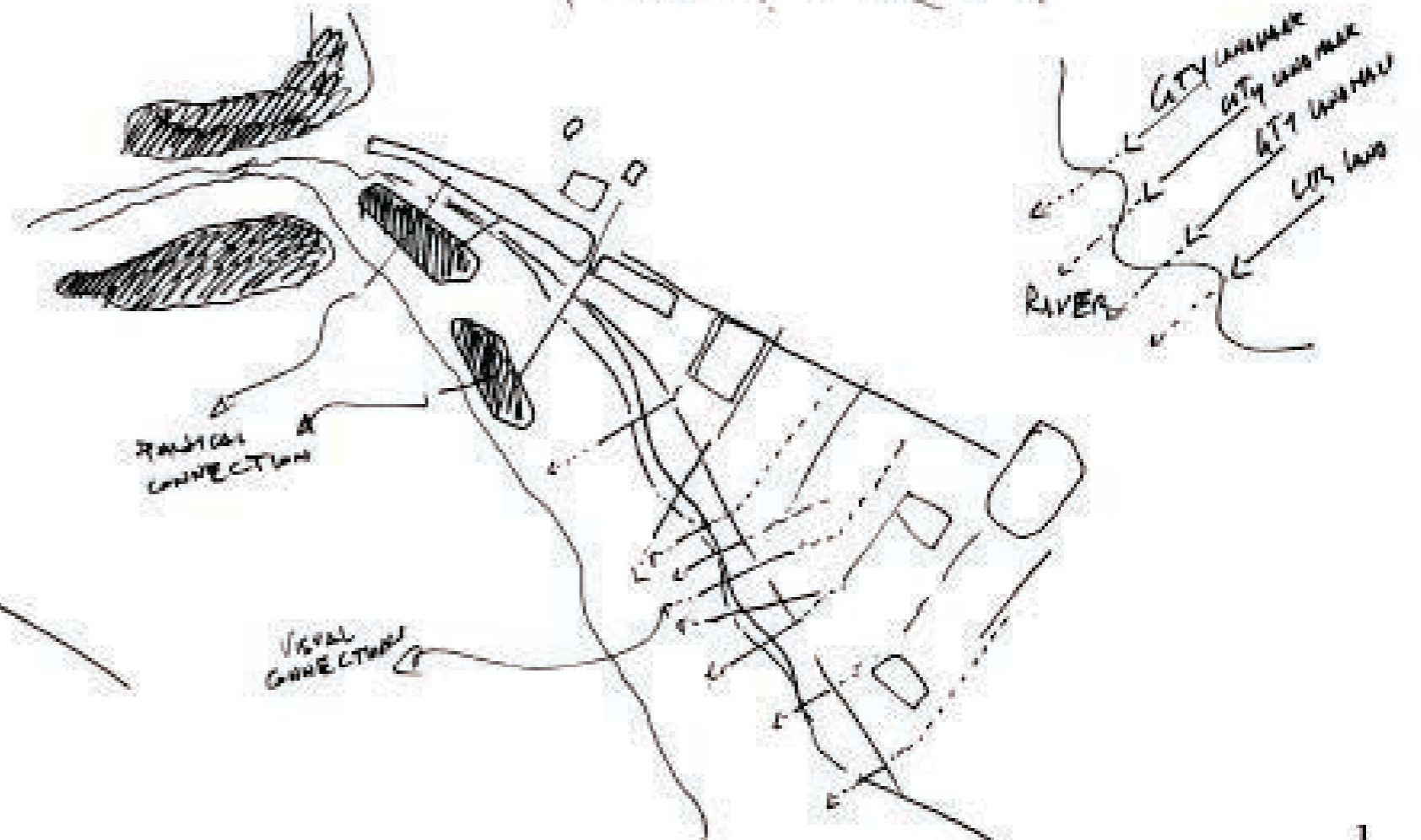
METHODS AND INSTRUMENTS
ACTION PLAN
COSTS ESTIMATE

PROJECT PANELS

SPATIAL PROGRAM

In terms of urban morphology the city of Berat presents itself as an aggregation of smaller nuclei which are a result of the progressive addition of neighborhood and the different expansion patterns influenced by the succession of conquerors over history. Despite this the city presents a balanced coexistence between different ethnicities and religious groups.

The primary urban roads run along the two opposite banks of the river, but they also delimit the latter and therefore become an additional obstacle to the connection between two sides of the city and the neighborhoods of Mangalem and Gorka. These roads seem two independent arteries that only meet in two points – one is a pedestrian bridge and the other accessible also to vehicles – this causes the river to appear as an independent element excluded from the life of the city. On the other hand the secondary roads, rigid and linear with a roman layout, appear as ramifications that are projected beyond the city and into the farmland, the surrounding nature and the sinuous hills.



TWO OPPOSING FORCES: THEIR TENSION GENERATES BALANCE

SITE

OSUMI RIVER

The hydrographical territory of Albania is approximately 44,000 km². The average altitude of this territory is over 700 m above the sea level making Rivers the most important freshwater resource. They find multiple uses in agriculture, industry, transportation, aquaculture, public water supply etc. (Ravindra et.al, 2003).

With a spread of 161 km, a watershed area of 2150 km² and its geographical position, the Osum River has an important impact on local agriculture. The River has been used for irrigation purposes since the first settlements and has been a great part of agricultural and environmental strategies not only for the city of Berat but for the rest of the Country as well.

OSUMI ISLAND

In the images taken from Google Earth showing Osum's behavior during rise and fall of river water for the last 11 years - starting from January 2003 until March 2014 - the two islands that remain untouched (or barely modified) through the decade appear as a significant land formation. This islands have become a natural icon for the locals which during summer months use them for sun bathing or simply for exploring the wildlife they house.

The native vegetation mass characterized by low grasses and high shrubs on top of this islands is also untouched and well adapted to this environmental conditions. As it is shown by the aerial images through the years the vegetation has grown in mass and age making the top of the island compact and resilient to the River's force. However this is a battle that cannot last for long as the island banks need protection in order to maintain a balanced vegetation, biodiversity and land mass.



01/19/2003



07/25/2004



11/13/2005



06/15/2007



07/30/2013



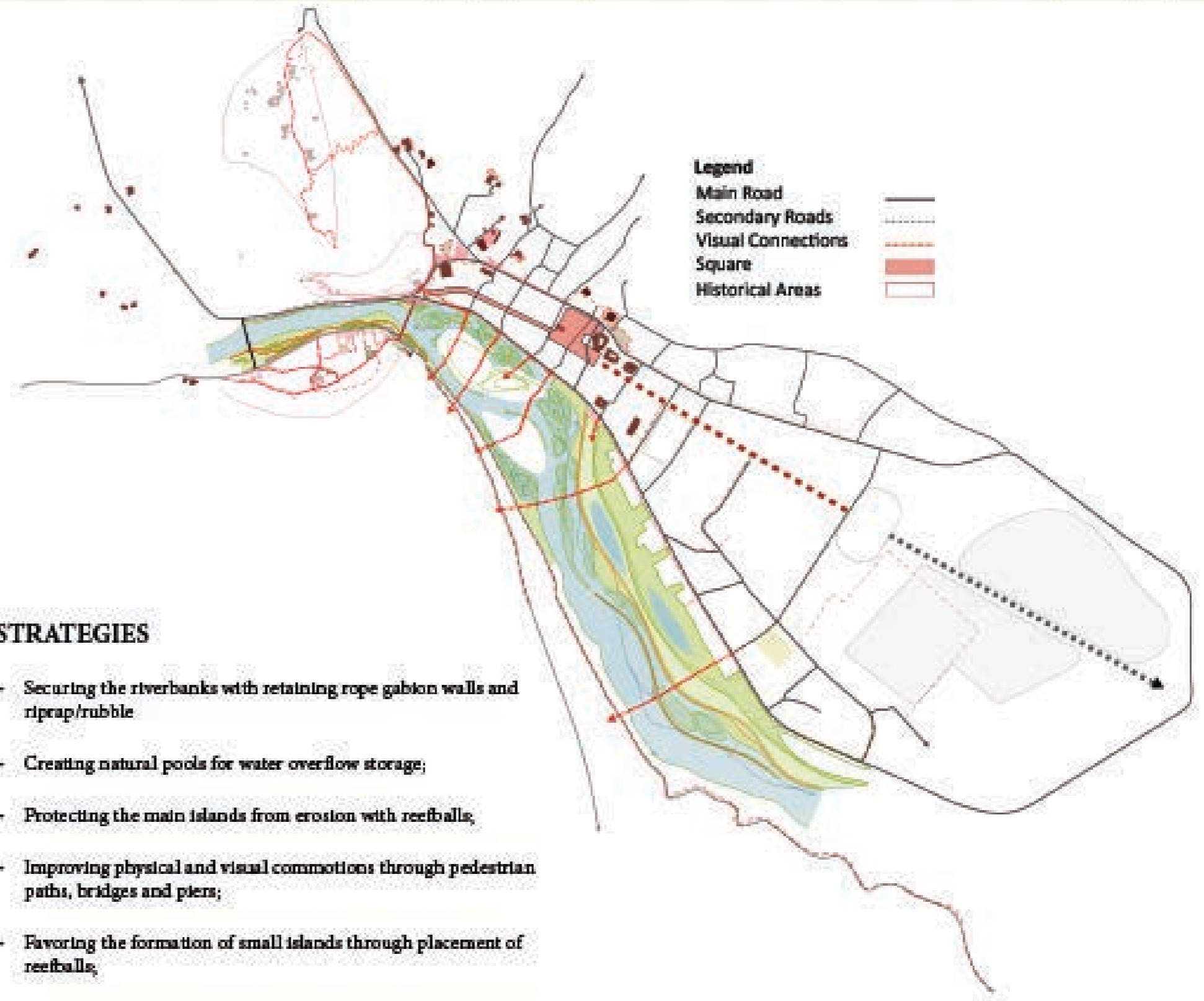
07/03/2014

STRATEGIC OBJECTIVES

The main goal of the project is to promote local development conditions through light and low impact landscape and programmatic operations on the riverbanks and the islands, while preserving the specificity of the territory and guaranteeing the city's resilience to flooding in the years to come. All the above can be achieved through the application of ecologically sustainable development models.

In synthesis the main objectives set by the project are the following:

- **STRENGTHENING THE CONNECTIONS**
Connecting the Osum Island to the city network, improving the connections between the riverbanks and the main areas of the city.
- **ENRICHING THE VALUE OF NATURAL, CULTURAL AND ENVIRONMENTAL ASSETS**
along the river with the aim of boosting and regenerating tourism throughout the year, offering to both citizens and tourists new spaces for outdoor leisure and recreational activities.
- **PROTECTING AND IMPROVING THE ENVIRONMENT AND PREVENTING ECOLOGICAL DEGRADATION**
through preventive actions, management and reorganization of degraded and abandoned areas.
- **GUARANTEEING THE RESILIENCE**
of the river and its islands.
- **FAVORING BIODIVERSITY**
and the presence of areas suitable for the growth of autochthonous plant and animal species.



STRATEGIES

- Securing the riverbanks with retaining rope gabion walls and riprap/rubble
- Creating natural pools for water overflow storage;
- Protecting the main islands from erosion with reefballs;
- Improving physical and visual connections through pedestrian paths, bridges and piers;
- Favoring the formation of small islands through placement of reefballs;
- Reintroducing and strengthening riparian vegetation and fauna (birds, insects, fish);
- Creating spaces for recreational and leisure activities along the paths and on the islands.

LANDSCAPE FROM ABOVE

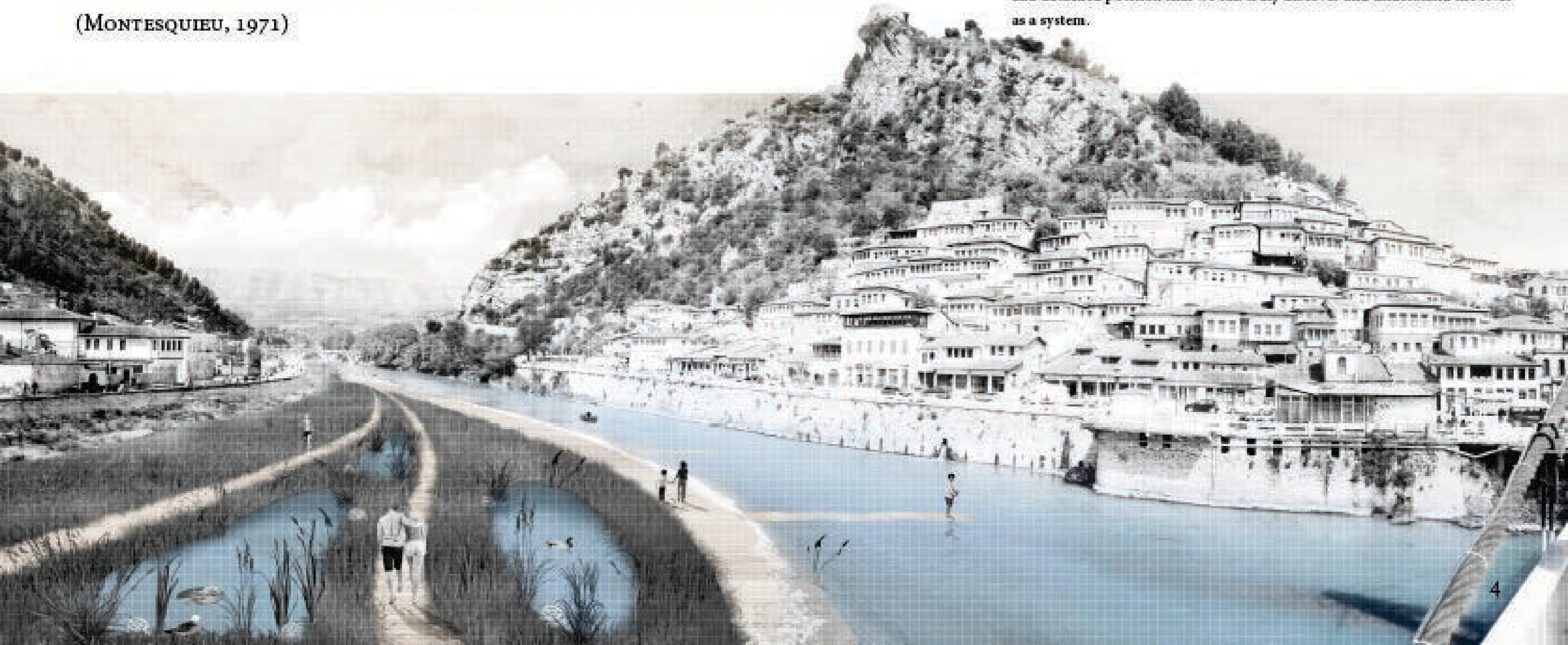
THE RIVER AS A SYSTEM

"When I arrive in a city, I climb the highest steeple or tower to have a view of the whole before seeing the individual parts, and when I leave I do the same in order to fix my ideas."

(MONTESQUIEU, 1971)

In the eighteenth and nineteenth century aesthetic culture of the western world the observation from an elevated point of view was mandatory if one wanted to evaluate the size or proportions of buildings and capture and combine the "presumed whole and the experienced detail" (Mending, 2011) at once. But even today, when the image of the city does not match with its monuments any more, the power of unlimited outlook from above is recasting the image of landscape from *green scenery beheld vertically to a flatbed infrastructure that includes both natural and urban environments* (Waldheim, 1999).

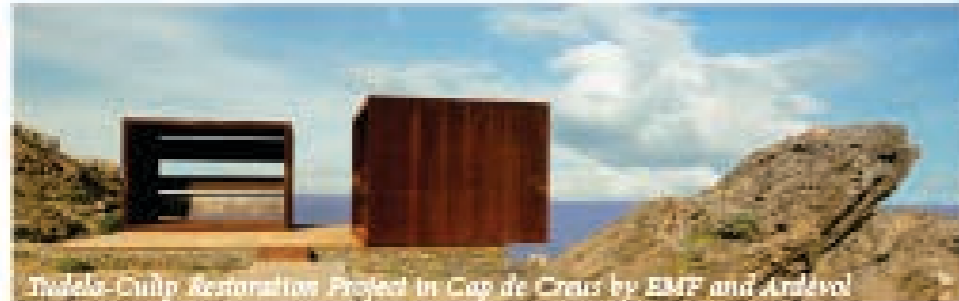
Any visit to Berat cannot transcend a climb up to the ancient Kala settlement where our gaze can embrace the river in its entirety. It is from this privileged and detached position that we can truly discover and understand the river as a system.



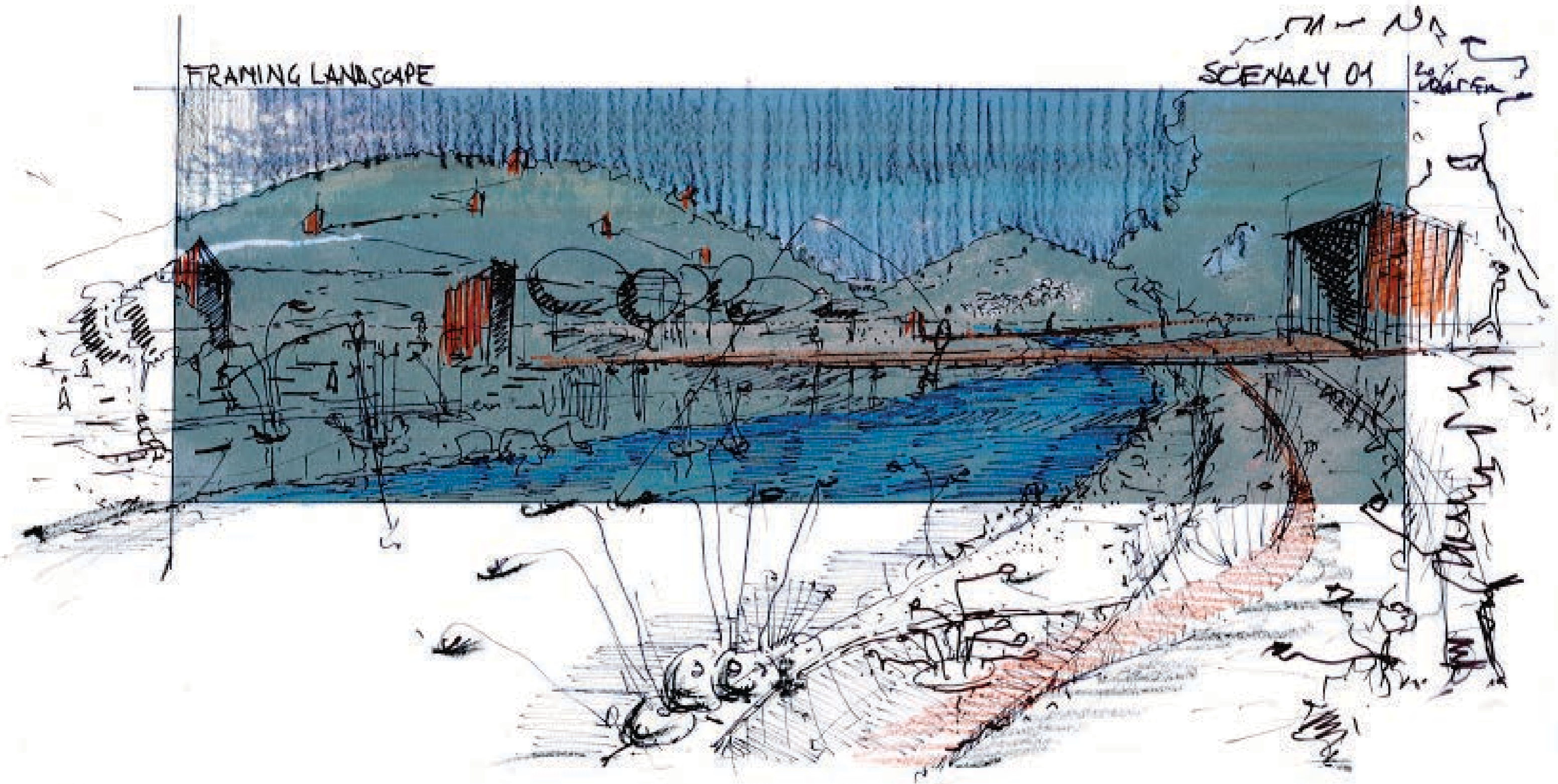
VISION

1001 WINDOWS FRAMING THE LANDSCAPE

Berat is known as the city of a 1000 windows, the windows of the Gorica and Mangalem neighborhoods look at each other across the river as if they were mirrors; windows offer the possibility to select a portion of the territory and frame the landscape. Similarly we can relate the island with the surrounding context and vice versa, through sculptural objects in the landscape and on the island that frame the context and project the view across the river and beyond, along the paths on and up to the top of the hills: the city can now be seen from new points of view and the existing views can be privileged and strengthened.



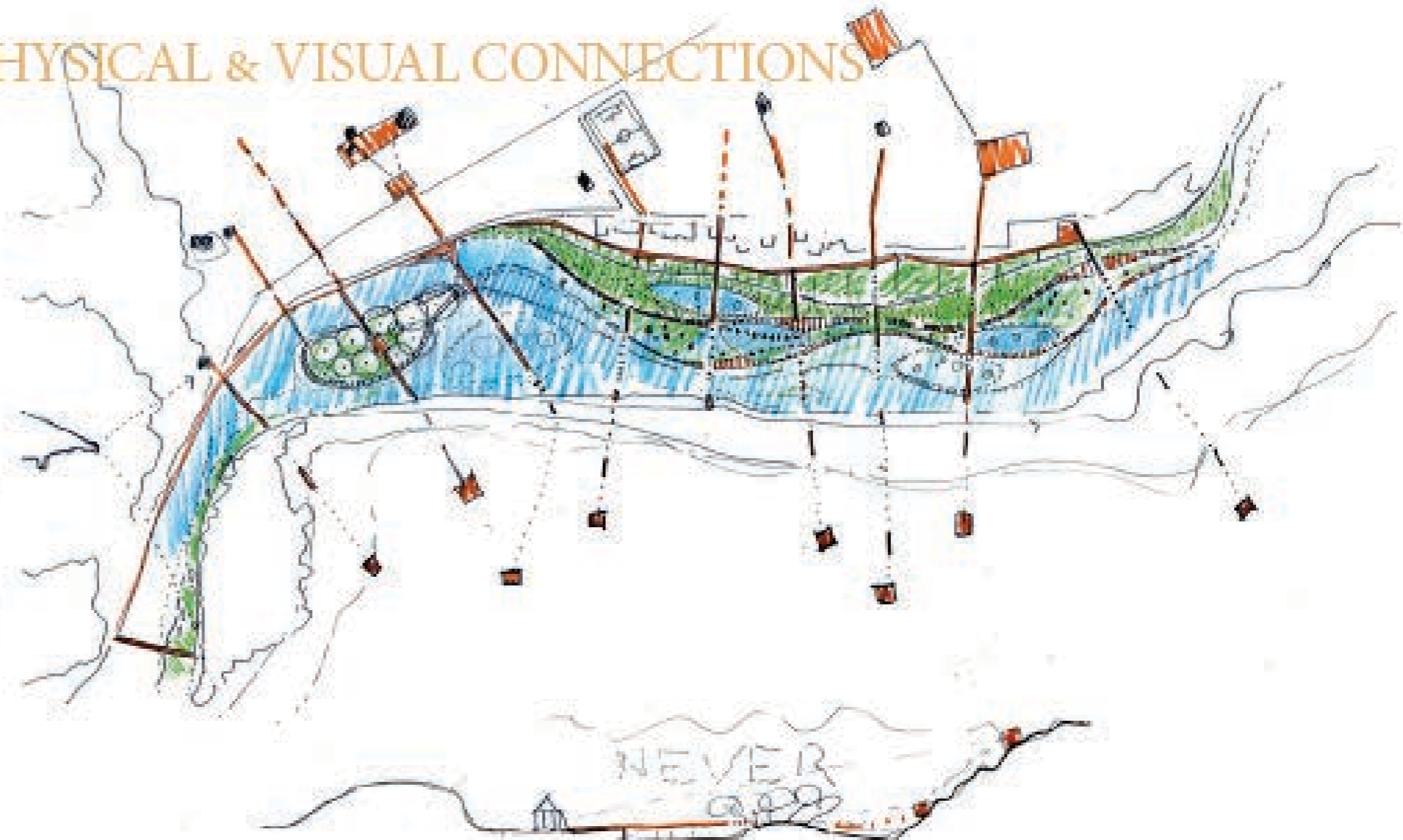
1001 WINDOWS FRAMING THE LANDSCAPE



LINKING ISLANDS WITH PHYSICAL & VISUAL CONNECTIONS

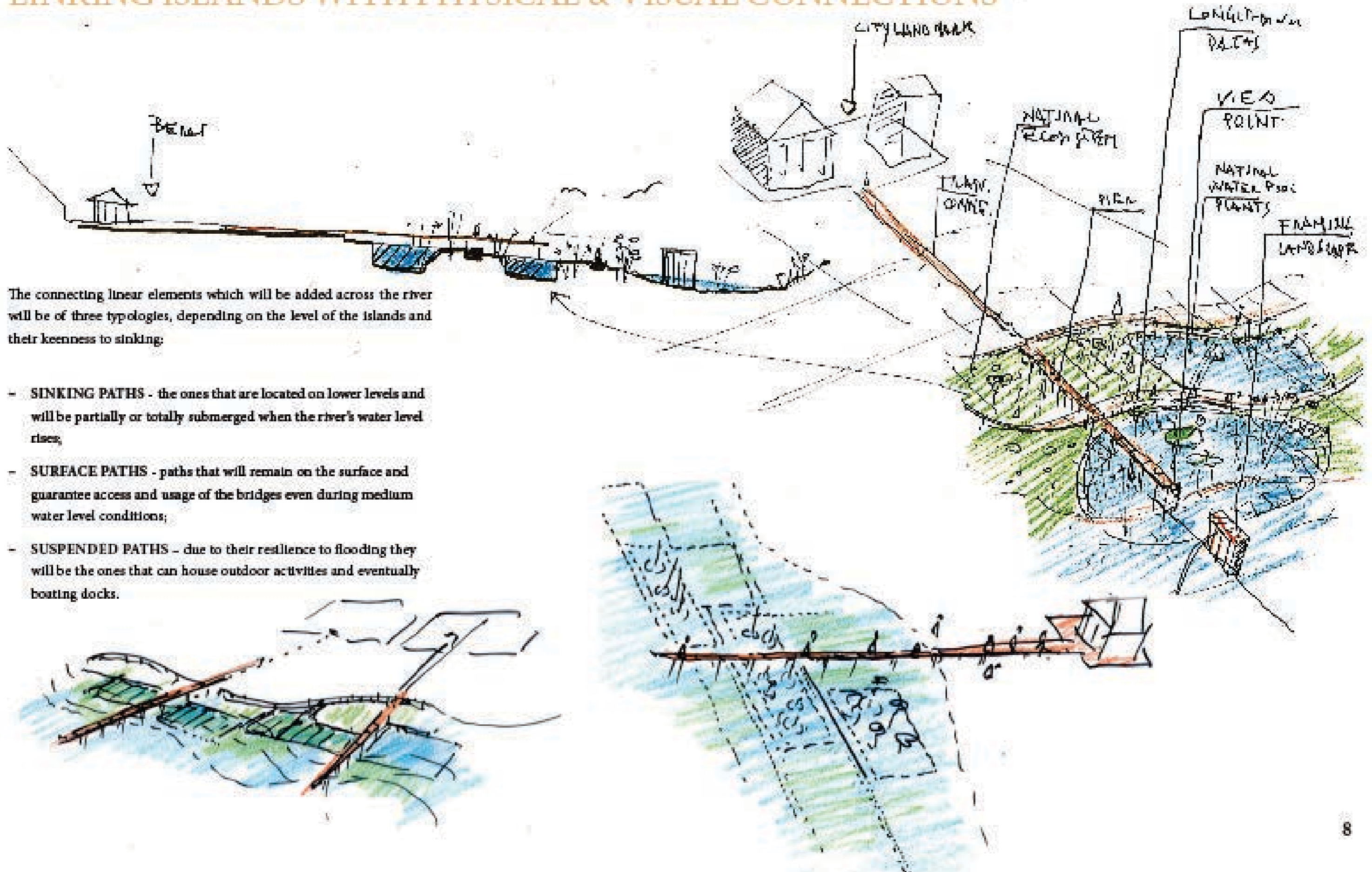
The city's urban polycentric morphology generated by the urban evolution through history and reinforced by the influence of the Ottoman urban structure, appears as a set of nuclear agglomerations on both sides of the river: Kala, Mangalem, Gorka, the expansion in the direction of the old bazar and the Murad Celest suburb to the NW on the foothill, are like islands linked by bridges across the river. In order to create an integrated system of relations the project proposes to highlight the existing paths towards buildings with cultural, social, artistic, religious and historical relevance connecting them to the riverside and the islands through paths and touristic, cultural and environmental itineraries. This will make the existing cultural values emerge and it will integrate them and the new leisure and recreational activities on the islands into a rich network of relations.

One of the project strategies foresees the inclusion of the island and the riverside paths in the pedestrian circulation system of the city. The paths along the river's waterfront will be regenerated and extended where needed to form a continuous promenade along the river, the latter will be crossed by pedestrian bridges that connect the north riverbank to the main islands. When the physical connections are impeded by the level of the island and the partial or total sinking of the paths, the physical connection will be absent, but a visual connection will be established through panoramic cantilevered decks and land art sculptures that frame the landscape and project the view toward the surrounding territory.



Waterfront Park of Atyl River by BLVD

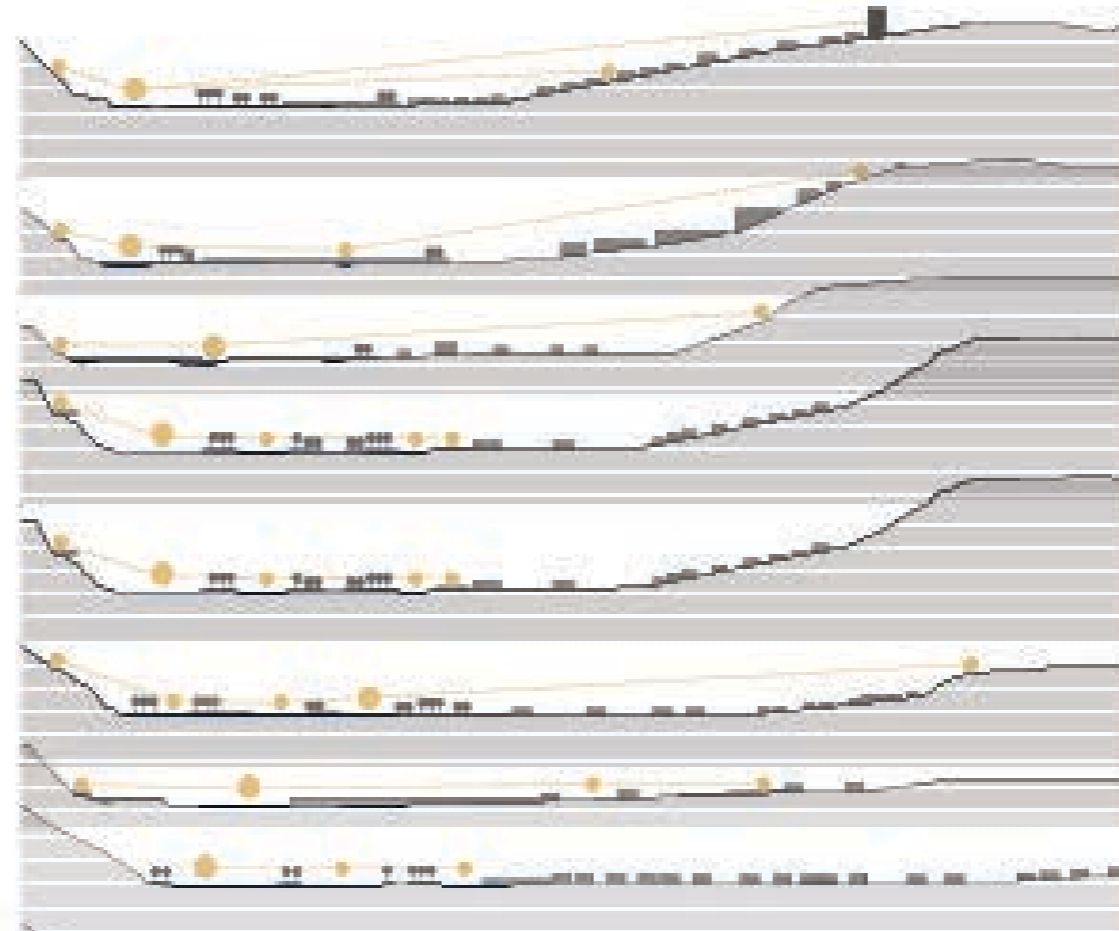
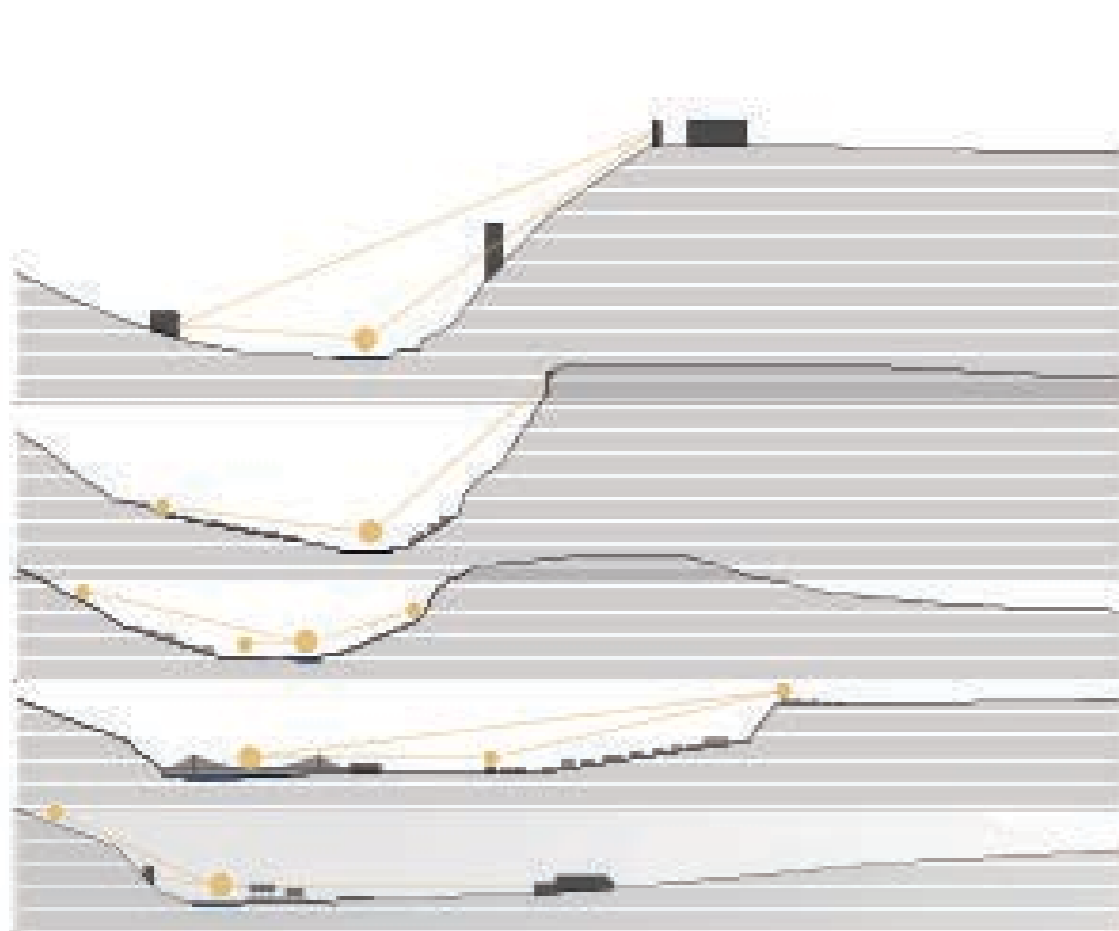
LINKING ISLANDS WITH PHYSICAL & VISUAL CONNECTIONS



The connecting linear elements which will be added across the river will be of three typologies, depending on the level of the islands and their keenness to sinking:

- **SINKING PATHS** - the ones that are located on lower levels and will be partially or totally submerged when the river's water level rises;
- **SURFACE PATHS** - paths that will remain on the surface and guarantee access and usage of the bridges even during medium water level conditions;
- **SUSPENDED PATHS** - due to their resilience to flooding they will be the ones that can house outdoor activities and eventually boating docks.

LINKING ISLANDS WITH PHYSICAL & VISUAL CONNECTIONS



PROGRESSIVE LANDSCAPE PROFILES

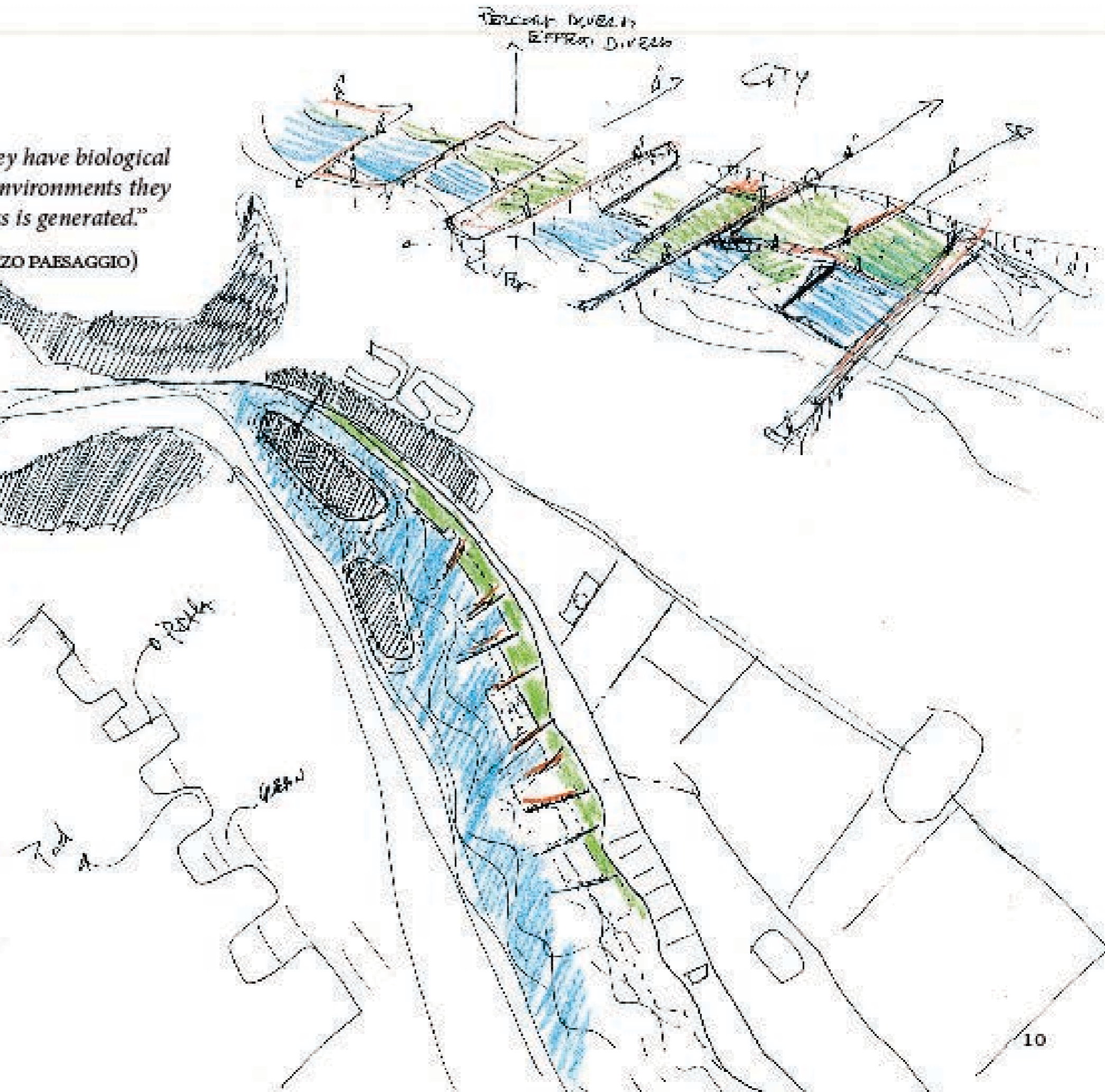


DYNAMIC EDGES

"Limits have a thickness, they are not lines, they have biological thicknesses and the latter are richer than the environments they separate. When different areas meet richness is generated."

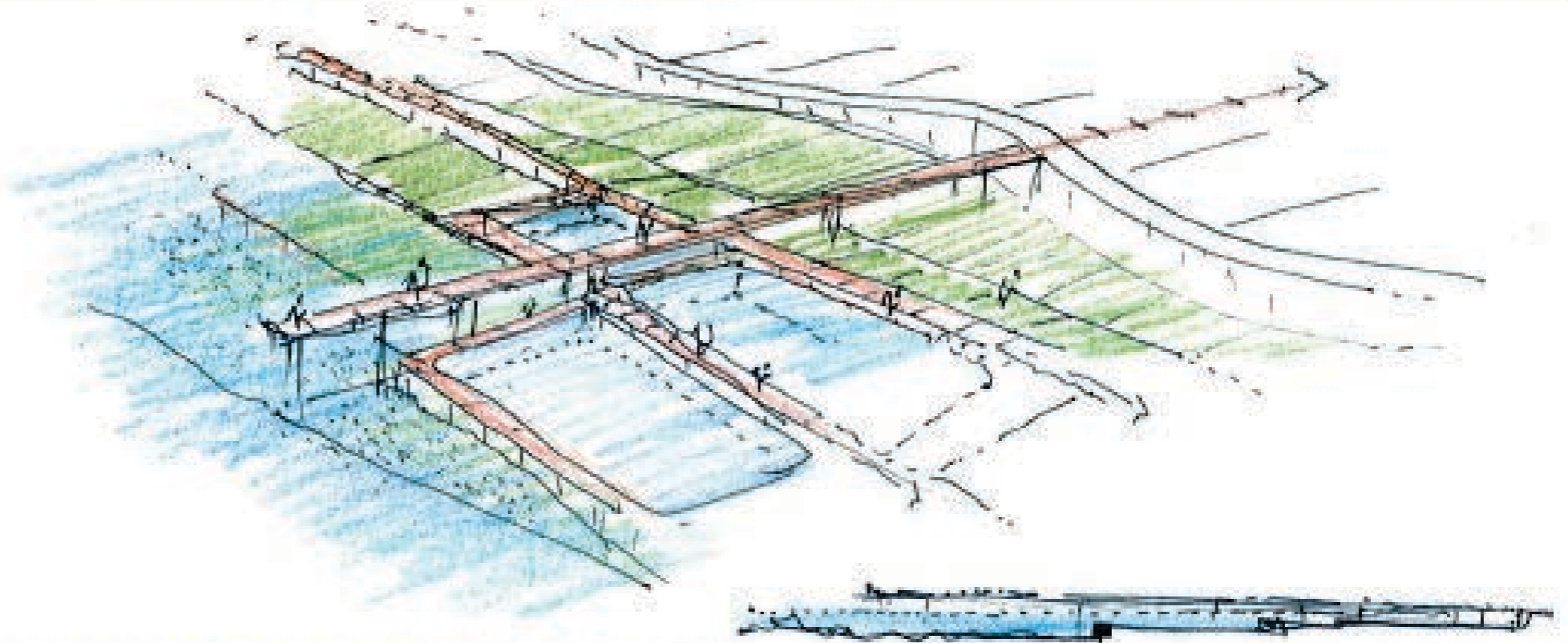
(GILLES CLÉMENT, 2005 - MANIFESTO DEL TERZO PAESAGGIO)

The project seeks for ways where urban can cohabit with nature and be resilient towards any natural phenomenon. One of the strategies applied is extending the concept of buffer area to the entire river system and transforming the riverside of the limit between city and river into a thick biological system that establishes a dynamic relationship with the water, balancing the shifting levels of water and offering at the same time recreation space and, most of all, an opportunity for biodiversity consolidation and preservation. Therefore the strategy adopted for the edges of the river is the creation of an artificial wetland and water overflow storage pools, the latter act as bladders that during periods of high tide store the overflow water and protect the waterfront from flooding and during periods characterized by low water levels become outdoor pools and complement the urban beach areas.



DYNAMIC EDGES

Moreover in the far East area of the north river bank this new dynamic limit will offer the possibility to deal with the informal settlement along the river, in fact the above mentioned strategy will regenerate the area (through paths and vegetation) and strengthen the resilience of the river banks (through retaining rope gabion walls with integrated pedestrian path, overflow storage pools and vegetation), guiding the future development of the area.



BERAT ISLAND

Berat island is not a static element in the landscape, its shape and vegetation cover changes following the season and the level of the water; each mutation generates a different scenario.

Similarly the landscape project and the new functions respond to this shifting condition, pandering the constant evolution of the island and managing, not guiding, its mutation in terms of vegetation and shape; but also offering suitable outdoor activities and services based on the accessibilities of the area in different seasons.

Ultimately the project elevates and underlines conceptually the main islands and suggests the formation of new smaller islands in the future through the introduction of reefballs along specific locations of the riverbed.



Surrounded Islands, Christo and Jeanne-Claude Biscayne Bay, Greater Miami, Florida, 1980-83



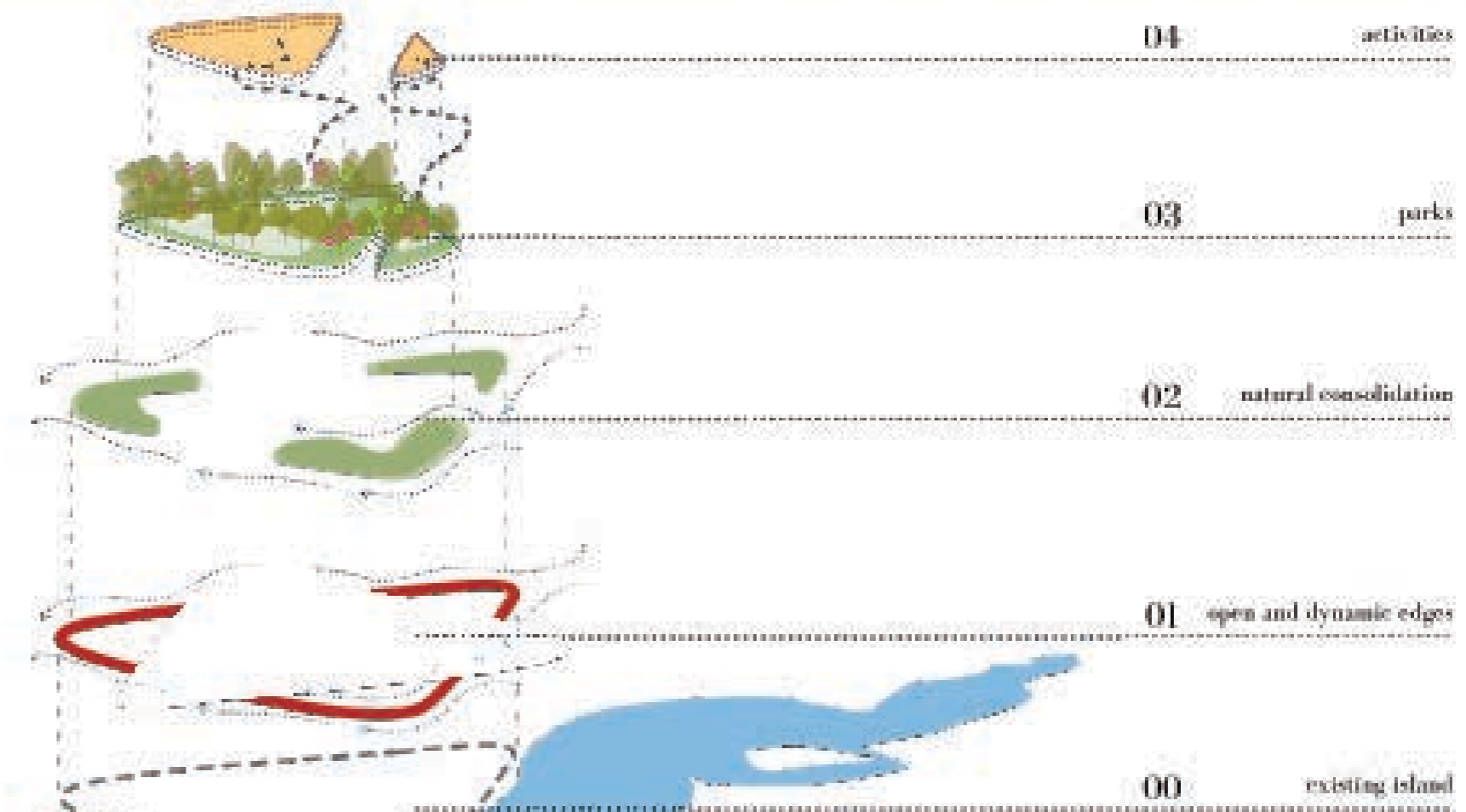
"The lark's wing ringed in the blue of gold meets the heart of the poppy asleep on the field studded with diamonds", Joan Miró 1967



Iceland, 2012 © Olafur Eliasson Courtesy of Olafur Eliasson and Tanya



Derbornae Island - Parc Henri Matisse, Lille, Gilles Clément



A REFUGE FOR BIODIVERSITY

BIRDS & VEGETATION

There is little doubt that Berat's biodiversity is declining, but for most taxa trends are difficult to quantify due to lack of data. However, birds are better studied than any other group of organism, and thus are well placed to provide us with information on the overall health of our environment. Birds are a good bio-indicators because they occupy a high trophic level, occur in a wide range of ecosystems, their taxonomy and identification is well known, their territorial behavior (songs and displays) allow them to be censused readily during the breeding season, it is possible to collect large quantities of data in a highly efficient manner using skilled volunteers.

In order to use the birds as an indicator first we have to restore their habitat, therefore the project proposes native vegetation such as grasses, shrubs and small trees to be planted on the river's edge.

Existing Bird Species

Alcedo atthis
Coracias garrulus
 Eurasian skylar

Grasses

Cyperaceae
 Sphagnum
Chrysopogon zizanioides (Best cost-effective solution for river banks protection from erosion- non-native but it has settled in Osurns river banks for centuries. It is not invasive and can easily be controlled by cultivation of the soil at the boundary of the hedge)
 Typha
Eleusine indica (low carpet forming)

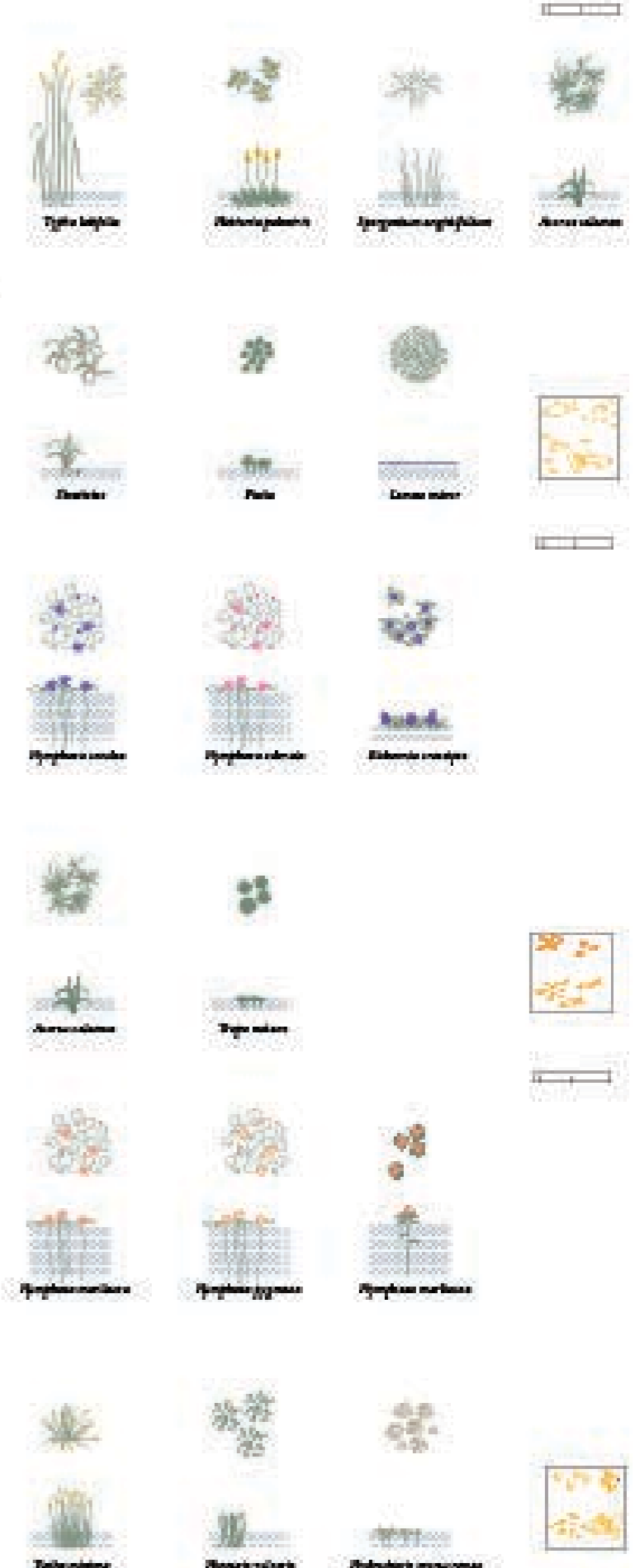
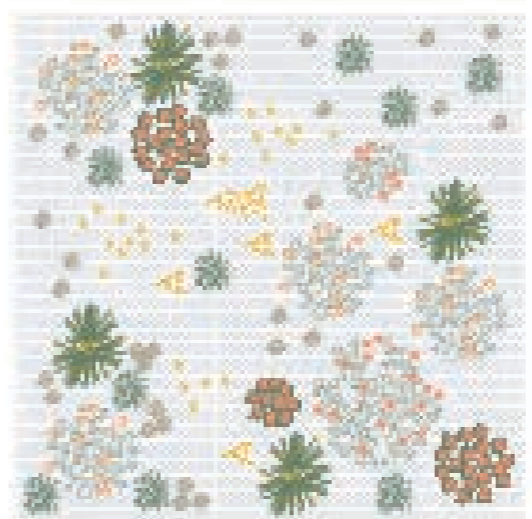
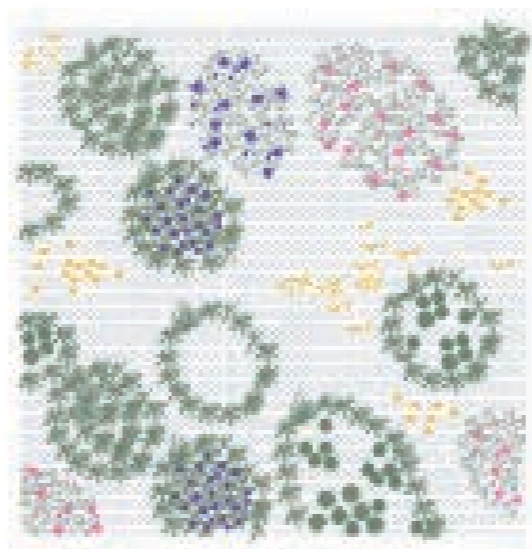
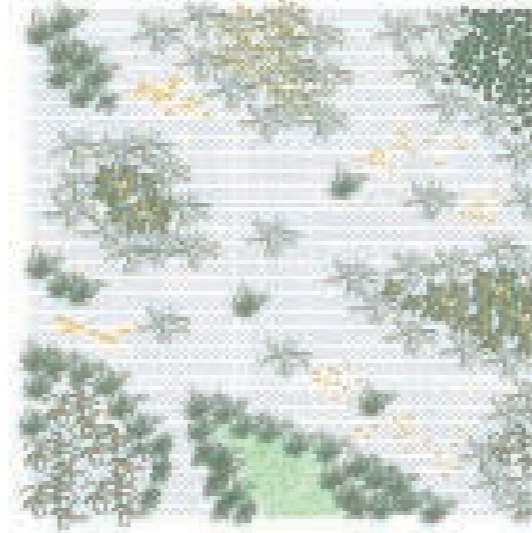
Shrubs

Compositae
 Erythroxylaceae
 Euphorbiaceae
 Myrtaceae

Trees

Prunus maritima
 Fabaceae
 Mimosaceae
Cassia grandis

ACQUATIC PLANTS



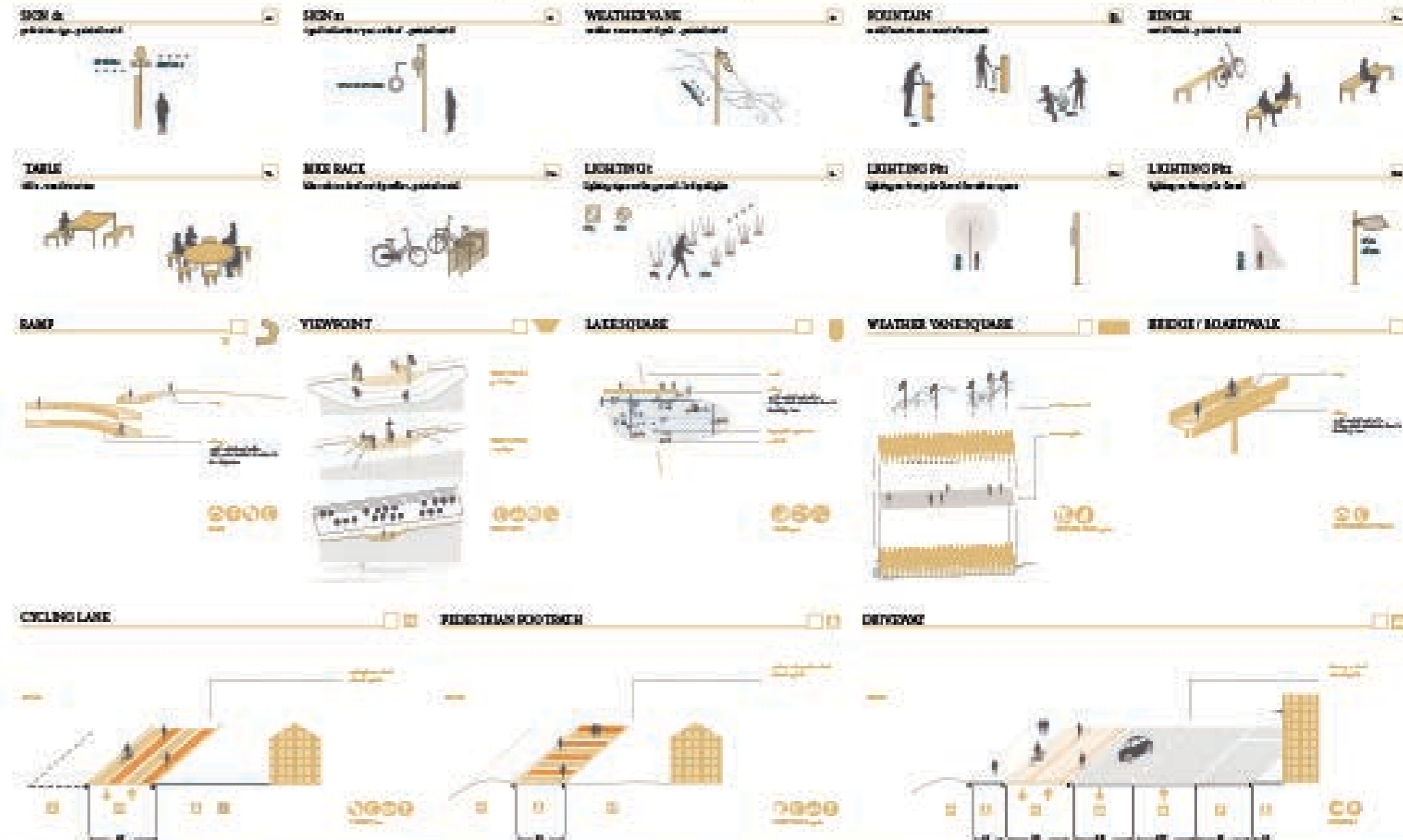
FUNCTIONAL ASPECTS

Berat has 32,606 Inhabitants (2011 census results) and one of the project's main strategies aims at introducing new leisure and recreation activities along the river and on the islands to attract a higher number of tourists, increasing and diversifying the attractions, which will also contribute to the economic growth and regeneration of the surrounding districts.

The programmatic approach is centered on the establishment of a cultural waterfront development and eventually converting at a later stage one of the hotels along the riparian landscape into a visitor center. The river waterfront area and the island will be entirely walkable and cycle-friendly, guaranteeing a healthy and safe environment for all age groups.

A new way to live the riverside -tourist attractions, cultural and recreational activities for tourists and locals.

The design approach is to integrate engineering and art whilst being sympathetic with the local environment and preserving the landscape and the natural aspect of the islands. The plan is to merge the river and land by providing light support facilities (small boating decks, small kiosks, barbecue areas, linear playgrounds for children on the suspended paths) for activities such as boating, fishing and nature walking, pick nicks and light sport and leisure activities. This should complement the already existing sports and leisure activities which characterize the SE area of the city Centre. Thanks to the diversification of the activities and their extension to all seasons the river and the island will no longer be just for walking and contemplating the landscape during spring, but also for swimming and sun bathing in summer (urban beaches), for bringing the children to the playground and for organizing outdoor educational activities all year.



Kaivedal Waves, JDS Architects - Copenhagen

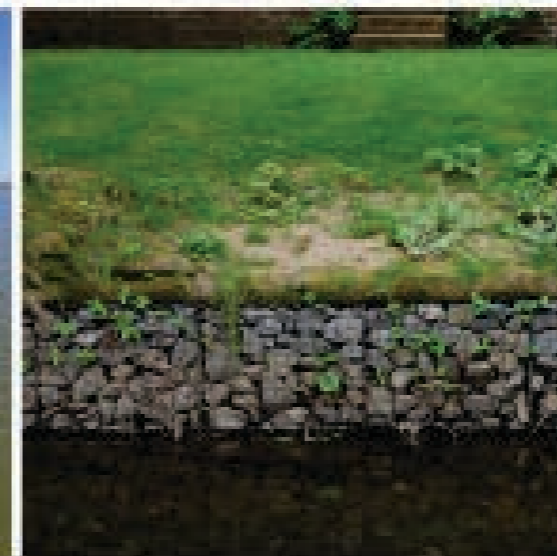
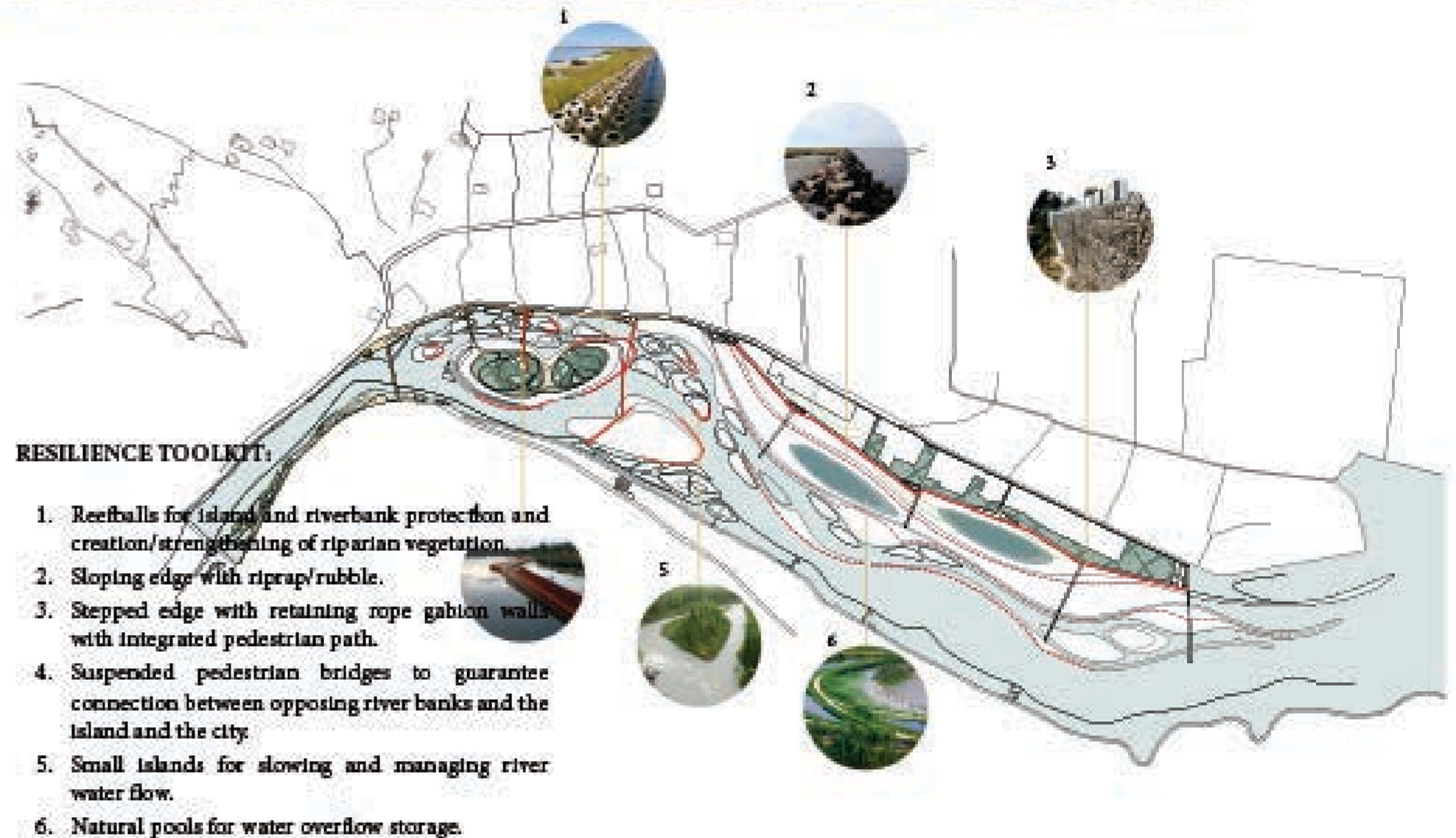
MANAGING RESILIENCE - TOOLKIT FOR THE RISE AND FALL OF THE RIVER

The main strategy to address the issue of resilience to flooding is to refrain from trying to fix a predetermined shape and acknowledge that the very inconstancy/fickleness of biological systems can become the guarantee of resilience to time. The approach is to manage the perpetual mutation of nature, to orient its variation, not guide the latter and predetermine or limit the natural and dynamic movement and modification of nature.

This attitude was inspired by the concept of biological order and "Garden in motion" by Gilles Clement – in his first book: "The Garden in Motion" he talks about natural disorder (or biological order), which is still seen as something to be organized by architecture as it is not perceived as a general conception yet. By observing his own garden Gilles Clement formulates a new attitude towards gardening and landscape design, following the sequence: *Observe, Understand and Act using forces that are already present on the territory.*

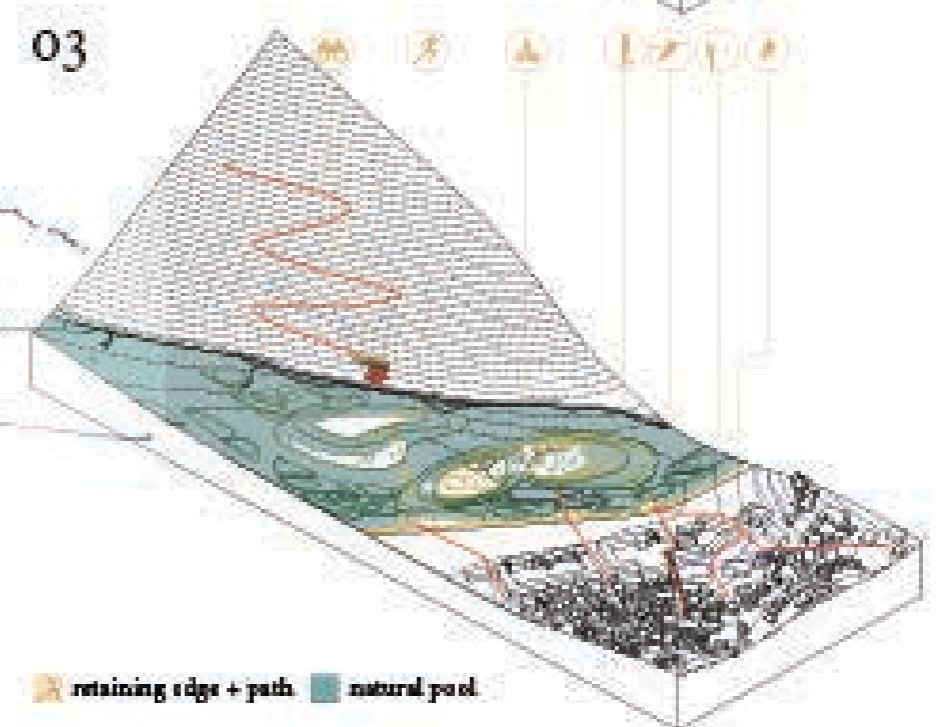
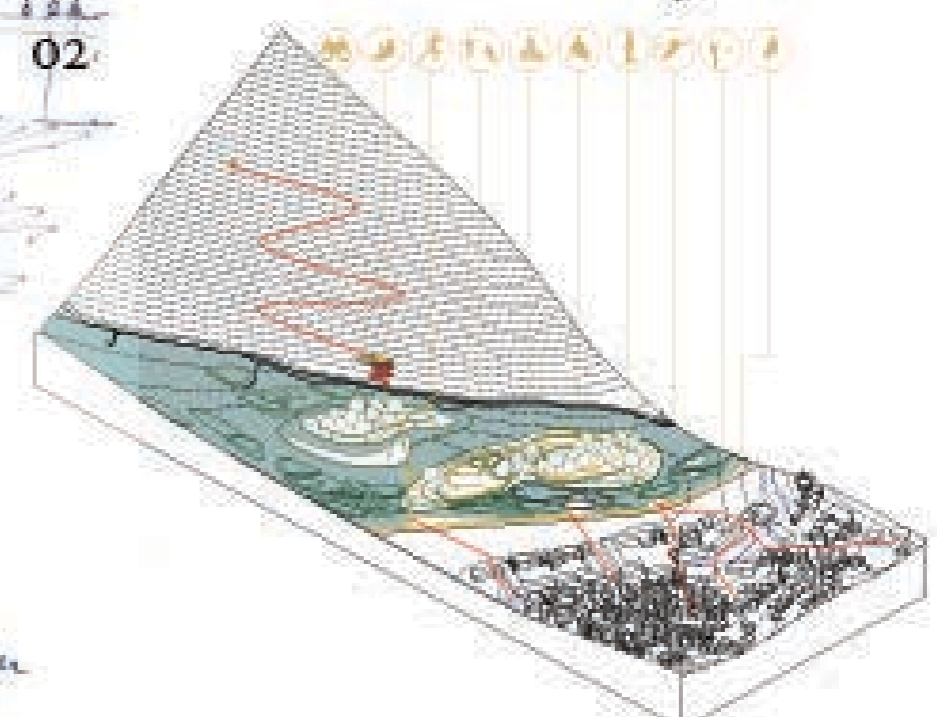
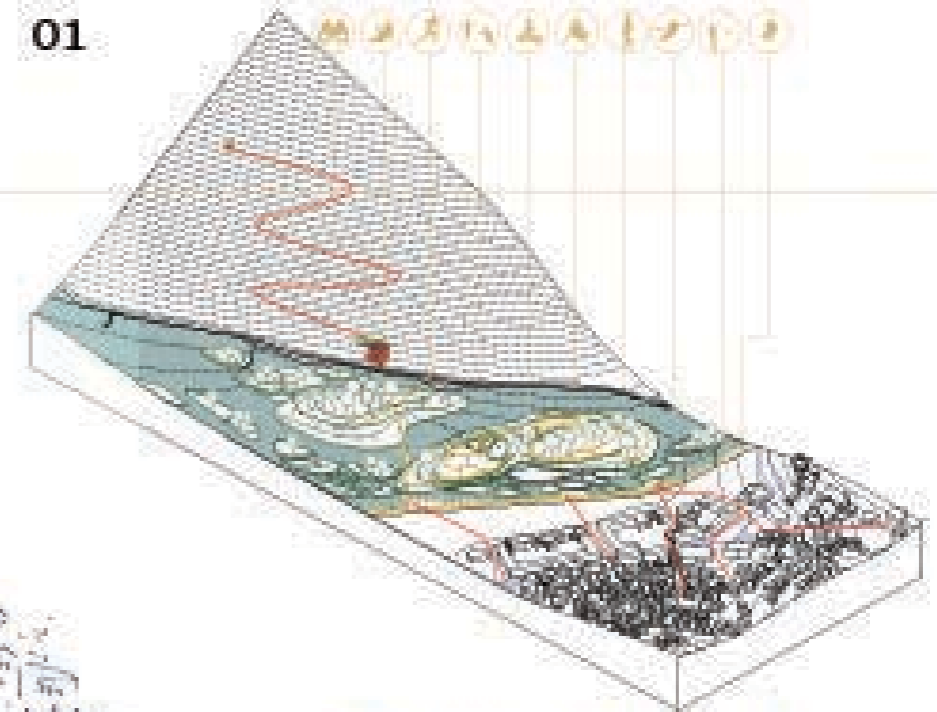
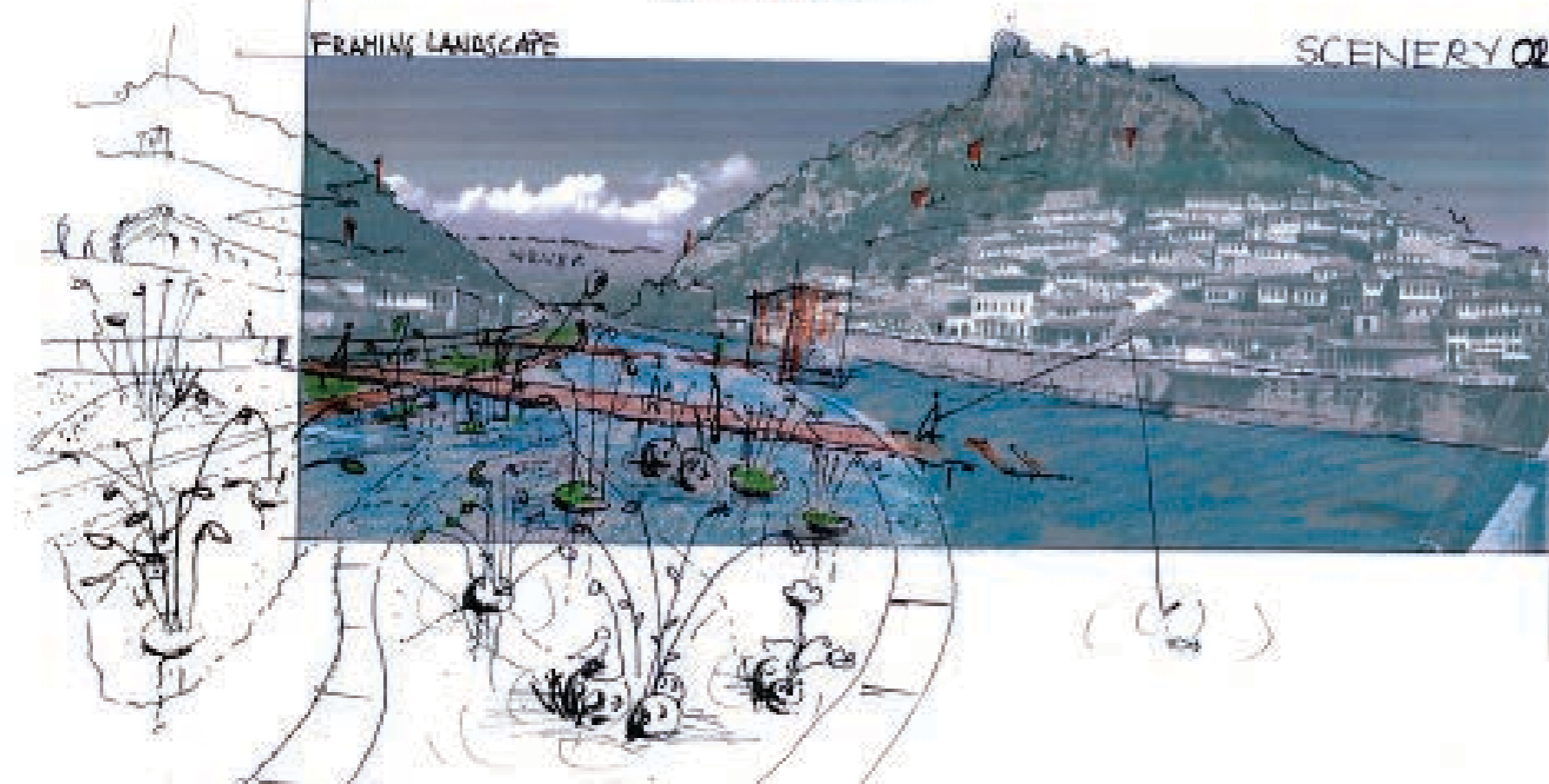
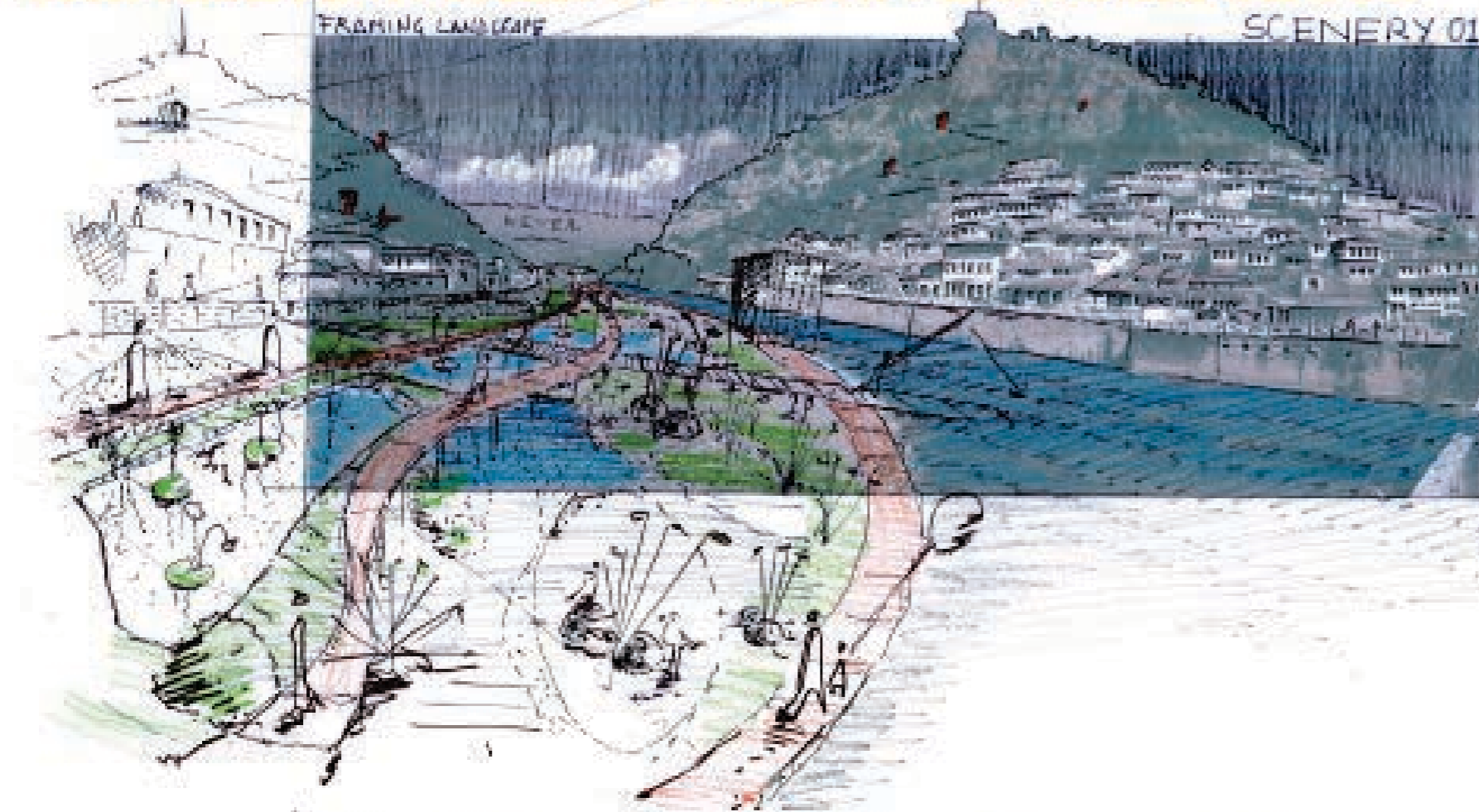
RESILIENCE TOOLKIT

In practical terms the strategy to make Berat city and Osum Island become resilient to flooding situations and anticipate water inundation is to propose a 'toolkit of resilience' that can be implemented in different phases and applied to similar riverside or seaside conditions around Albania. The approach divided in stages and potential conditions of improvement makes it suitable and applicable in other territories of similar conditions and open to similar climate change risks.



VISION

THE RISE AND FALL OF THE RIVER: 3 SCENARIOS

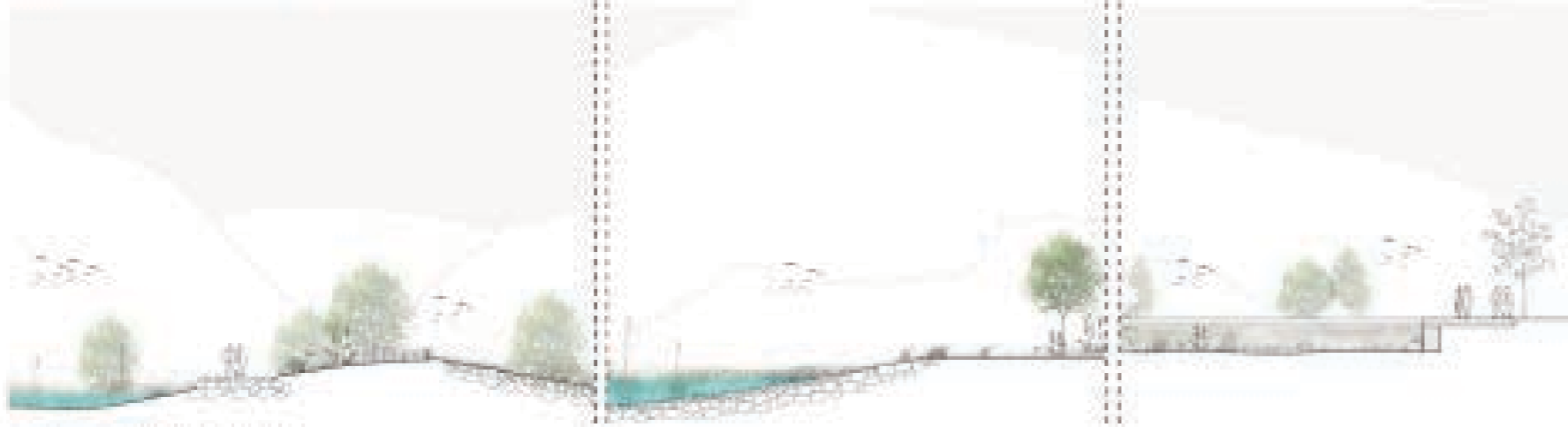


retaining edge + path natural pool

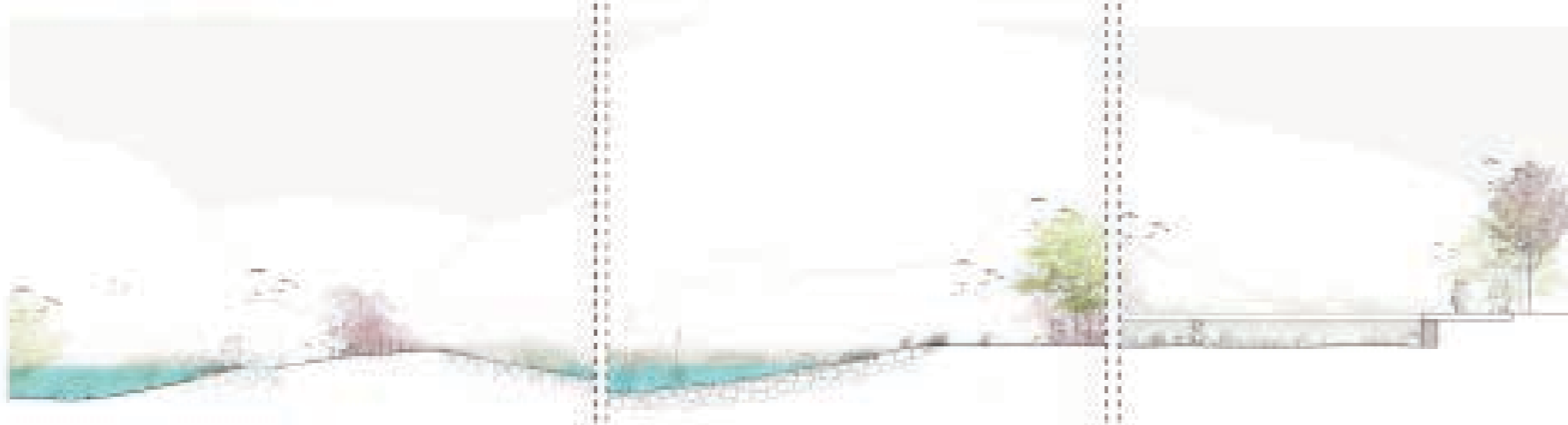
VISION

THE RISE AND FALL OF THE RIVER: 3 SCENARIOS

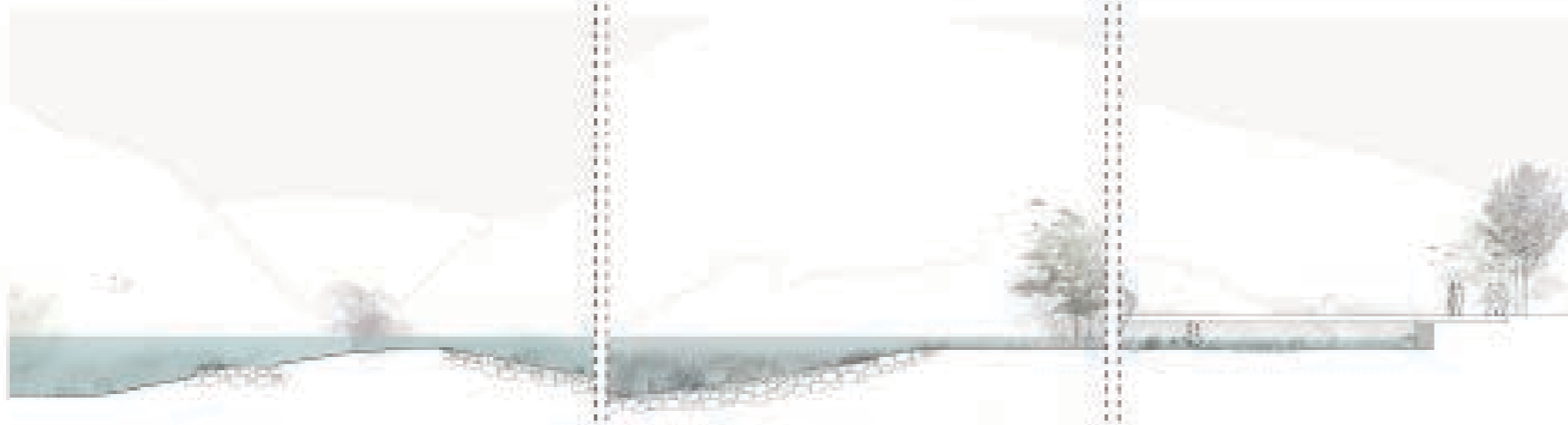
Section B - SCENARIO 01



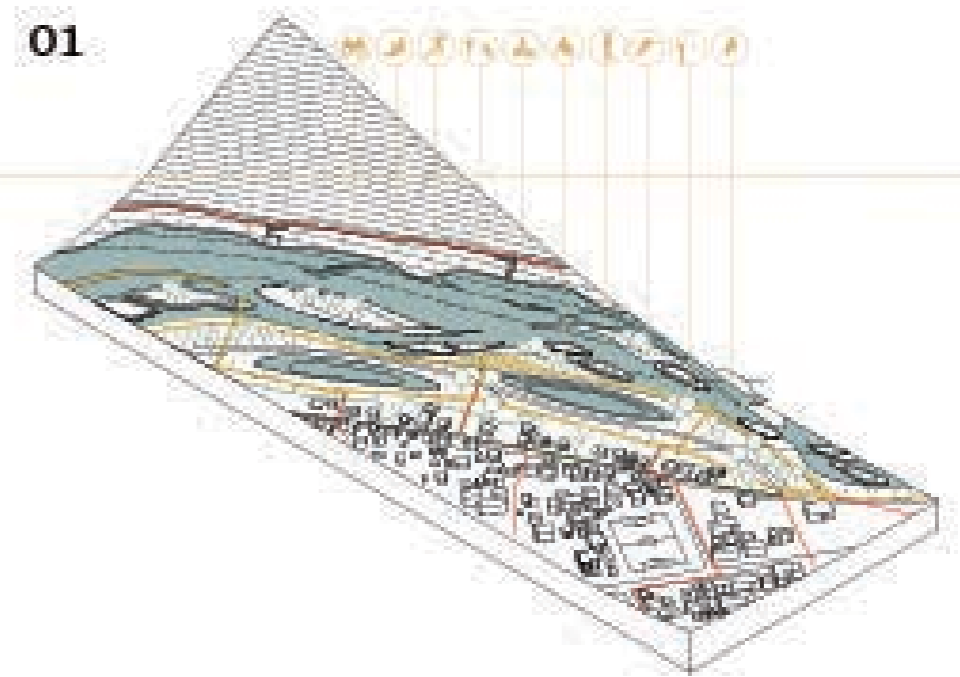
Section B - SCENARIO 02



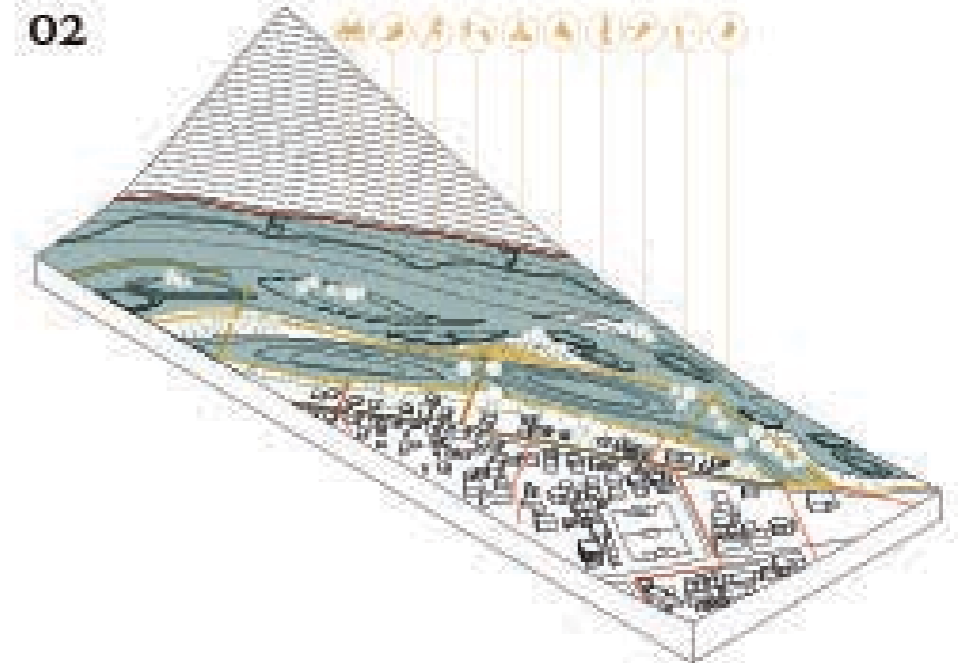
Section B - SCENARIO 03



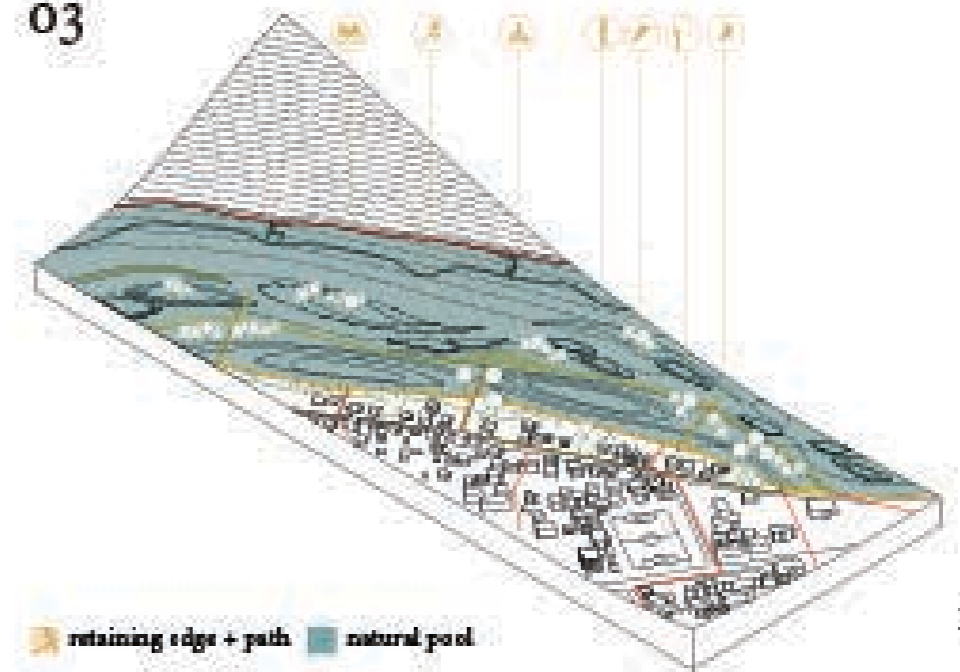
01



02



03



retaining edge + path natural pool

ACTION PLAN & COSTS ESTIMATE



POTENTIAL LEVELS OF IMPROVEMENT






Landscape is an open system, it is a Medium uniquely capable of responding to temporal change, transformation, adaptation, and succession. These qualities recommend landscape as a medium uniquely suited to the open-endedness, indeterminacy, and change demanded by contemporary urban conditions. As Stan Allen puts it

"Landscape is not only a formal model for urbanism today, but perhaps more importantly, a model for process."

As the project employs landscape as a Medium for the urban and social development of the city, the Action Plan takes into serious consideration the temporal aspect of landscape processes and therefore separates the implementation of the project into "Potential Conditions of Improvement", which enable the project to be realized in phases. Each phase can and should be revised at the end of the previous one, taking into consideration and adapting to the natural changes and the new directions that biological processes undertake.

The solutions offered are defined as Minimum, Medium and Maximum; the cost estimate is referred solely to the Minimum solution as the latter is independently implementable and capable of answering on its own to the main objectives set forth by the project.

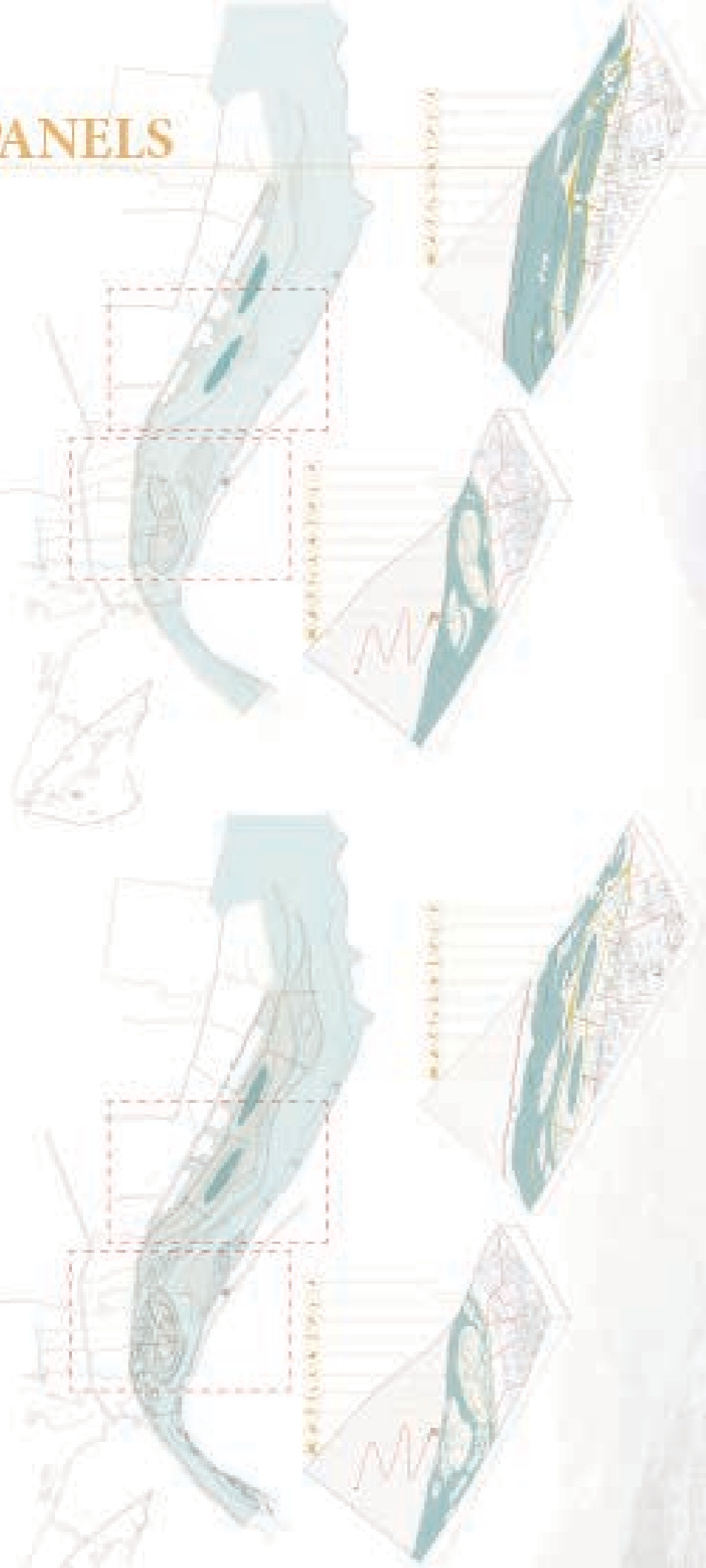
Budgeted estimation for "Minimal improvement to guarantee resilient / ISLAND"								
NR	Technical analyze number	Type of work	Unit	Quantity	Price per units (ALL)	Value in ALL	Value in EURO	Specifications
4	3.415/3	Wood Bridge (Ura druri - Shese me derrasa, 5 cm)	m2	236.5	ALL 1,982.00	ALL 471,338.00	EUR 3,265.05	
5	3.393/4	Paving with gravel (Shese shavor lartë bërthor, me cilindrin)	m2	3000	ALL 295.00	ALL 885,000.00	EUR 6,466.83	
7	Ar168	Decorative bushes (P/V shkurra dekorative Juniperus V.18 grup 3 - cdo 6.6m)	pc	150	ALL 1,054.00	ALL 158,100.00	EUR 1,086.43	
8	2.29	Ground Excavation (Gërmet me ekskavator me shpër 0.5m,shkarkim ne toke)	m3	14230	ALL 124.00	ALL 1,764,520.00	EUR 12,594.84	
Total 1						ALL 3,291,943.00	EUR 23,513.16	
Unexpected work (2% of Total 1)						ALL 260,347.48	EUR 1,881.05	
TOTAL						ALL 3,555,190.48	EUR 25,394.22	

Budgeted estimation for "Minimal improvement to guarantee resilience"								
NR	Technical analyze number	Type of work	Unit	Quantity	Price per units (ALL)	Value in ALL	Value in EURO	Specifications
1		Sea/Inlet(Lo-Poa Ball Module with full admittance (2-4 feet tall, 1.2 feet base diameter, average weight 220 pounds) (Surface area 36.6sq ft, average holes 12)	pc	25	ALL 8,480.00	ALL 212,000.00	EUR 1,480.00	
2	3.187	Embankment (Shpresa me rreze të rreth, gjerë 3x3x1.8m)	m3	6987	ALL 3,264.00	ALL 22,803,568.00	EUR 184,561.20	
3	3.193/4	Paving with gravel (Shese shavor lartë 10cm, me cilindrin)	m2	11296	ALL 295.00	ALL 3,332,224.00	EUR 23,952.28	
4	3.415/3	Wood Bridge (Ura druri - Shese me derrasa, 5 cm)	m2	2500	ALL 1,982.00	ALL 5,005,000.00	EUR 35,186.31	
5	3.193/4	Paving with gravel (Shese shavor lartë 10cm, me cilindrin)	m2	3200	ALL 295.00	ALL 952,000.00	EUR 6,866.83	
7	Ar168	Decorative bushes (P/V shkurra dekorative Juniperus V.18 grup 3 - cdo 6.6m)	pc	300	ALL 1,054.00	ALL 316,200.00	EUR 2,231.48	
8	2.29	Ground Excavation (Gërmet me ekskavator me shpër 0.5m,shkarkim ne toke)	m3	14230	ALL 124.00	ALL 1,764,280.00	EUR 12,584.84	
Total 1						ALL 34,718,572.00	EUR 247,532.71	
Unexpected work (2% of Total 1)						ALL 3,779,844.32	EUR 28,004.62	
TOTAL						ALL 37,497,425.32	EUR 267,767.32	

PANELS

SCENARIO 02 - *contemporary* *urban* *redevelopment*

SCENARIO 01 - *contemporary* *urban* *redevelopment*



DYNAMIC RESILIENCE
A Symbiotic Relationship between Nature and City

SCENARIO 03: **resilient city** **resilient city** **resilient city**

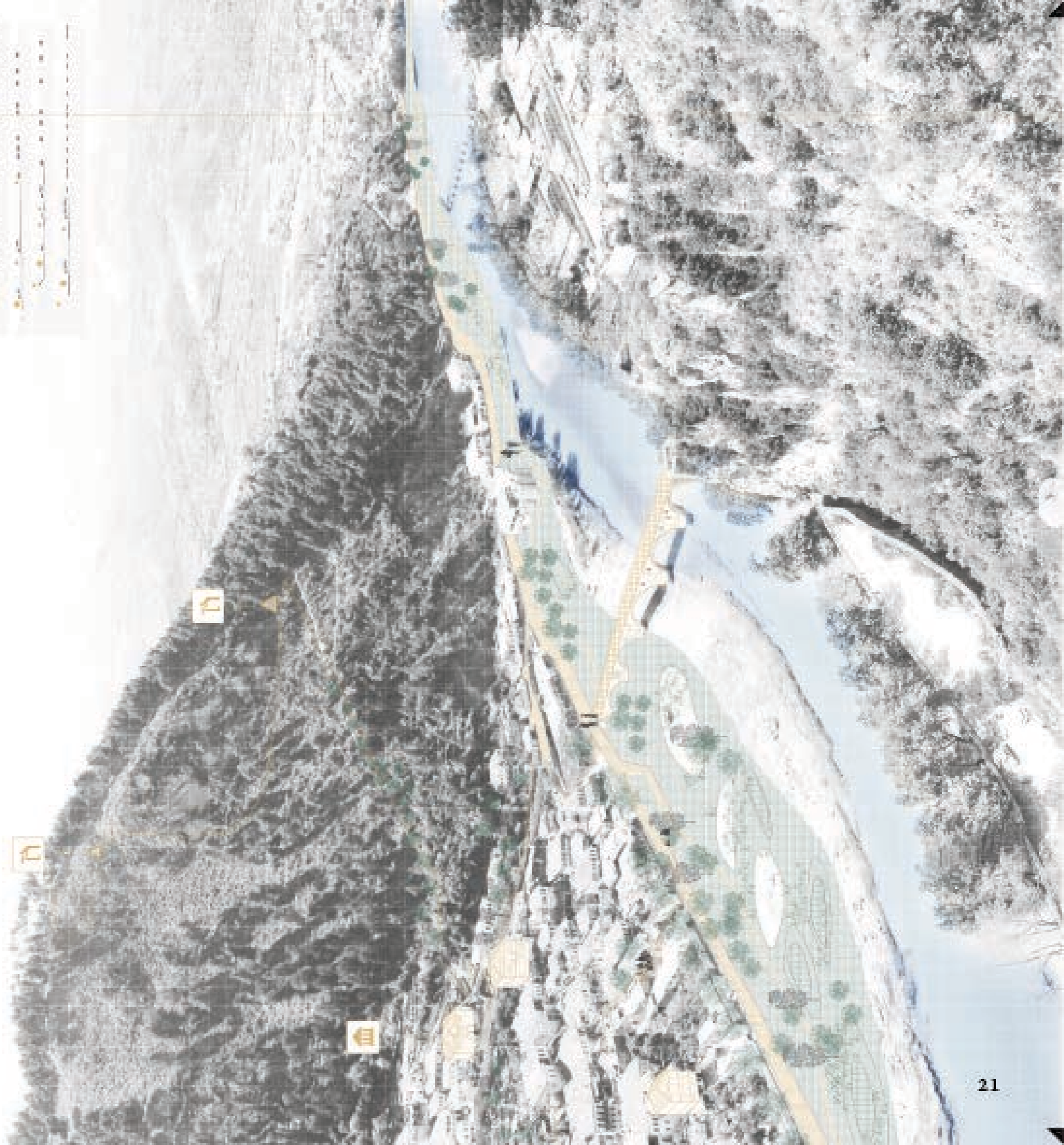


PANELS

1. **Panel 1:** *Urban and natural performance metrics*
2. **Panel 2:** *Urban and natural performance metrics*
3. **Panel 3:** *Urban and natural performance metrics*
4. **Panel 4:** *Urban and natural performance metrics*
5. **Panel 5:** *Urban and natural performance metrics*
6. **Panel 6:** *Urban and natural performance metrics*



PANELS



PANELS



DYNAMIC RESILIENCE

A Symbiotic Relationship between Nature and City

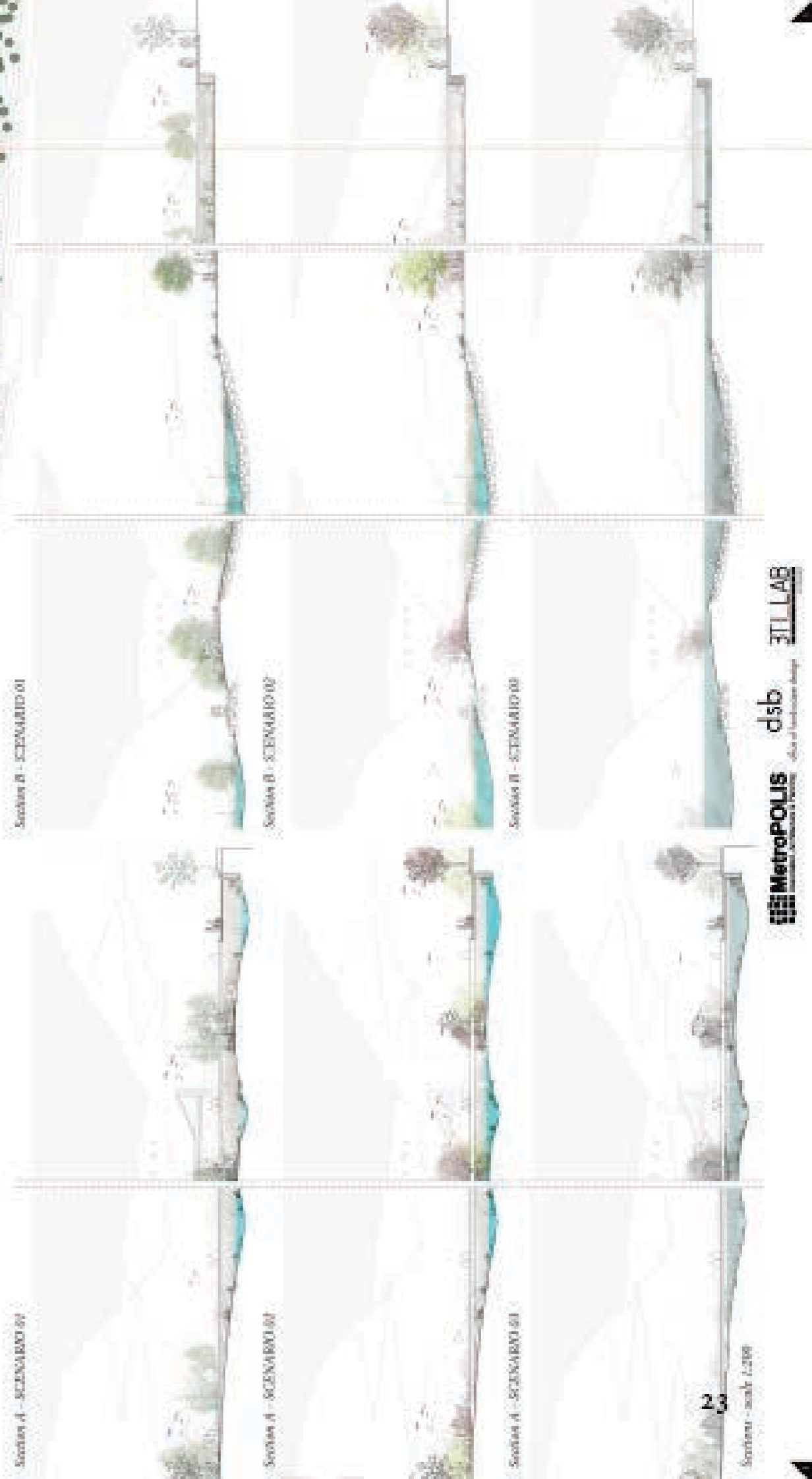
PANELS



PLAN - SCALE 1:100

Section A - SCENARIO 01

Section B - SCENARIO 01



Section A - SCENARIO 02

Section B - SCENARIO 02

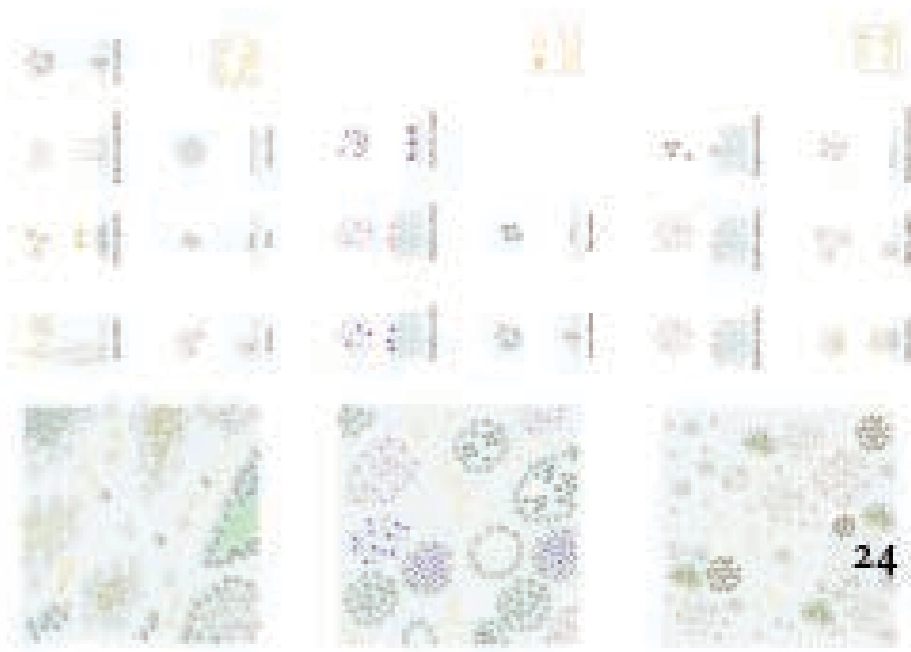
Section A - SCENARIO 01

Section B - SCENARIO 01

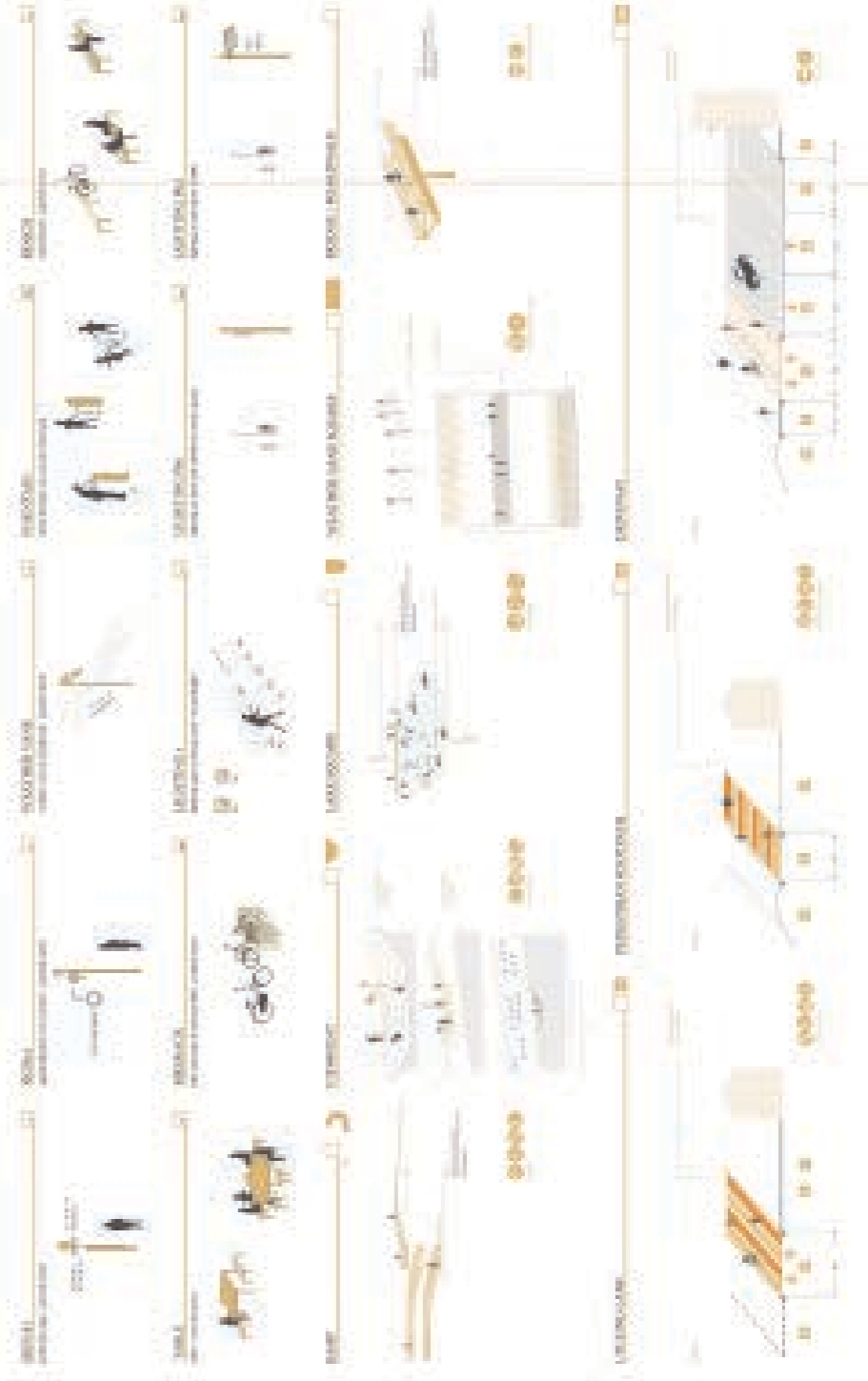
PANELS



Acquatic plants abscax



Furniture abscax



DYNAMIC RESILIENCE

A Symbiotic Relationship between Nature and Architecture



Views of the suspended paths and the Architecture Avenue



View toward the island



