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An Alternative Landscape Vision for Bisri: Rethinking the Dam

*Linking Ecology, History ,and Culture of Bisri River with a
New Water Collection Strategy*

Rani Chamseddine

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INTRODUCTION

Existing Problems

Existing Problems the site Suffer from:

- Targeted by dam construction that will start in september of 2017 which will cause the disappearance of half the area which is characterized by ecological and historical features, minimize the water level after dam, changing some river habitat, and changing the character of the area by attracting residence and new economical features.

- People lack of interest in ecological value vvvvvsuch as the riparian forests surrounding the river

- Neglected Historical Features by community and government (The Old birdge, roman columns, and old houses and churches)

- Safety issues ,lighting
- Flooding level along the river

- Absence of maintenance for the tertriary roads connecting the village with the river

- Vacants lots located between riparian forests and agricultural fields

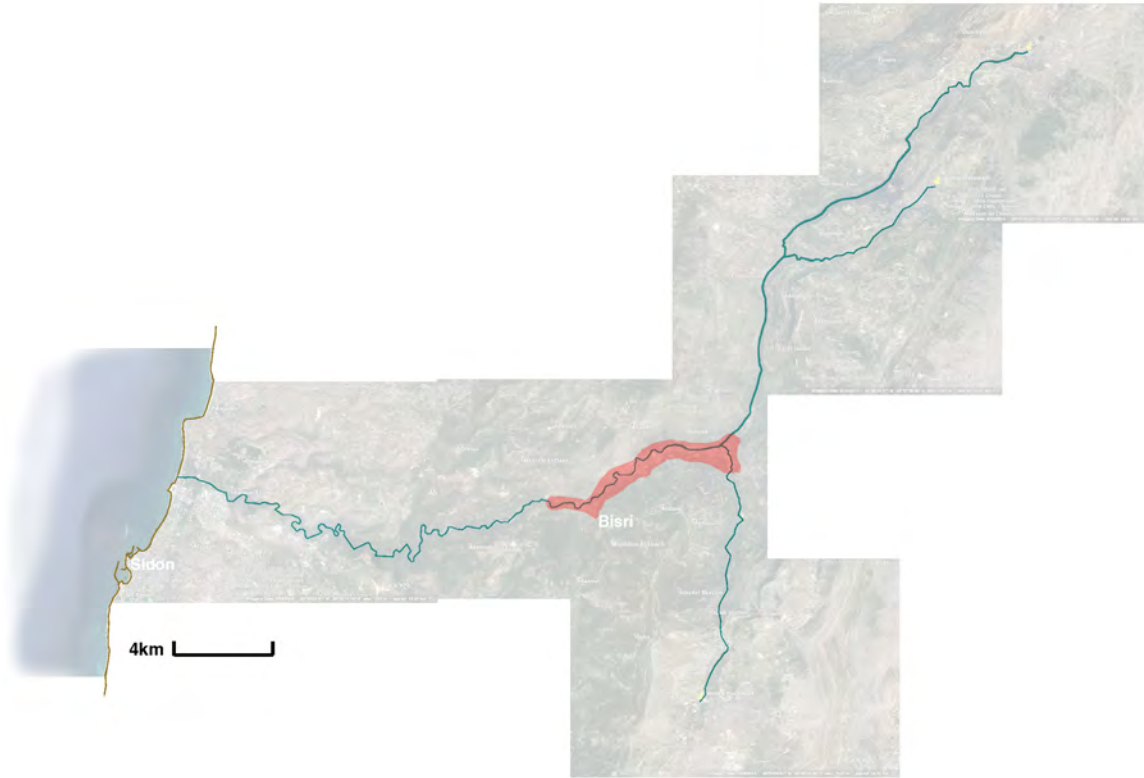
- Seasonal attractivness of tourism on restaurants

Background

The site is Bisri river and valley; the area is characterized by its variety in agricultural fields, ecological variety in term of fauna and flora and many historical sites from different eras.

The area is highly visited by many tourists during the weekends.

The dam proposed will cause the submerge of all characters listed above about the area.



Site Limit with the context

Design and Research Questions

Design Questions:

- *What are the other alternatives for water collection from river other than having a dam ?
- *What are the important layers for Site inventory and analysis related to the project approach ?
 - Forested area
 - Agricultural fields
 - Landuse
 - Historical areas
 - Views
 - Community
 - Topography
- *How am i Connecting the different patches along my site such as historical features, gathering spots, village, and others ?
- *What Kind of programs i am having in case of alternative ?
- *What are the arguments that make my programs location more relevant ?
- *What is the capacity of storage of the alternatives compared to the Dam lake capacity ?

Site Limits ?

The site limit selection was based on the topography, the roads, and the river plain , so my site is the river plain that is between the two roads on each side of the river and it start from the village area till the historical area.



Site Limit

Research Questions :

- What is the maximum water level in winter when the river fold ?
- What is the minimum water level of the river in summer ?
- What is the effect of the dam on the area before the dam wall ?
- What is the effects of the dam on the area that is after the dam wall ?
- How layers in site analysis are more detailed than inventory ?
- What is the ecological impact on the community ?
- What community think about the riverscape ?
- What community think about the dam construction ?
- How the history affect the future plan of a river project ?
- How the river is affected by human activities and

notes/sources:

1. Public perceptions of river corridors and attitudes towards river works (Landscape Research)
2. How to Evaluate and Forecast Changes in Landscape (Landscape Research)
3. RENATURATION OF THE RIVER AIRE (Geneva) (Landezine)
- 4.Longi rice terraces china

METHODOLOGY

First step was to have an overview on the whole river and why I have chosen this specific area.

List the characters of my site and what are the existing problems with a basic map site inventory showing the main layers

Second Step will be more contact with the community and to know more their relation with the river.

Site inventory will be more into details of each layer of the area and analysing in details the layers from inventory and draw some conclusions from the site analysis that will help me in my design

Third Step was to create a SWOT analysis based on the analysis of the area showing strengths, opportunities, weaknesses, and threats then draw a conclusion what are the important SWOT layers that relate to my project Statement and from it I will have a formation of a strategy

The main layer of the strategy was to create an alternative way to collect water from the river and that why I started to search about case studies that can help me.

The fourth step was to design the big strategy of my site by:

1- Deciding on the alternatives which were basically ponds, wetlands, and seasonal dams. and their location based on site analysis and conditions.

2- Design the program that integrate the community with the water system.

3- Design the trail that link the programs and water system with the village.

4- Enhance in my design the ecology and agricultural value of my site.

REVIEW

Literature

Articles related to the Site :

- Based on Al Nahar Article Published in 29 april 2015
The site is qualified as a natural protected area where it has a rare ecological diversity that do not occur in any area in Lebanon.

In addition to many historical sites that are considered a part of the heritage in the area such as the Mar Moussa Church, Monastery of Saint Sofiya, romans columns, othomans bridge, and old cemeteries.

- Second article was the ecological assessment done by dar al handasa and it show the impact of the dam on the layers of the site. The dam will submerge many riparian forests, agricultural fields, and the historical area. In addition that it will move the habitat and will negatively impact the aquatic habitat because there will be a disconnection between the lake and river and a decrease of water level in river.

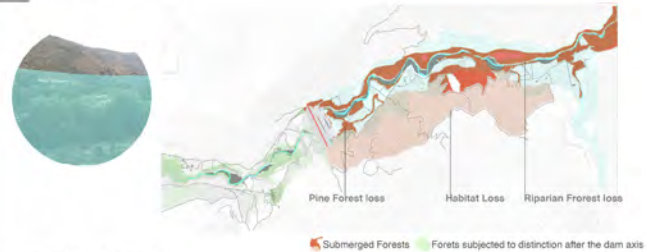
But the assessment show that that we can have a solutions for these problems : agricultural fields on other areas surrounding the lake, the forests species are not rare in lebanon, and they are proposing a new area for the historical feature, and the fishes can move from lake to river by a fish ladder.

Dam Impact Analysis Done By myself and Not from the assesment

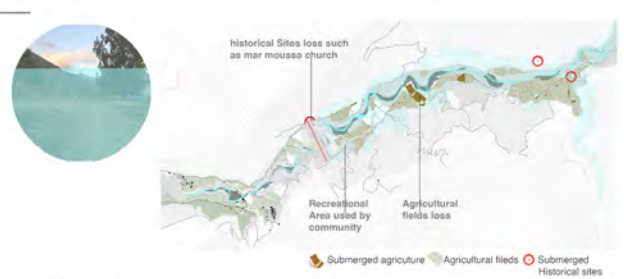
The Dam Area



Ecological Threat



Cultural Threat



Water Threat



Case studies articles:

Taichung river restoration network:

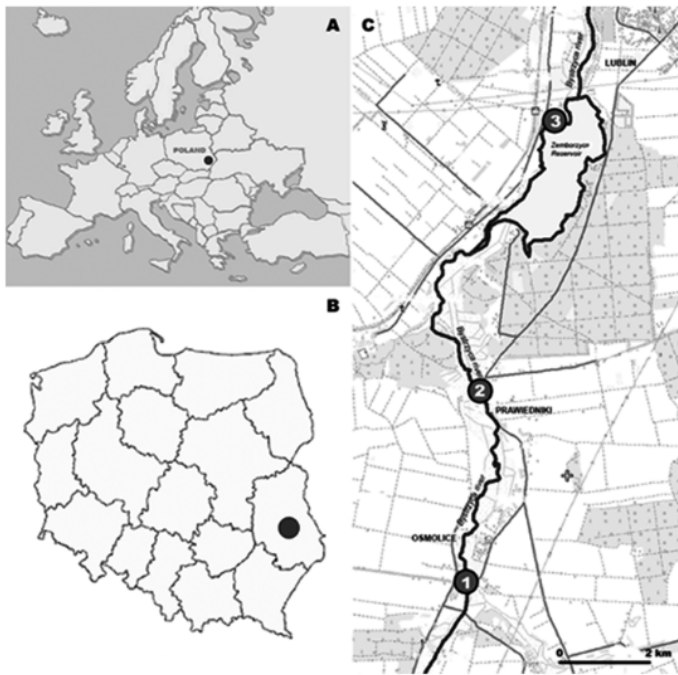
The project is located in japan and there case was to collect water from river by ponds located arround the lake. In addition they have tried to solve the flood problem casued by ponds in a certain time of the year. the conclusion from this case study was that we can collect flooded water by a water system that is at the same level of the river. In my case will be ponds



Elwha Dam Removal

The dam was built in 1912 and was removed in 2009 because it had lot of ecological impact. But the removal has also a negative impact because the land that was submerged was totally dead and need a minimum of 30 years to be reclaimed (shown in picture 2)





Case Studies

How to Evaluate and Forecast Changes in Landscape Image:

The Case of a Small River Valley in Poland

Authors: Tadeusz Jan Chmielewski, Agnieszka Anna Kułak & Malwina Michalik - Published in 16/ June/2014

*Main Topic : explore the past case in a river to set the plans for future and to know what features should be protected as naturally and culturally unique heritage.

*They consider that the ecological and cultural functions have developed simultaneously for centuries which have changed some characters in river. Cultural heritage have been developed from natural heritage and has improved it in many ways.

*Method and results of landscape studies on the river that will answer questions concerning the future direction of the development of the shape of Bystrzyca river valley,

*Research stages (retrospection—diagnosis—variant prognosis) :

1- retrospection -Analysis (done in arcmap GIS) of changes which have occurred over 1961-2009 I terms of land uses structure , landscape images.

The research was done by comparing analysis of archi-

val maps, aerial and ground photographs, interviews with residence, and field observations

Material used:

-Physical map of the study area in 1961

-Orthophotomap with 5m resolution 2009

The changes noticed in the historical style and identity of the place allowed

*Results:

Analysis of changes in land-use structure show:

-reduction of arable land (-18%) ,grasslands (-49%)

-increase stagnant water and the development of farm building (+11.3%)

-Two forms of land use had completely disappeared:

open sand dunes (-3.19 ha) and sand dunes with patches of vegetation (-17.1 ha), There was almost complete disappearance of peatlands (-93%).

-In the study area, two new forms of land use were created: summer resort buildings (+2.6ha) and fallow lands (+42.82 ha)

2- Diagnosis:

The park and palace: The site is now neglected and start to demolish / restoration

The Bridge on the Bystrzyca river: the site is unmaintained / Development

Part of the Marina resort beach at Zemborzycy Reservoir : Negative situation of ecology, problems in run-off / recreation and development



Al Awali Pond (Local Case Study)

Located just one kilometer after the site, the pond takes water from the Al Litani river and the purpose is to generate electricity and not for water collection.

The conclusion is that we can have a series of similar ponds in my site located in areas that are higher from the river and have the least topographical changes and thus we can collect water from the Awali river and from rain as well.

Notes/Sources:

1. Al Nahar article (Published in 29 April 2015)
2. <http://www.sites-sw.com/project/landscape-architecture/epopenspace/>
3. How to Evaluate and Forecast Changes in Landscape (Landscape Research)
4. Al Awali Pond Wikipedia

CONTEXT

Site Selection & Background

First step was to start an overview on the whole river. the first map show the topography of areas around the river which varies form the coastal, low rural ,high rural ,and mountainous areas. Second map was to show the difference in the river plain width. The width of the plain decrease in area as long as the altitude increasing except in my site which is located in a high rural area and the width of the plain is like the one in coastal areas or even larger.

The site limit selection was based on the topography, the roads, and the river plain , so my site is the river plain that is between the two roads on each side of the river and it start from the areas that are more residential till the areas that are historical.

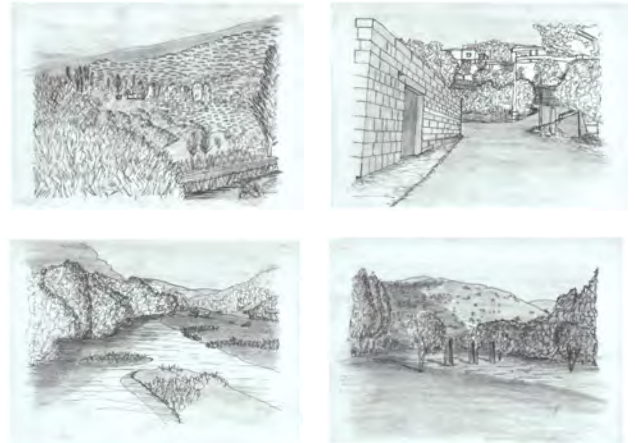
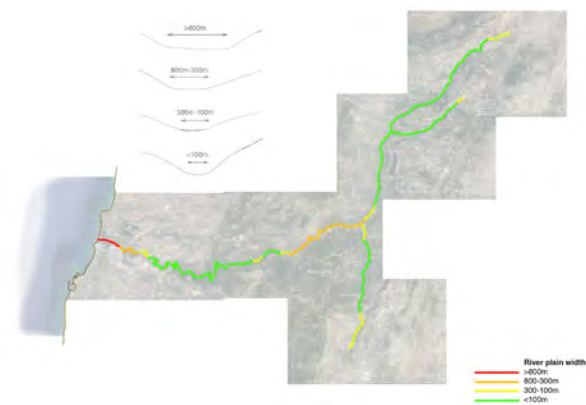
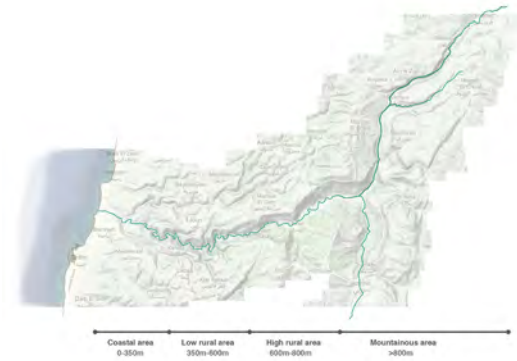
The site has a lot of ecological, historical, agricultural, and cultural values.

Ecological : Variation of fauna and flora

Historical : Mar Moussa Church, Monastery of Saint Sofiya, romans columns, othomans bridge, and old cemeteries.

Agricultural : Different type of agricultural fields such listed in the analysis

Cultural : The village located on the hill and the community relation with the river in term of recreations and existing program.

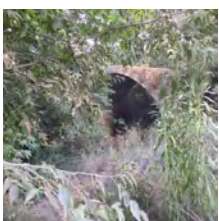


Sketches of historcial and cutural values



The dam Location and lake

Historical and cultural areas location



Understanding The Bisri River



Site Inventory

In the first map in site inventory i have showed the different types of roads that are in the site depending on the use and materials.

Second map show the community value of the site embodied by historical, most visited, farmers, and residential areas.

Third map show how people use the site as a recreational area.

Fourth map show the ecological layer of the site through the difference type of riparian forests.

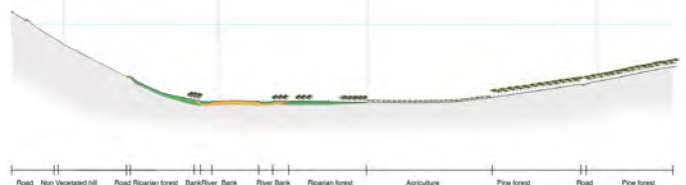
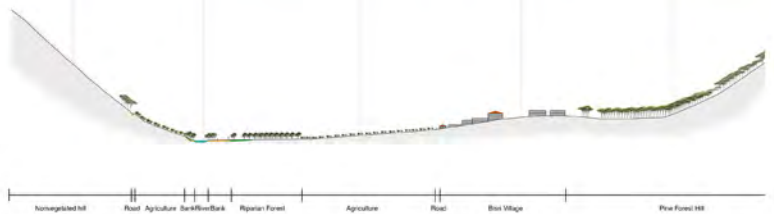
The fifth map show the different landscape typologies from the forests typologies and agricultural fields.

The last layer in my inventory was the water layer where i have showed where the river flood and increase in term of width.

The area is approximately flat characterized as river plain and located between two hills as shown in the section.

Sections that cross the site horizontally show relations between many notions such as village, agricultural fields, forests, and river/ banks.

Sections cutting the site horizontally



CONTEXT In the second slides i have moved to analyze more the relations between the inventory layers.



People Gathering Area



Picnic Area



Camping and Recreational area



Birds Live in Forest



Pine Forest



Riparian Mix Forest



Agricultural Trees



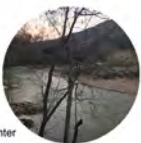
Vineyard



Plants/Green Houses



River Flow In Summer



River Flow In Winter

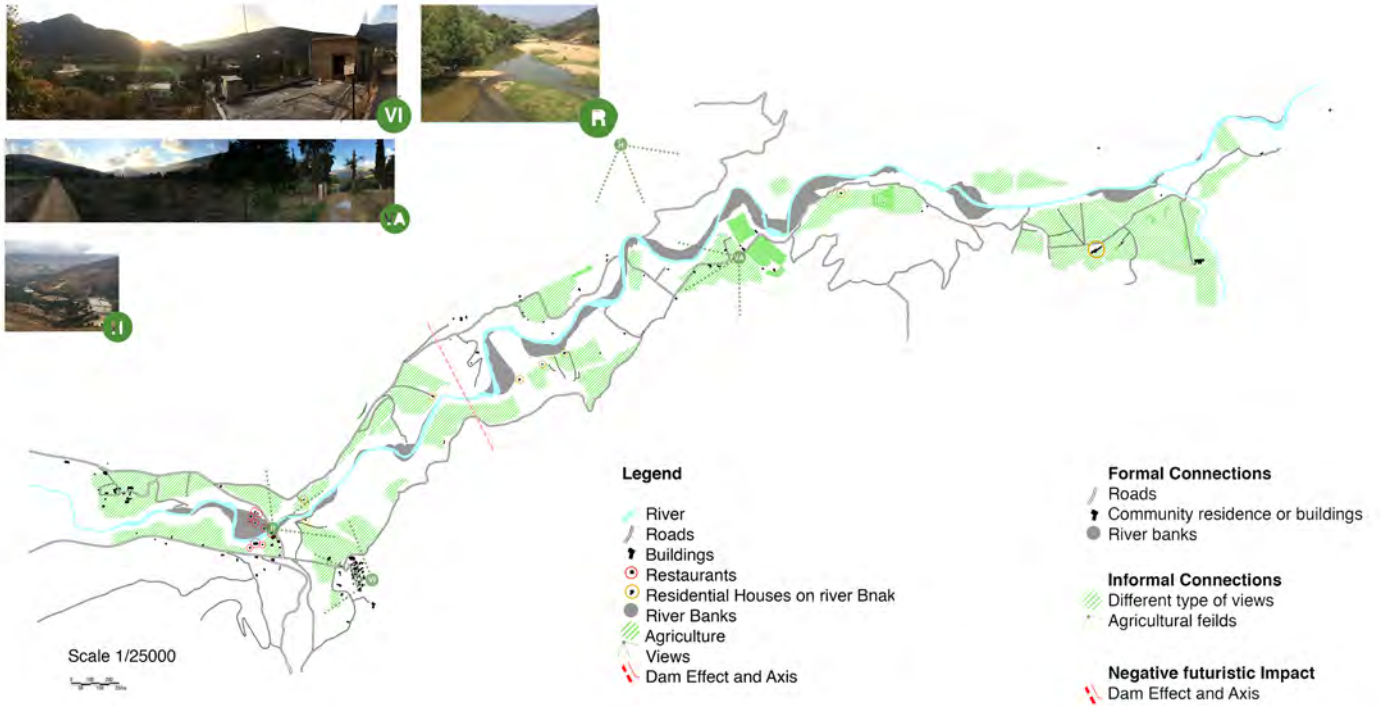


River Flow In Spring

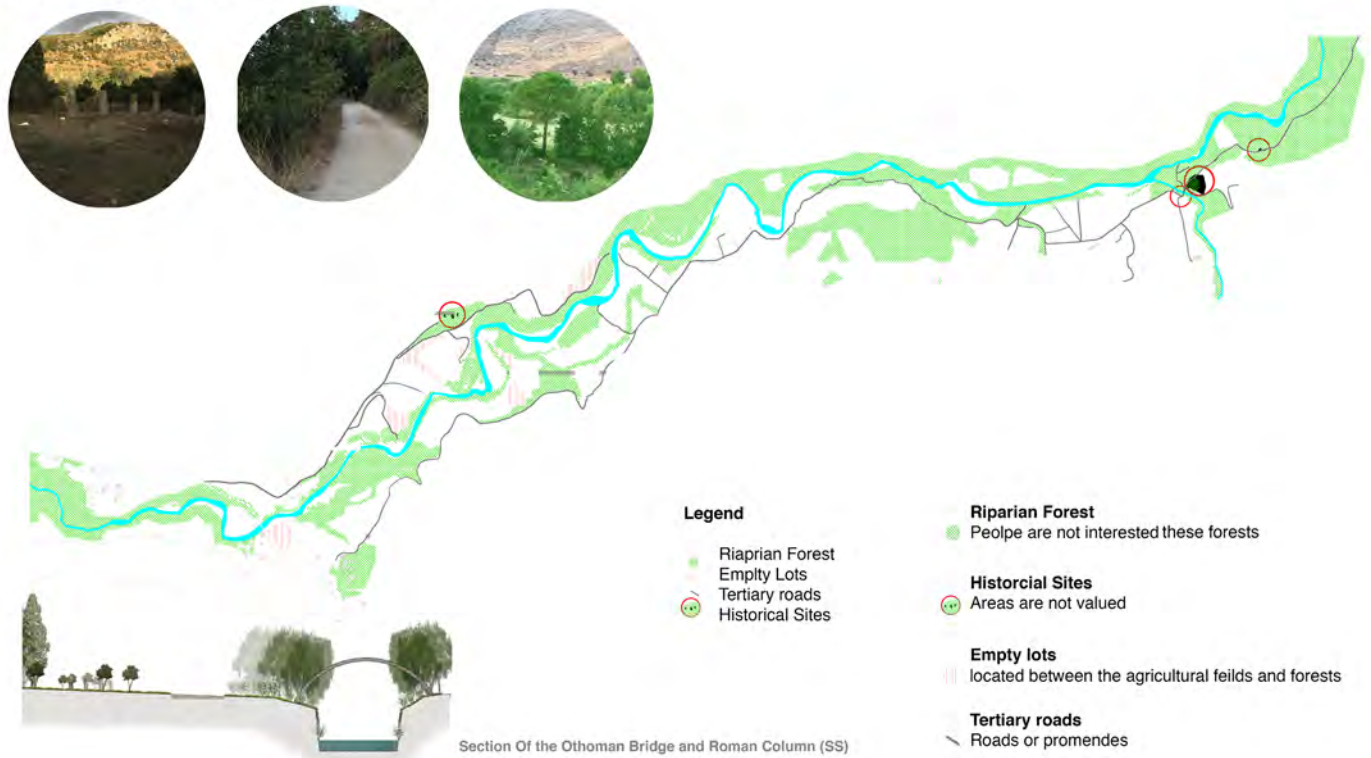


Understanding The Landscape of Bisir River

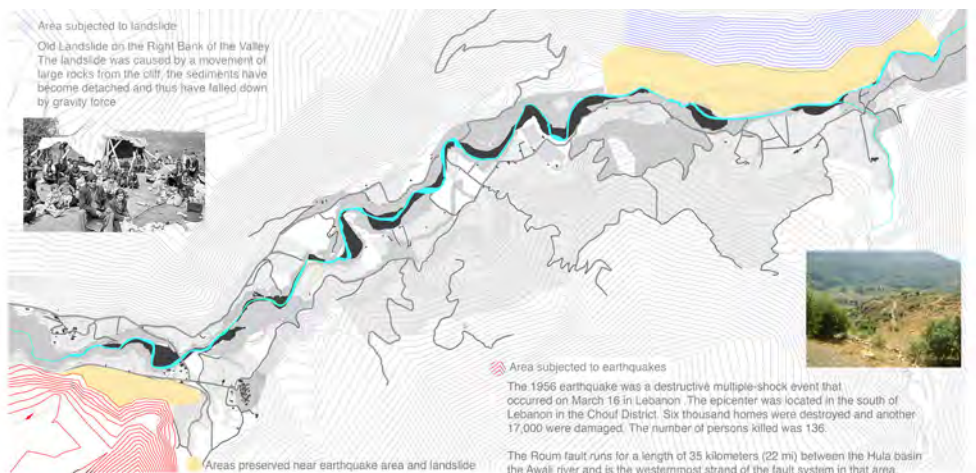
People Connections with the River



Areas Neglected By Community



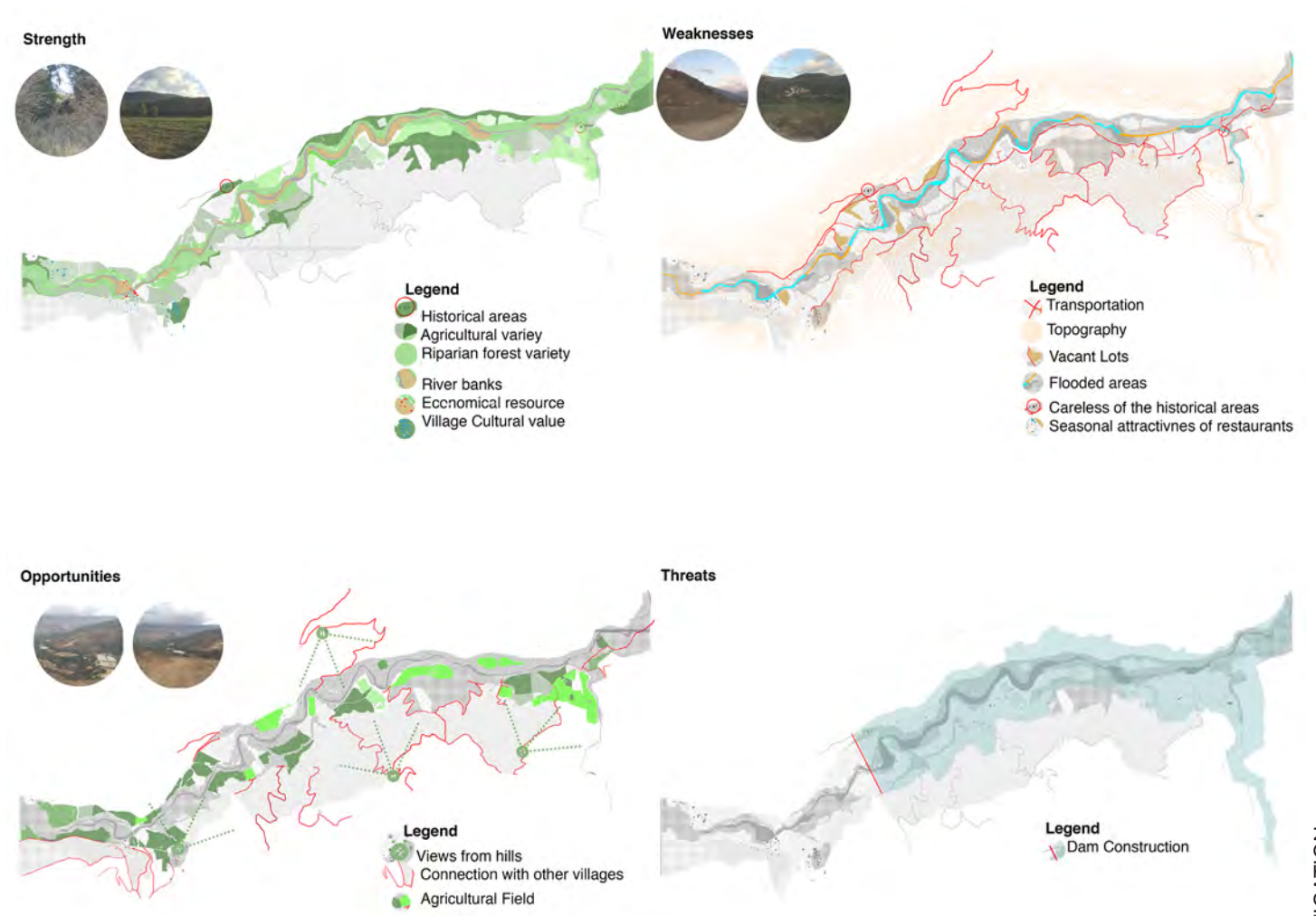
Geomorpholglial Analysis



Section showing the flora variety in the site during the winter and summer with the relation of flora and fauna



SWOT Analysis



PROPOSAL

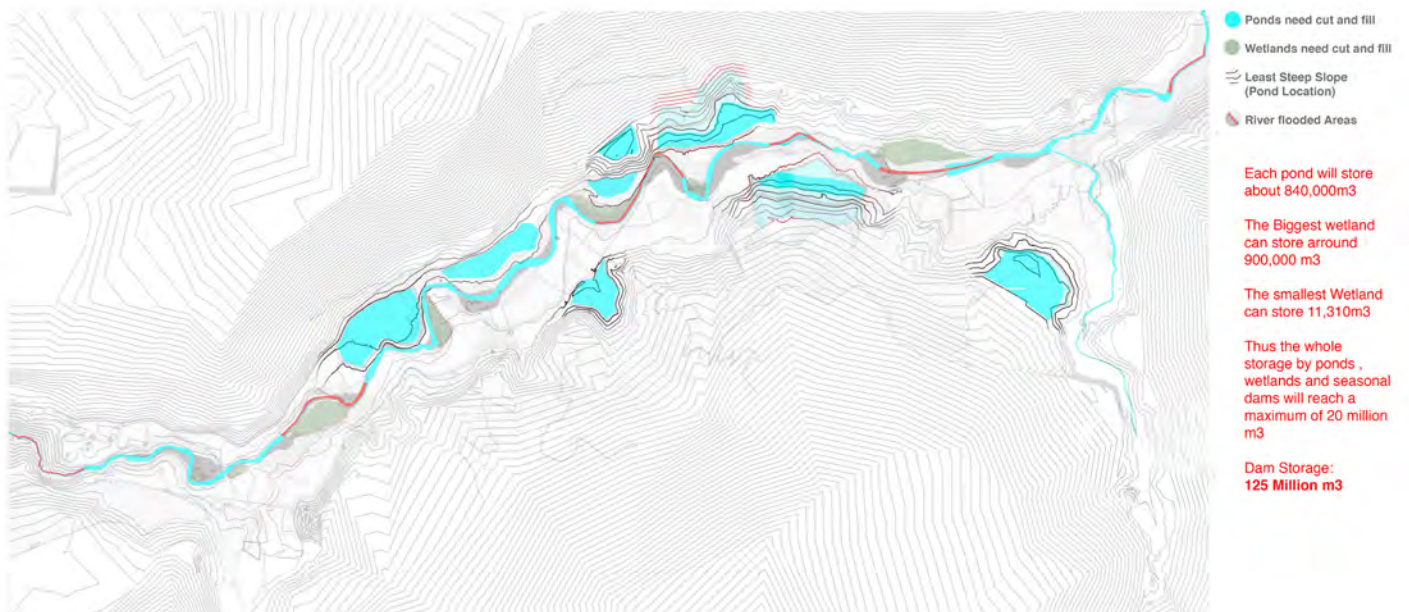
Project Statement

Designing a new water collection strategy provided by ponds, wetlands, and seasonal dams for Bisri river instead of the dam proposed by the government while also providing a series of active and passive recreations for the community and the visitors of the area by having play zones near existing active areas ,amphitheaters near gathering spots, and open yards and platforms which surround the ponds which have different recreational experiences. In addition to linking these spaces with some view platforms and amphitheaters that surround some historical areas and the village of bisri.

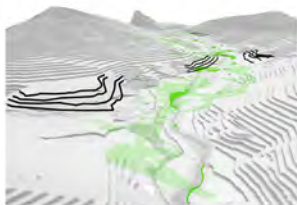
My project is responding to many aspects of the site such as :

- Responsiveness to the place by targeting a problematic the site is suffering from which is the dam and designing an alternative
- Responsiveness to the culture by having many recreations that attract people and link the project with the village
- Responsiveness to the natural and ecological needs by providing a eco friendly alternative way for water collection and enhancing the natural value of the site.

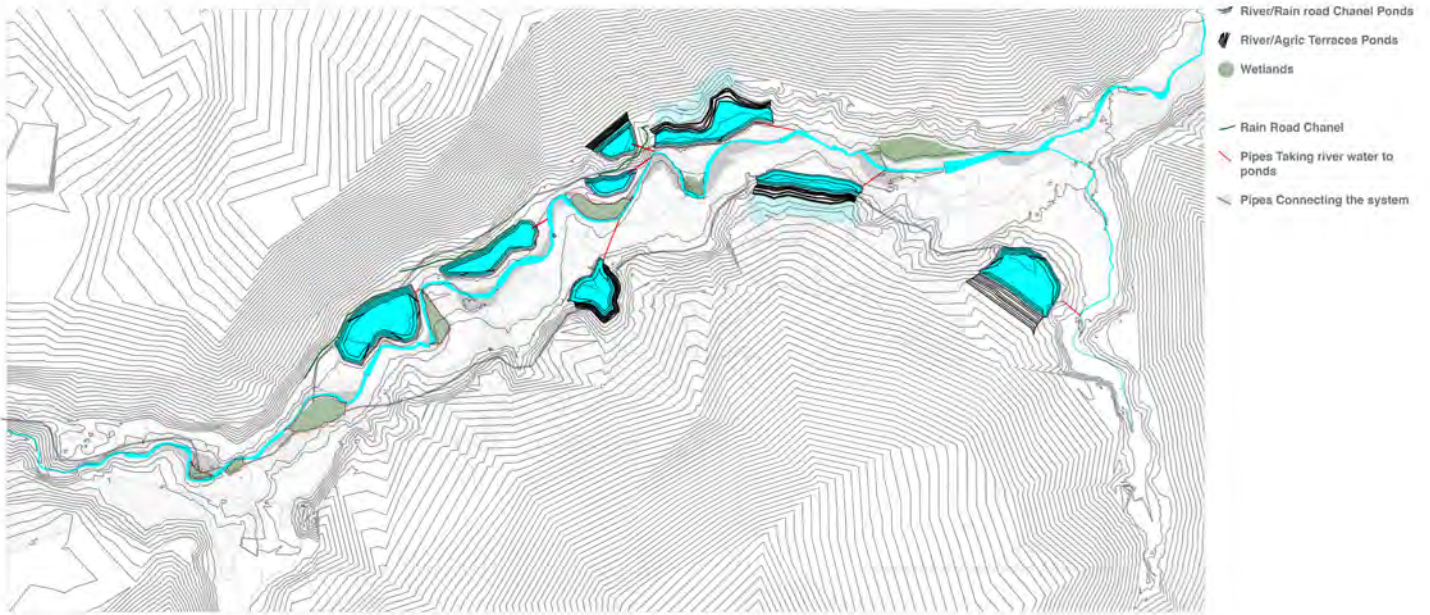
Developing a multilayered water system



Working with Topography



Developing a multilayered water system



Creating a Water System

Process and Scenarios

My site is characterized by its agricultural, forested and historical values and visited by many tourists from outside the area. In September 2017 the government is planning to build

a dam in the valley to collect water from river, and thus more than 3/4 of the values listed above will be totally submerged in addition to the impact on the water quality. After analyzing the area in the fall semester, and analyzing what is the impact of the dam on the area. I came with a strategy that provide an alternative way to collect water from the river other than the dam which will be mainly ponds, wetlands, and seasonal dams which are connected to other recreational spaces and historical sites through a trip along the site.

The main layer of my design is the water system which will act as an alternative to the dam and will be beneficial for the economical, social ,and ecological value of the site. the layer of water system is divided into 3 parts:

1-Ponds: 8 ponds are located on a higher areas from the river level(If they are at same level it will cause a flood) and which have the least topographical changes, 3 of them will collect water from rain through road channel that are adjacent to the pond and the other 5 the roads are in front of them from the river side, so they will have terraces which flow the steep topography that face the ponds from behind thus it can collect rain. In addition, we can collect water from river as well by pumps to store it in the pond. The ponds will be surrounded by recreational areas and will have passive recreation inside the pond in dry season.

2- Wetlands: They are for water collection and located in areas where the river uses to flood and will act as an ecological site in dry season, and we will have 7 wetlands.

3- Seasonal dams: Small dams located after wetlands and they can collect river water by a small walls made from plastic or steel and wood that can collect a small amount of water and keeping the flow that pass above the wall and they can be removed in dry season.(System storage is 20million m3 however dam storage is 125million m3 but if we can apply my strategy along the whole river we can reach the dam amount)



Ponds On Slope

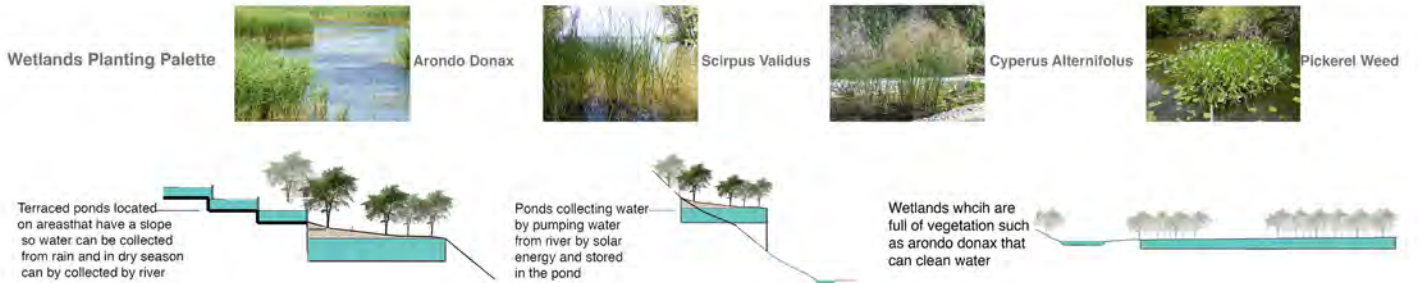
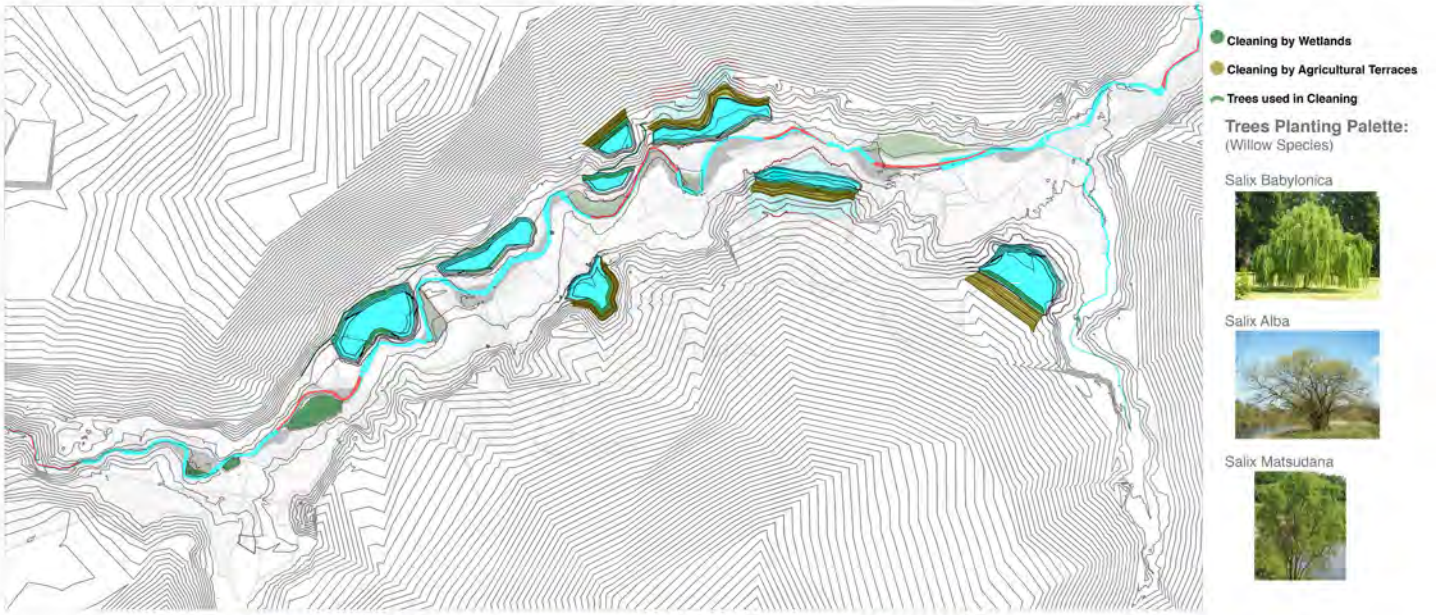


Ponds On Flat Area

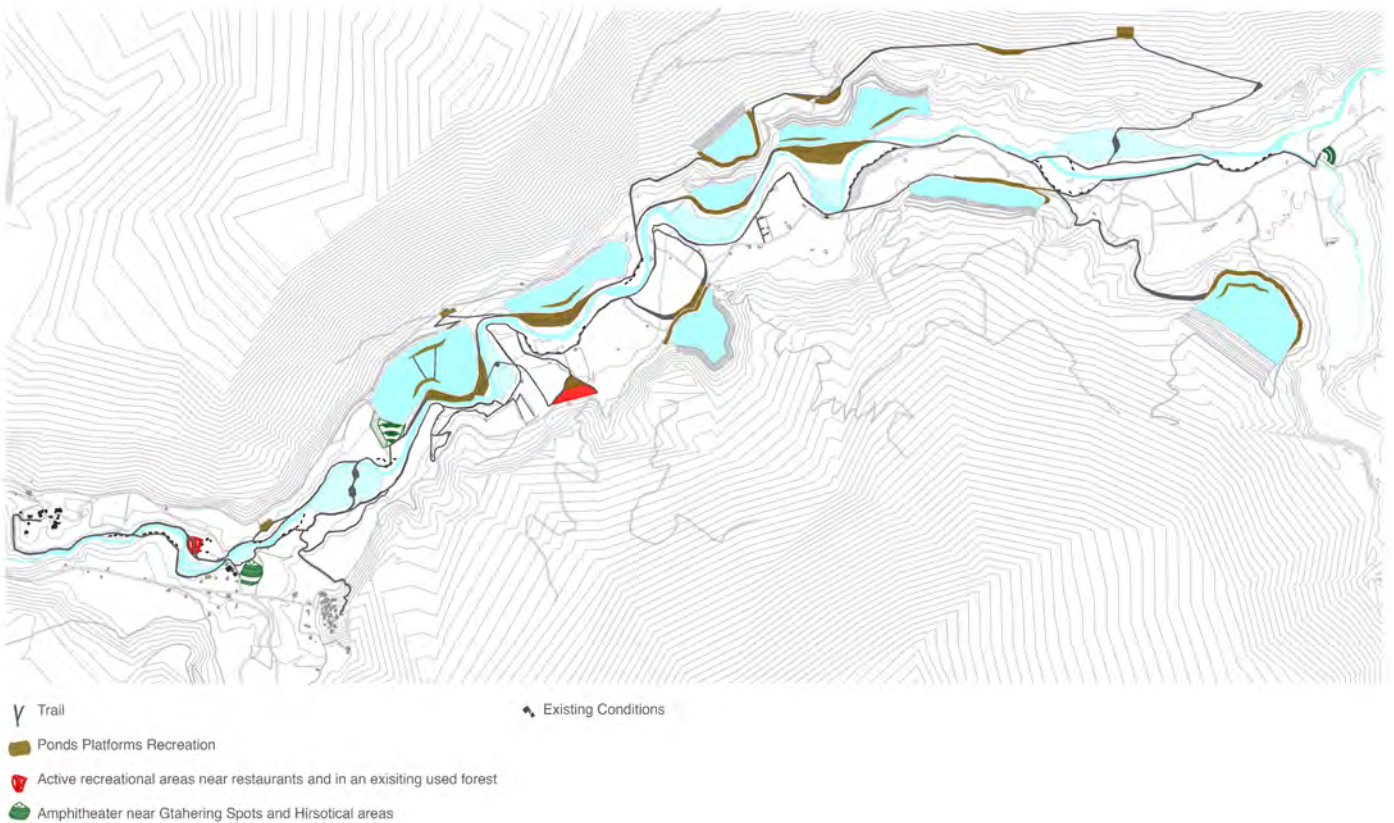


Wetlands on river level

Water Cleaning System



Integrating the Community with the Water System



Program

An important system in the water layer was cleaning So the water will be cleaned by 3 wetlands that are at the end of the site and am using grass vegetation in it such as arondo donax and other. Agricultural terraces on some of the ponds Willow trees species inside the ponds

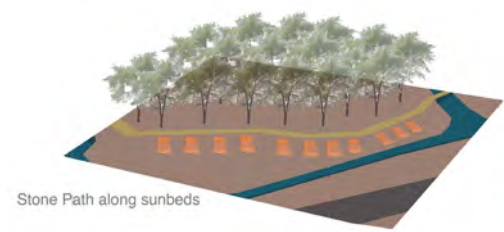
The second layer in my design is the creation of communal cultural spaces which will make the project more integrated with the site and attract people to the area.

I am providing these communal cultural spaces through:

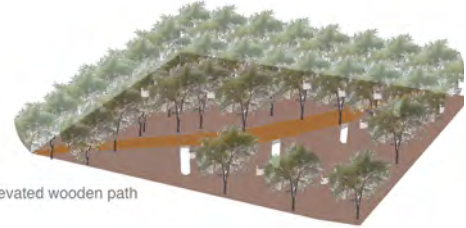
Active recreational areas such as play area near to existing restaurants, and a passive recreation for adults in a well dense pine forest where I am having swings below existing pine trees.

Passive recreational areas which are three amphitheaters near to existing gathering spots and near the roman historical columns, two types of sittings along the trail that go all over the site which are some of them benches that go along the trail other are sunbeds on river banks adjacent to the trail that connect all these areas with the village of bisri and with the ponds through pebble open yards (part of the trail) which will be also for recreation around the ponds by having two kind of sittings for view and other one near the pond. And other wooden platforms will be near to the historical areas for view purpose. In dry seasons we can have also recreations inside the ponds by having terraces and wooden platforms.

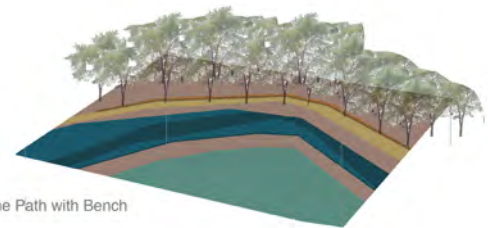
Last layers is Highlighting the importance of the ecological value of the site by Making the trail(Have Different Typologies) that have some sittings on its edges go within these forest that have mix of vegetation and adding native trees form the riparian forest in the recreational areas to provide shade and have different experience by the difference of the canopy height of the trees used. And expanding agricultural value of the site by the terraces of the 5 ponds, adding some trees around one pond and integrating the trail to some agricultural fields so people can have education about the value of agriculture in the site.



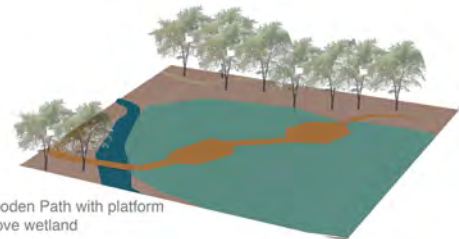
Stone Path along sunbeds



Elevated wooden path

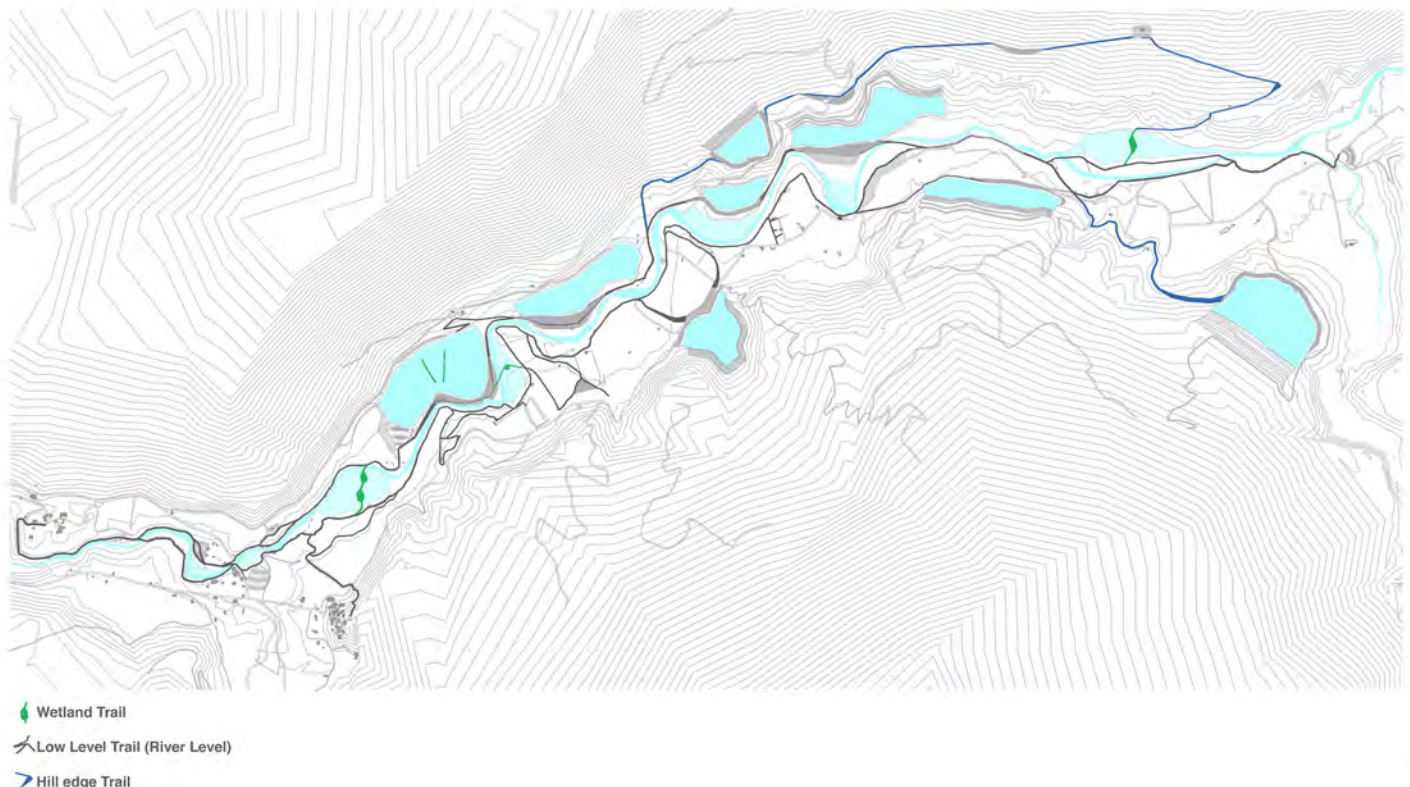


Stone Path with Bench

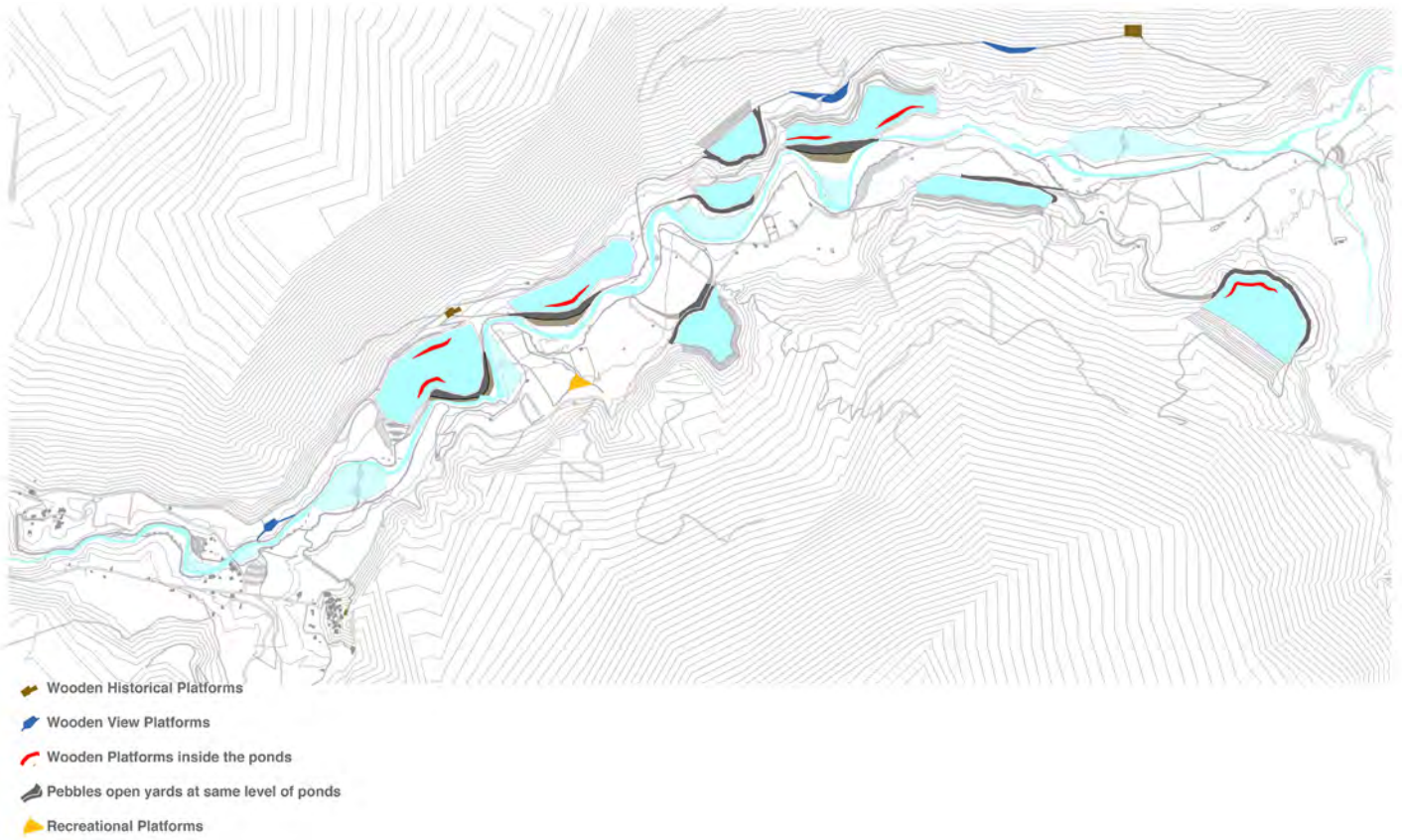


Wooden Path with platform above wetland

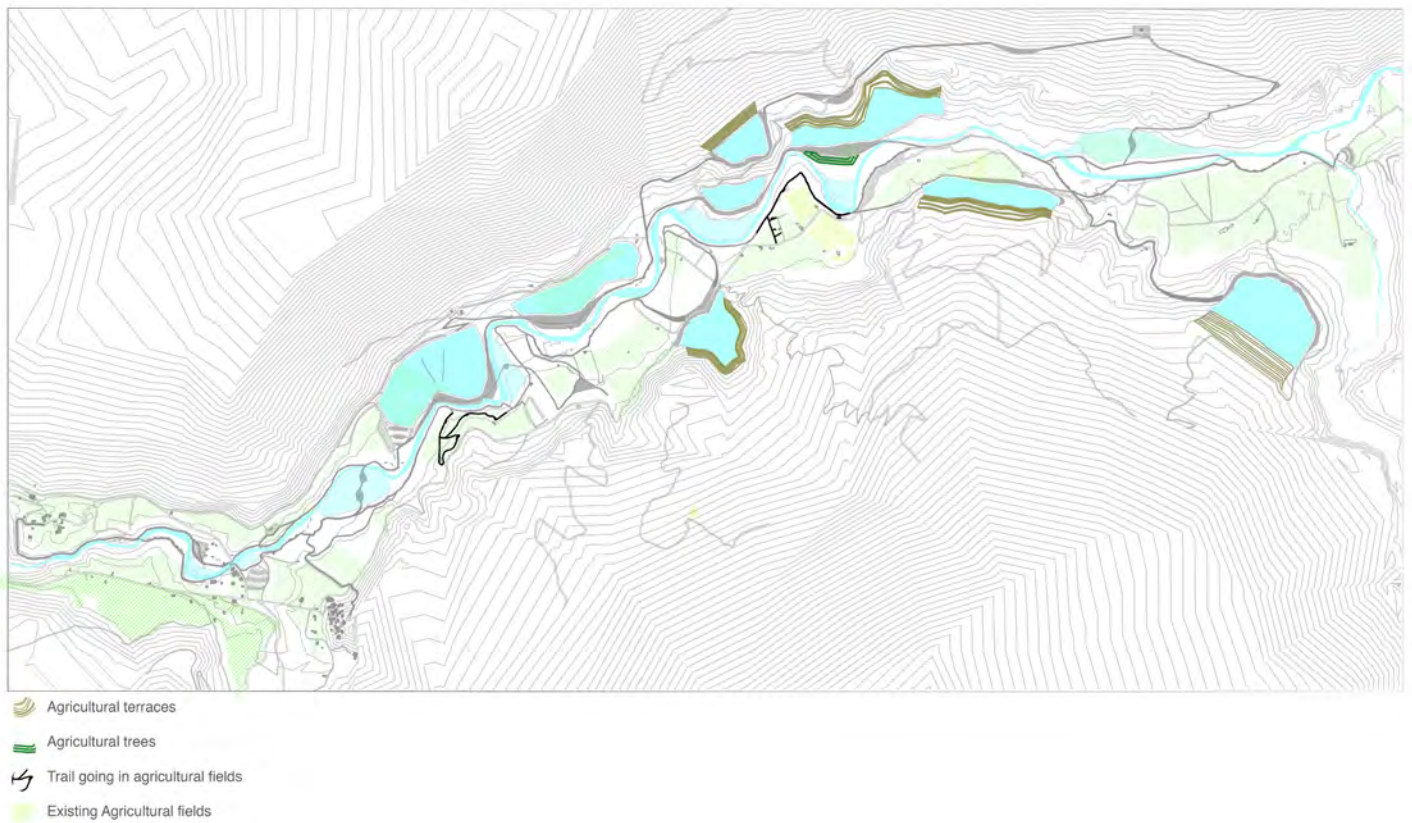
Trail Typologies



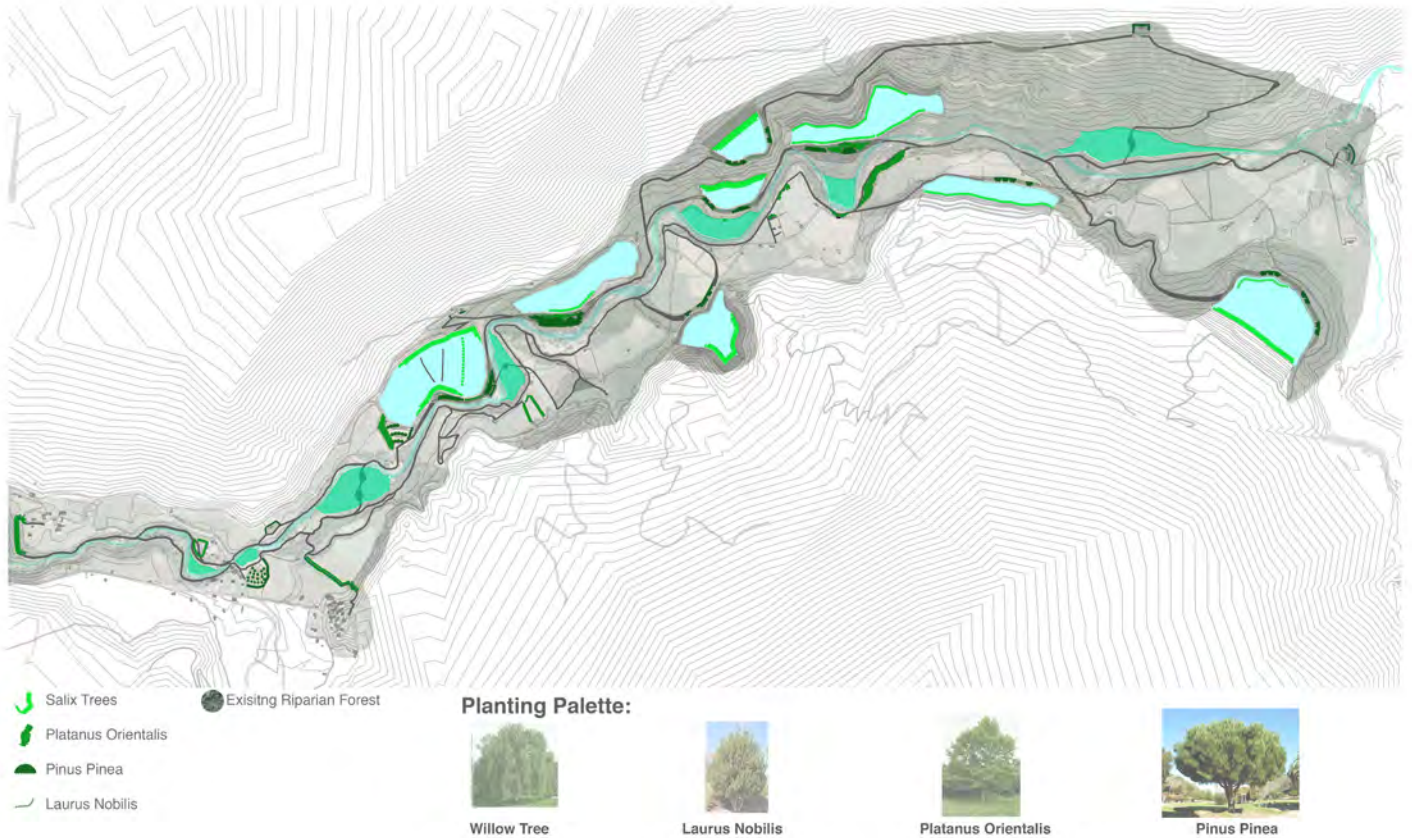
Open Yards and Platforms typologies



Expanding The Agricultural Value of The Site



Creating New Ecological Value for the site



Final Design

The last phase of my project was to zoom in in some important areas which show the linkage between different notions.

1- First Zoom titled Integrating Water to Culture and Community:

In this zoom I showed the pond (which is a rain channel pond) and the recreation around it connecting it with the wetland by a floating path and with the dense pine forest recreation where I am having swings below the pines and the wood platform of mar moussa and st sophie church. with the amphitheater and the trail that pass by some agric fields. The section show the pond pebble open yard, wooden terrace link with the river and the wetland. The perspectives/Zoom sections show the elements in the zoom in :First the ponds and the design that is around and inside the pond, the wooden platform near mar moussa looking the pond.

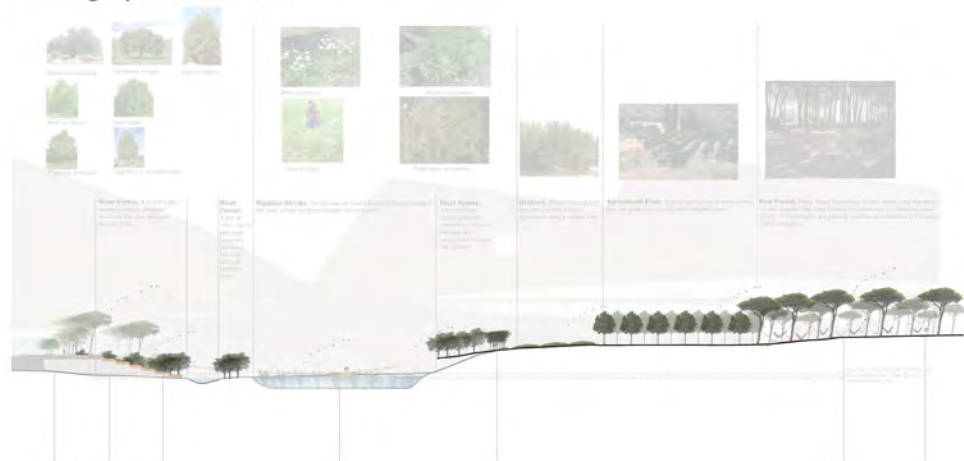
PROPOSAL 26

2- Second Zoom in titled The Water Bodies System: I have showed how the water bodies integrate with each other and how I am integrating people with the agricultural tent.

the perspective I have showed the elements of my design and the relation between the different water bodies two types of ponds and a wetland relating them to the zoom in section.

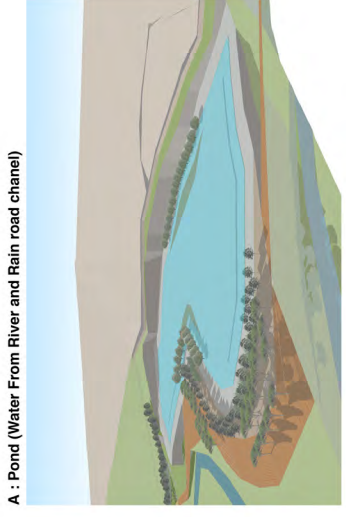
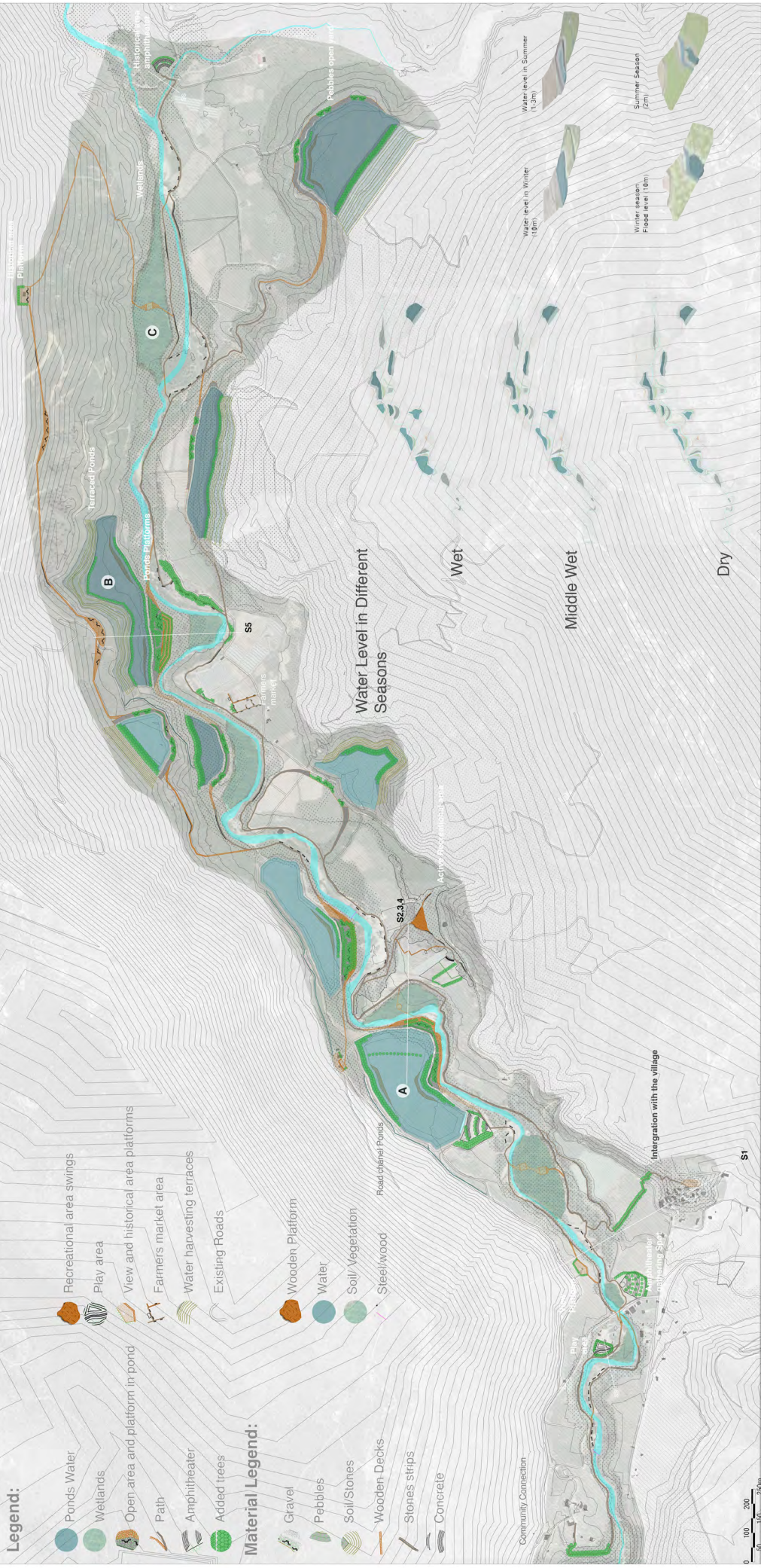
3- Last Zoom titled Connecting Bisri Village with the Project: show the wetlands near the village , the amphitheater near gathering spots , the wooden view platforms in the valley and above the village,the trail connecting the spaces.

Fostering Riparian Habitats (s3)

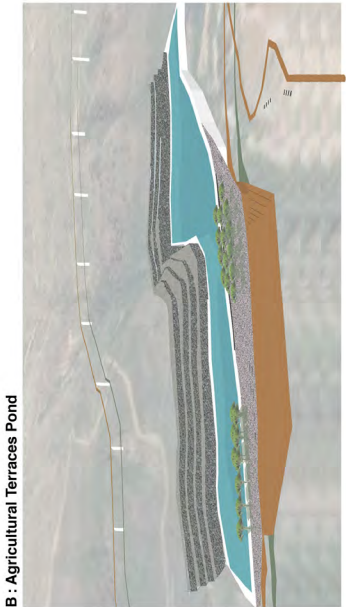


Master Plan

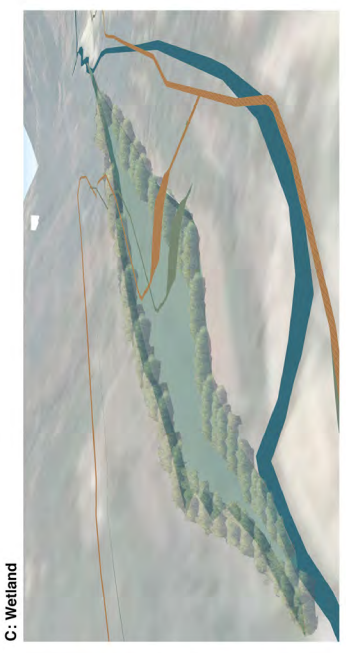
(Scale 1/5000)



A : Pond (Water From River and Rain road chanel)



B : Agricultural Terraces Pond



C : Wetland

Integrating water to Culture and Community

Zoomed in PLAN on the Pond and Recreational areas



Legend

- Willow tree
- Pinus Pinea
- Laurus Nobilis
- Platanus Orientalis
- Wetlands
- Grass
- Wooden Deck
- Pebbles
- Concrete
- Stones
- Gravels
- Stone Decks

Section Showing the relations between different features (S4)



Elements of the Zoom in Through Perspectives and Sections

Inside the Pond Recreation



Pebbles Open Yard



Platform



Wooden Platform and path Inside the pond



Gravel Terraces Inside the ponds with Willow trees



Pebbles Open Yard



Wooden Terraces and floating path

The Water Bodies System

Plan of The Water Bodies System



Section Showing the relation between Different Water Bodies (S5)



Elements of the Zoom in Through Perspectives and Sections







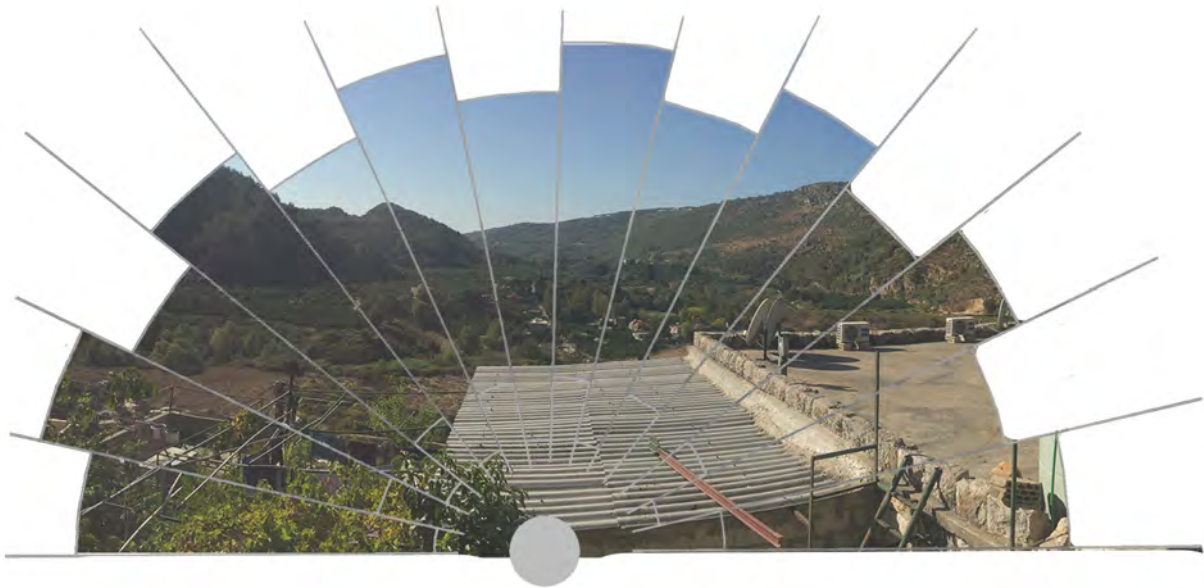
Connecting Bisri Village with the Project

Plan Showing the village connection with the project



Legend

-  Wooden Decks
-  Pebbles
-  Concrete
-  Stones
-  Gravels
-  Stone Decks
-  Wetland
-  Grass
-  Added Platanus Trees

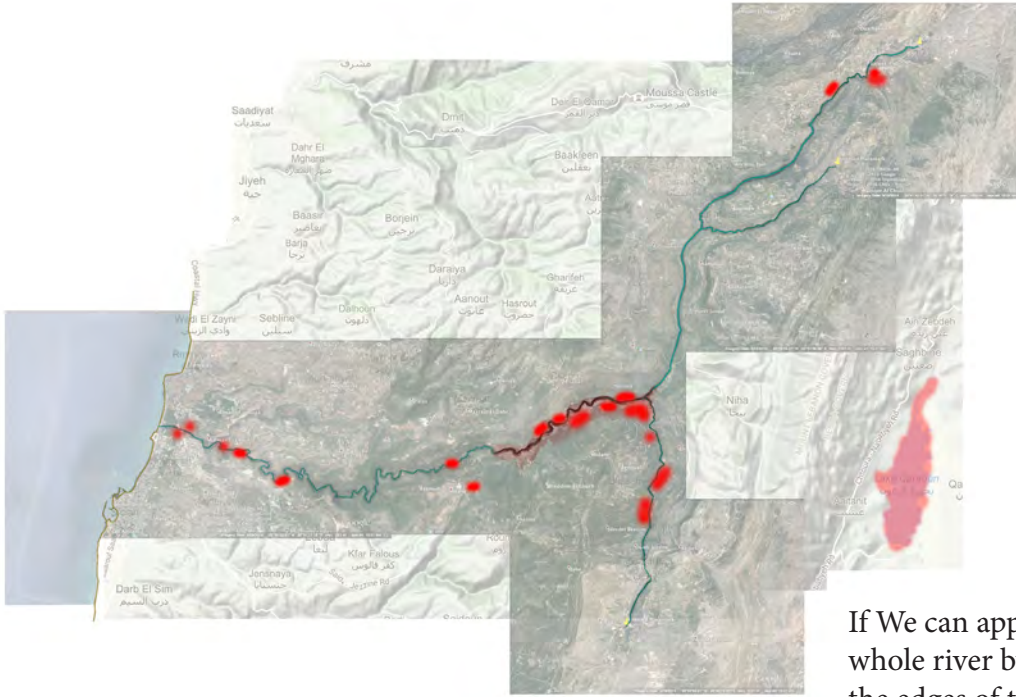


View On the wooden Platform Located Above the village

Section Showing the play area, Wetland, and village (SS')



Conclusion



If We can apply the same strategy on the whole river by having ponds and wetlands on the edges of the river thus we can reach the 125,000,000 m3 of storage the same amount gained by the dam.



Mood perspective from the hill overlooking the valley, river, and the project with all its layers.

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