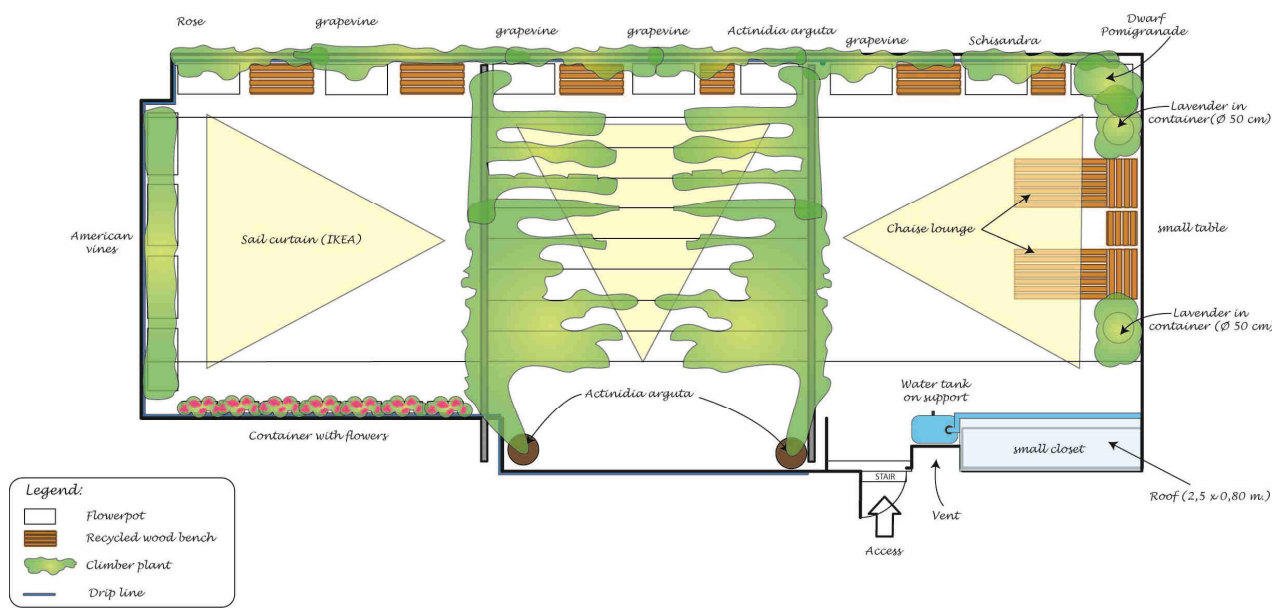


B&B AL TEATRO

Via Guaccimanni 38 – Ravenna (RA) - Italy



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I INTRODUCTION

Daniela is a friend of mine, she is a lawyer and she is deeply involved in developing a community of people interested in the transition movement (together with a friend we started a project of skillsharing in Ravenna to find people interested in transition and to share our own skills), she loves nature and six years ago she decided to invest some money and open a B&B in the center of Ravenna. She contacted me for a design because she wanted to have a relax zone in the terrace on top of her B&B and in particular she wanted to shade the car park in front of the terrace using plants in flowerpots. On the terrace there are already some flowerpots with plants but they are suffering because of the bad soil condition and because of the very strong exposition to the sun.



Figure 1: The fence with grapevine and the parking in front of the B&B.

The intention is to shade the car park view by transforming the North side fence in a living green edge, to regenerate the soil in the flowerpots and to add some resources for enhancing the relax time.

The Permaculture design method chosen for this project is the **S.A.D.I.M.E.T.:**

Survey, Analysis, Design, Implementation, Maintenance, Evaluation and Tweaking

I.1 ETHICS

Earth Care: on the terrace there are only a few flowerpots with earth inside, when I started in November 2014 the soil in the flowerpots was in very bad condition. I concentrate all the first phase of the work in enhancing the soil state.

People care: the terrace will be used by Daniela and her family for resting and relaxing. In the future Daniela will offer the possibilities to her clients to have breakfast on the terrace between plant of vines, *actinidia*, *schisandra* and some beautiful views of the old building and churches of Ravenna.

Fair Share: The surplus product will be offered to the wild birds, the free time obtained from the optimization of the maintenance of the terrace could be used for relaxing or taking with clients in the terrace.

I.2 PERMACULTURE PRINCIPLES

Follows a list of the permaculture principle and how they have applied in the project.

Observe and Interact: few time for observation from my side but plenty of time of observation from the client side. In the meantime I took out the plants from the container to check the roots state, and to check the soil conditions. Also the plants spent few years on the terrace so I can test which kind of plants were suitable to resist in that situation.

Catch and store energy: I design a small roof to protect the closet and to collect some rain water to be stored in a water tank, the water will be used for the plants.

Obtain a yield: I plan to use plants that give a yield (Actinidia, Grapes, Schisandra, and aromatics), other form of yield is the shade under the green gazebo. The hardy kiwi will grow on the existing structure and will shade the part of the terrace below them. The regenerated terrace will also give a yield in the form of space for clients breakfast.

Apply self-regulation and accept feedback: I encouraged the client to cover the soil with mulch in order to preserve the life in it, and also encourage the client to collect rain water and use it to water the plants. I also took some risks with plants (for some of them the environment could be too hot to survive) and so I have to wait till summer time to have responses and a few feedback.

Use and value renewable resources and services: for the project we recycle the old containers, only a few were added to fill the gaps. I also suggest to build chairs and benches using recycled pallets organizing a practical lab with people from the community.

Produce no waste: I plan to put in the wormery all the leaves of the plants and also all the fruits and waste of the B&B kitchen in order to produce a very good humus to use back in the flower pot to feed the soil.

Design from pattern to detail: the main aim was to cover the front fence with the climbing plants and we prepare the containers, than we get through details and we decide what kind of plant we need and what association we can put together in order to make the system more bio-diverse.

Integrate rather than segregate: we integrated different kind of plants (perennial climbers, perennial aromatics, perennial flowers and annual) rather than plant them in specific and monothematic containers. The result was good-looking containers and happy plants.

Use small and slow solution: I proceed to manage one container at a time using only manual work (I did it by hands). The water used for irrigation come from tank using only the pressure of the water (we did not use any pump).

Use and value diversity: the diversity was in every container due to the plants associations and also every container was unique.

Use edges and value the marginal: the container were positioned on the margin and on the fence but in straight lines.

Creatively use and respond to change: suggested some unusual plants typical of sub-tropic climate.

I.3 ANALYSIS TOOLS

- Base map
- Shadow mapping
- Zones
- Sectors
- Client interview
- PASTE
- Input/output analysis

II SURVEY

II.1 OVERVIEW:



Figure 2: Satellite view of the building with the terrace at B&B Al Teatro.

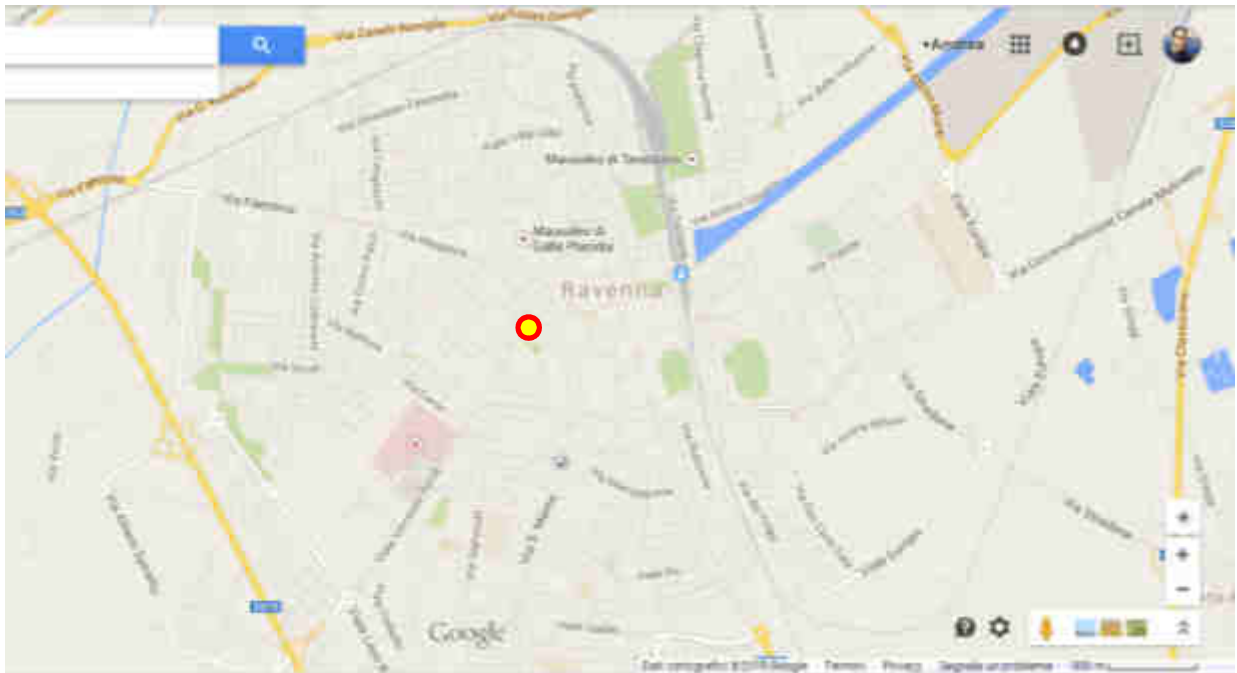


Figure 3: The position of the B&B in respect to the city of Ravenna.

II.2 CLIMATE

Altitude: less than 15 m wsl

Precipitations:

769.2 mm/year average 1960-1999;

546.4 mm/ year average 2000-2010

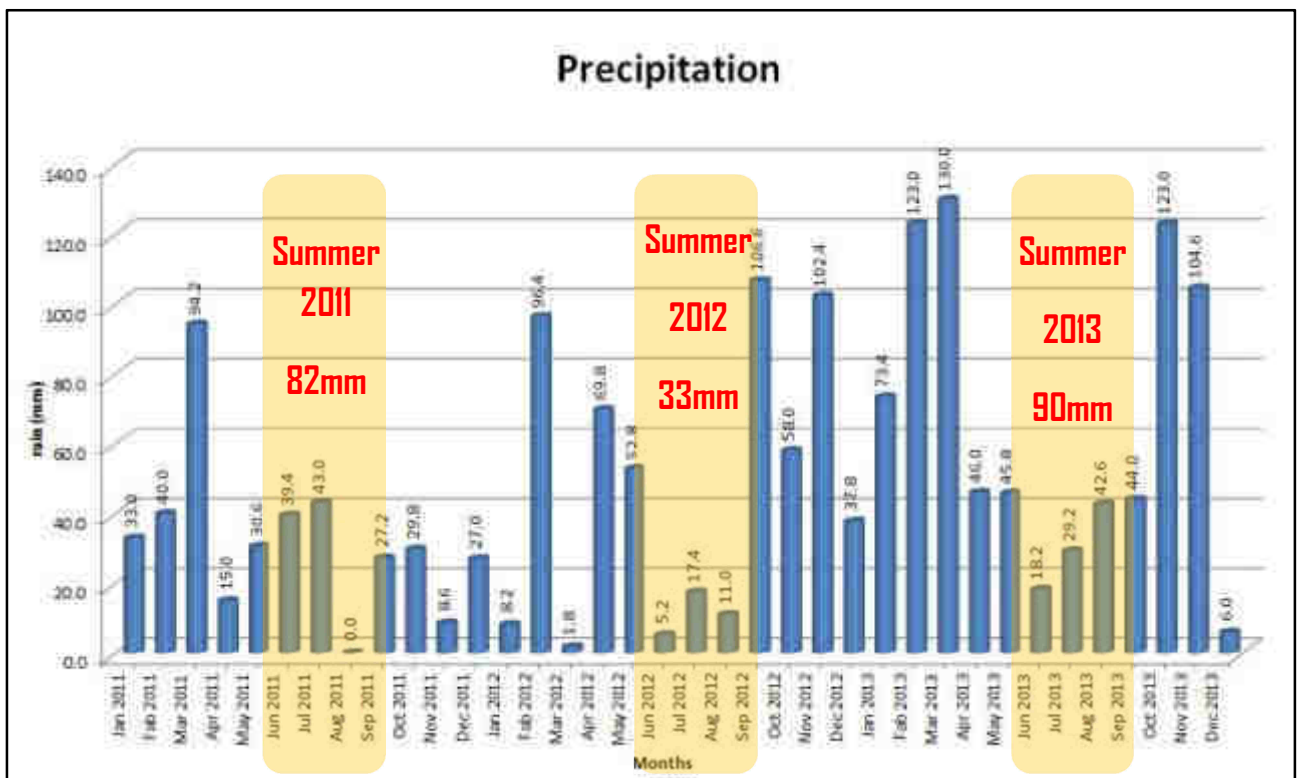


Figure 4: Precipitation (year 2011, 2012 and 2013) with highlighted the small amount of precipitation during the summer time.

Snow: normally between December and March, max 50 cm. Late frost in April with an average of 2,8 days of frost in April.

Drought: very high from April to May and medium from May to July.

Temperature: Min -5° C, Max 35°C

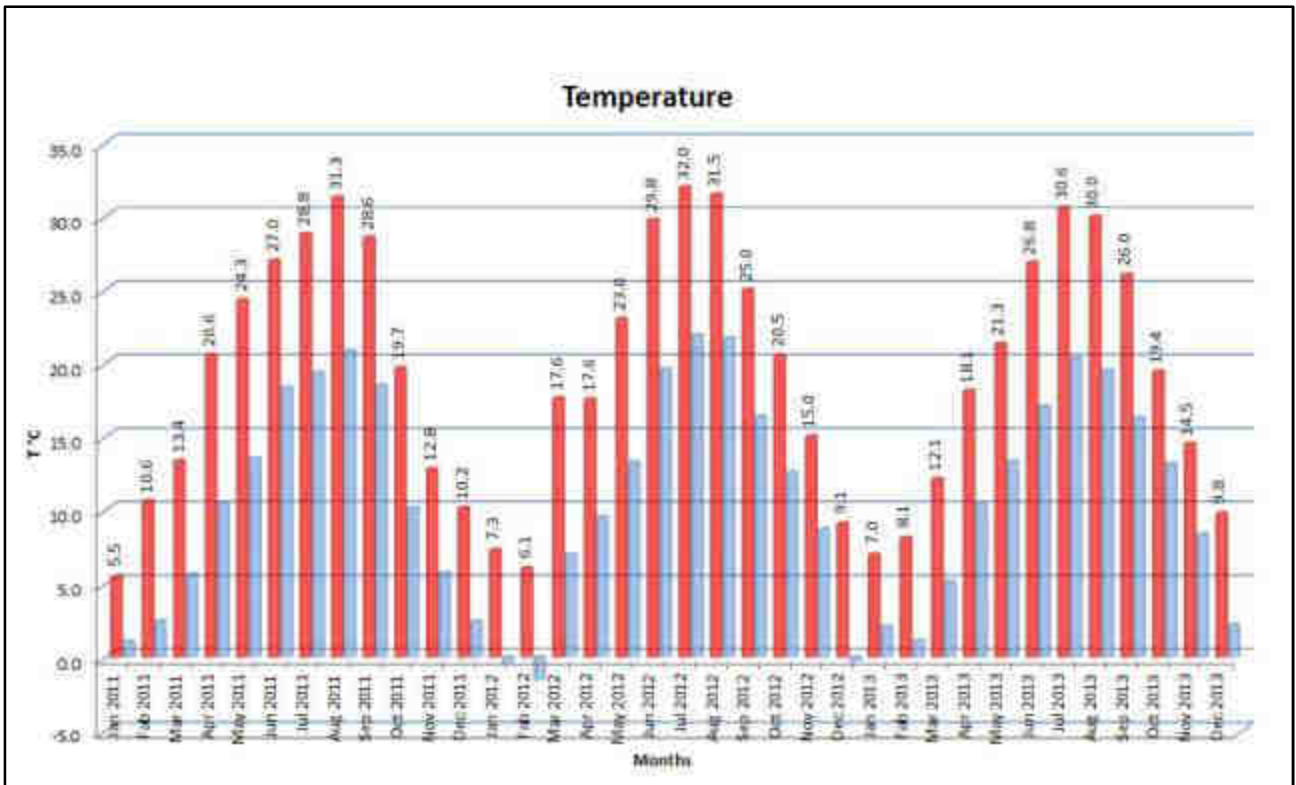


Figure 5: Tmin and Tmax for year 2011, 2012 and 2013.

In summer the temperature are not extreme but could reach easily temperatures over 30°C for several hours in the summer. The terrace is well exposed to south so the sun exposition is very strong on the terrace. This is a serious limiting factor and has to be considered during the selection of the plant.

In winter the temperature are not very cold, only few days during three months. Moreover the winter temperature are increasing due to global warming so the winter will be more mild in the future.

Winds: Winter: from North-West, Spring and Summer: from East and South-East and Autumn: from West and North-West.

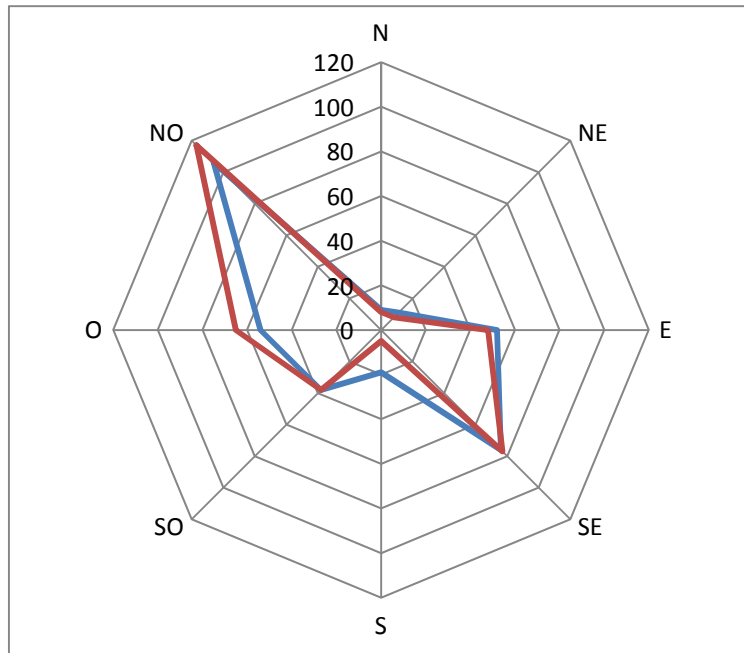


Figure 6 Wind direction. In red the wind direction for year 2013, in blue the 10 years average.

II.3 SECTOR ANALYSIS

The most important sectors to highlight for this design are the winter winds and the sun exposition. The terrace is between two higher building, therefore in the morning the East side will be in the shade while the West side will be shaded in the evening.

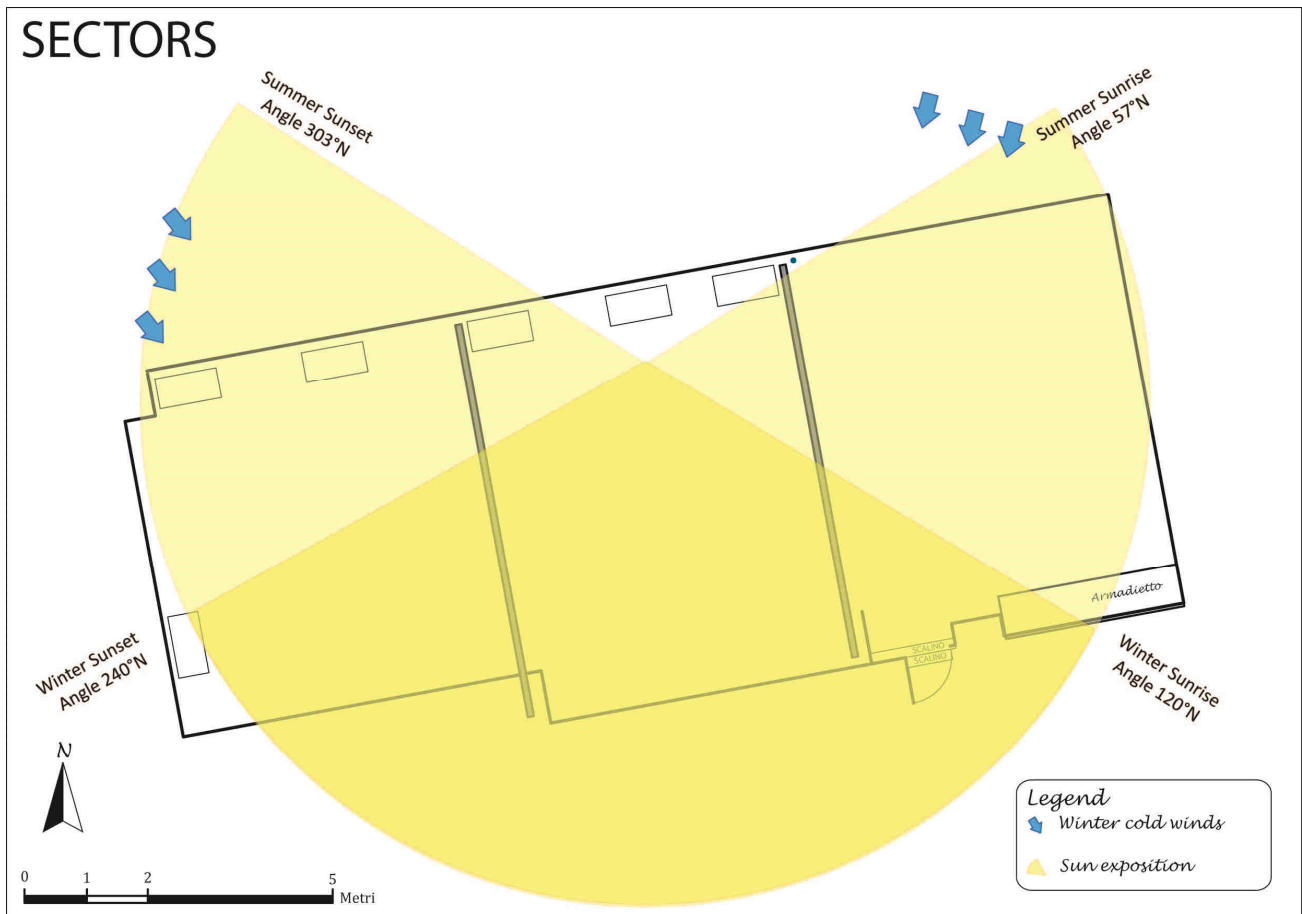


Figure 7: Sectors map.

In the terrace the winter wind comes mainly from the North West and North East, they are not strong winds and indeed they can be called breezes, but they blow almost every day.

The sun exposition areas in yellow show the sun "foot print" for the winter and summer season.

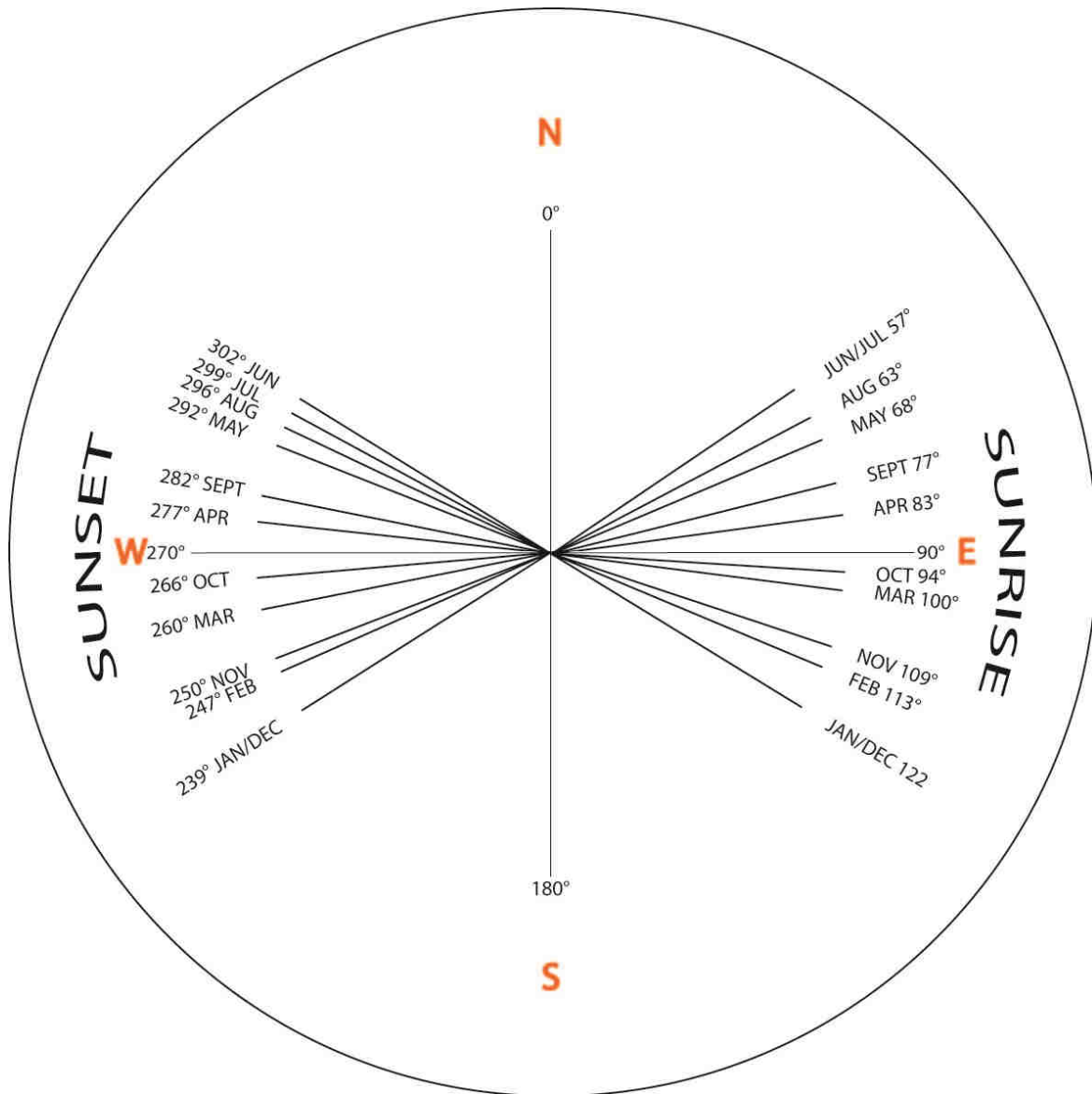


Figura 1: Angles of sunset and sunrise for the area.

II.4 CLIENT INTERVIEW

The client Daniela Mingozzi is the owner of the B&B Al Teatro, the interview has been done on the 27 of October 2014.

- **Name:** Daniela Mingozzi
- **Address:** Via Guaccimanni 38 Ravenna (RA)
- Dimension of the terrace: 15,5 x 7 m
- Number of people in the terrace: 4

- **People visiting and living the field** : friends, clients, (maximum load 30 people and 100kg/sm)
- **Physical disabilities**: No access for people on a wheelchair or for people with physical disabilities, the only access is a set of three ramps of steep stairs.
- **Works and skills**: Daniela can take care at the plants
- **Values**: sustainability as much as possible.
- Food attitude: Omnivorous
- **Age**: from 8 to 50.
- Economic situation: around 1000 euros
- **Resources**: tap water, lights and wall sockets.
- Type of property: B&B
- **Restrictions**: load, maximum load on the wood cover of the terrace is 100kg/sm
- **Potential weather adversities**: Snow and ice, heavy rain and hail.
- **Maps**: land register maps, Google map/ Bing
- **Requested products**: climbers plants, flowers and aromatics.
- **Privacy** Daniela don't want to see the cars of the parking below the terrace
- **Priorities**: shading the parking view, optimising the operation in the terrace.
- **Water**: tap water and rain water to be collected.
- **Soil in the flowerpots**: Silty-clay with very low humus.
- **WANTS**: shaded gazebo, relax area, place for having breakfast, to hide the fence and the parking below the terrace, save existing plants, flowers and fruits, save the existing structures.
- **NEEDS**: low maintenance system.
- **Services**: rain water tank and worm been composter.
- **Winds**: from North West and North-West

II.5 SURVEY

The survey has been carried on the 27 of October 2014



Figure 8: From left to right and from top to bottom: view of the terrace from the East, view from the West and the South side.



Figure 9: from left to right: the cabinet, the access and the small chimney

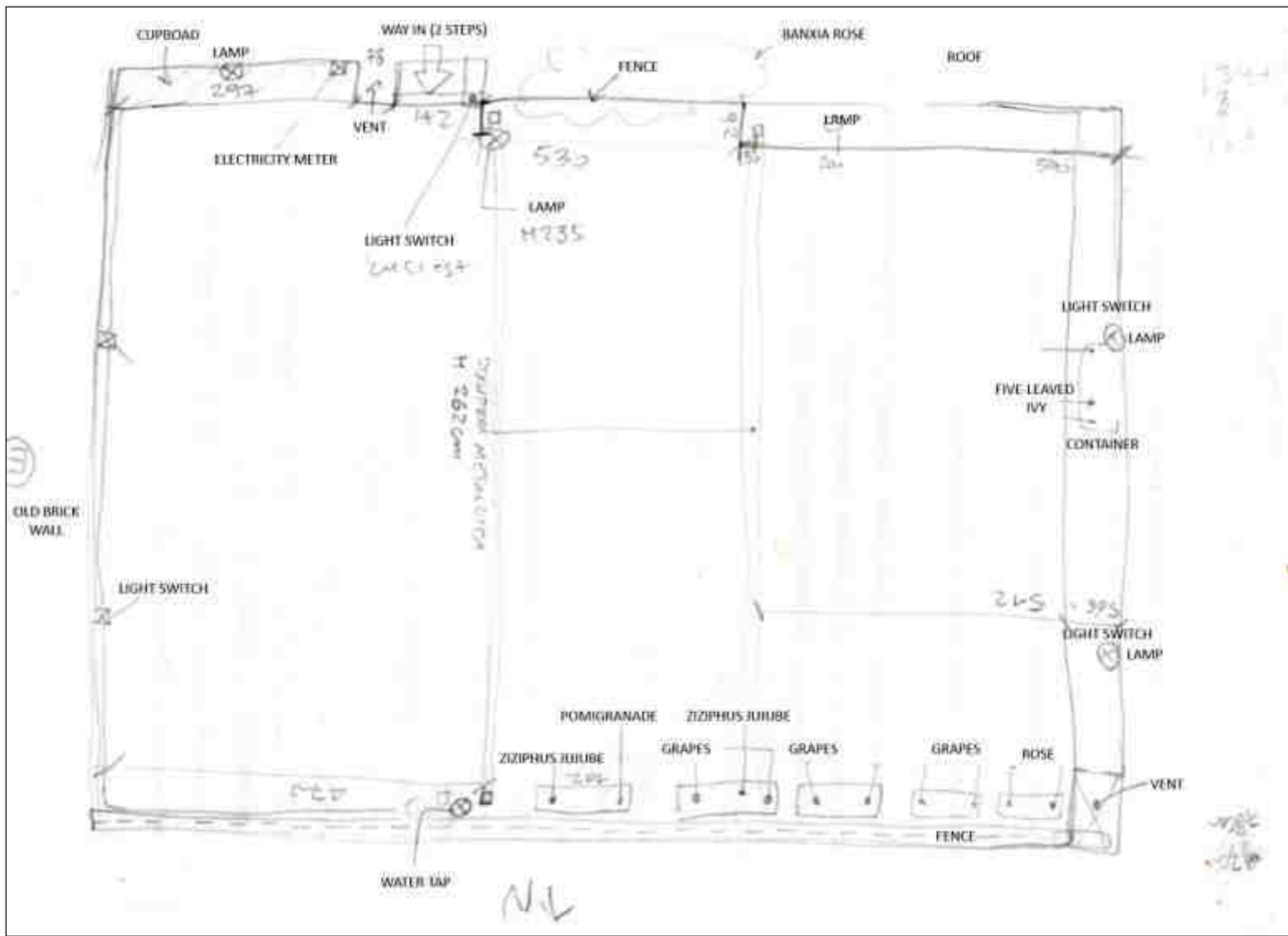


Figure 10: Survey draft map

In the North side of the terrace there are 5 flowerpots (100X40 H40 cm); they contain: 2 roses, 2 grapevines, 2 grapevines, 2 grapevines and a *Ziziphus jujube*, one pomigranade and a *Ziziphus jujube*.



On the west side there is a flowerpots with the *Pathenocissus quinquefolia* (five-leaved ivy) while in the South side there is a beautiful and huge *Banxia* climbing rose.



The North side is facing the car park which stand 3 floors below the terrace, the South side is facing the roofs of the adjacent houses while the East and West side are facing the walls of the neighbor buildings.



II.6 P.A.S.T.E. (Plants, Animals, Structures, Tools and Events)

PLANTS	ANIMALS	STRUCTURES	TOOLS	EVENTS
<p>2 <i>Ziziphus jujube</i></p> <p>1 Pomigranade</p>	Birds.	5 lamps		Family relax
<p>6 grapevines</p> <p>2 <i>Pathenocissus quinquefolia</i></p> <p>1 big Banxia rose</p>		Old shading structures		Client breakfast
<p>2 roses</p> <p>Some weeds</p>		6 flowerpots		Book presentation

III ANALYSIS

III.1 NEEDS, WANTS AND VALUES

NEEDS	WANTS	VALUES
Low maintenance system Place for clients breakfast Soil regeneration Water	Flowers Fruits Save existing plants Roses Save existing structures Relax zone Worm bin	Sustainability Recycle and reuse of things and products

III.2 FUNCTIONS, SYSTEMS and ELEMENTS

FUNCTIONS	SYSTEMS	ELEMENTS
Bio screen	Climbing plants	Vines Actinidia arguta Wisteria Akebia Schisandra chinensis Flowerpots Soil, Biochar, Rice chaff and Compost Water Mulch
	Shrubs	Rosa Aromatics Dwarf pomigranade Flowerpots Soil, Biochar, Rice chaff and Compost Water Mulch
Relax	Chaise lounge and bench	Wood Pallet Work tools Nails and screws
	"Nature in flowerpots"	Climbers Plants Shrubs Flowerpots Soil, Biochar, Rice chaff and

		Compost Water Mulch
	Gazebo	Existing structures Iron wire Work tools Climbers (Actinidia) Flowerpots Soil, Biochar, Rice chaff and Compost Water Mulch
Low maintenance	Drip line water system	Drip lines Timer Battery Mulch
	Mulching	Rice chaff, straw, etc... Running plants (clover)
	Strong and rustic plants	Aromatics
Watering	Tap water	Drip lines Timer
	Tank for rain water	Roof Tank Support Work tools Tubes
Fertilization	Wormery	2 small bins (25 liters) Soil Rice chaff

		<p>Worms</p> <p>Food scraps</p>
	<p>N-Fixers layer</p>	<p>Wisteria</p> <p>Alfa alfa Beans, Lupins, clover, etc...</p> <p>Flowerpots</p> <p>Soil, Biochar, Rice chaff and Compost</p> <p>Water</p> <p>Mulch</p>
	<p>Potassium source</p>	<p>Seaweed</p> <p>Wood ash</p>

III.3 INPUT/OUTPUT ANALYSIS

INPUT		OUTPUT
A fence Climbing plants and shrubs Container Soil Water Water system	BIO SCREEN	Screening (parking lot) Source of diversity Food production Leaves Fruit Flowers Beauty Scented terrace
Wormery N-fix shrubs and plants Potassium sources	FERTILISATION	Healthy plants Good and alive soil Worms Compost Available nitrogen source Available potassium source

BIO SCREEN: the bio screen system will be made of a set of climbing plants, shrubs, aromatics and flowers in containers along the existing metal fence of the terrace. Some plants will produce fruits (actinidia, pomigranade, grape vines, akebia, schisandra, etc..) others will produce herbs (aromatics) others flowers (bulbs, aromatics, etc...) the flower will attract pollinators (some insects hotel will be added too). The guild of plants below the shrubs and climbing plants will keep the plant protected from pests, therefore will not be necessary to use anti-pest systems. There will also be N-fixers plants to add available source of nitrogen (wisteria, lab lab beans, etc...). The bio screen will screen the terrace from the parking lot, but will also produce diversity and life, will produce food and protection for insects and also nesting places for birds (some birds house will be added too). The plants will produce also leaves and biomass that could be added to the wormery system in order to produce compost to feed the plants in the containers.

FERTILISATION: this system is composed of three elements:

- 1- Wormery
- 2- N-fix layer of plants
- 3- Sources of potassium

The wormery will be filled with scraps from the kitchen (from the B&B) and from the garden waste, the wormery will produce a rich compost to feed plants in container and also worms to be added in containers too (for soil regeneration and also for birds). The wormery will also be a tool for teaching sustainability to clients and children.

The N-fix layer of plants will be a selection of climbers, runners and herbaceous plants to be added in the containers in order to feed plants. The plants will also produce flowers, diversity, will attract pollinators and will also produce litters to feed worms or to use as mulch in the containers.

The potassium source could be ash from the local pizzeria, algae from the tank or from a small pond to add to the system.

The GAZEBO will use the existing metal structures for growing climbers (actinidia). Climbers will create a great shade to have breakfast, will produce fruits for the autumn and winter, will reduce the heat in the terrace by shading it. Climbers will also attracts pollinators and could offer a nesting site for birds and insects.

DESIGN

III.4 ZONES

For this project I have identified 4 zones:

- **Zone 0:** The house (B&B) is the zone zero, it is not in the map but can be well represented by the accessing stairs.
- **Zone 1:** The East side of the terrace will be the zone 1. In this zone will take place the *chaise lounge*, the water tank and will be the most visited zone of the terrace.
- **Zone 2:** will be the area below the gazebo in the center of the terrace.
- **Zone 3:** zone three will be the West side of the terrace; this zone is the in the other side of the terrace in respect to the access stairs, and will be only salutary visited. In the next future this area of the terrace could be the breakfast area for the B&B clients.
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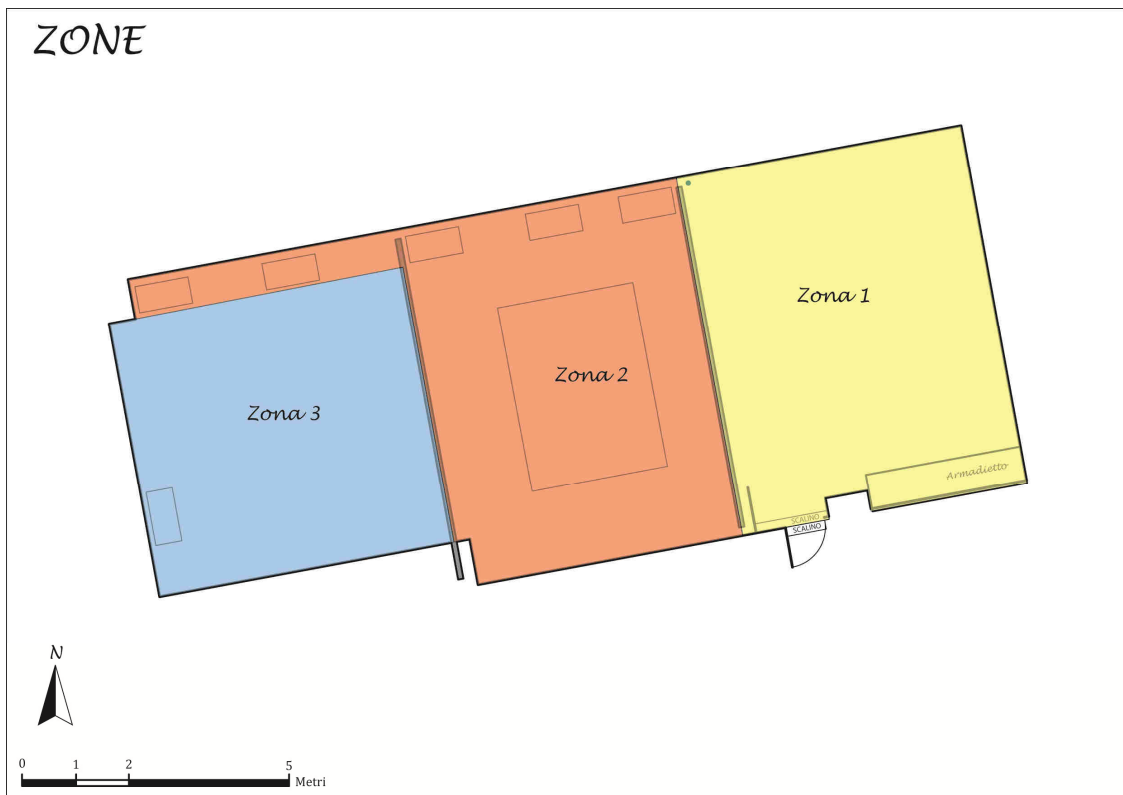


Figure 11: Zones map

III.5 SUGGESTED PLANTS

Climbers with edible fruits

HARDY KIWI - *Actinidia Arguta*



White flowers in late Spring

Edible fruits in Autumn (for having fruits a male plant is needed every 7 female plants)

CHOCOLATE VINE - *Akebia Quinata*



Evergreen or semi-evergreen

Violet flowers in Spring

Edible fruits in Autumn

The stems are excellent basketry materials

MAGNOLIA VINE - *Schisandra Chinensis*



Flowers in Spring

Fruit ripens between August and October. For having fruits a male plant is needed together with a female except for *Eastern Prince*.



Medicinal plant, edible sap.

HONEYSUCKLE - *Lonicera caprifolium*



White flowers in Spring

Black berries loved by birds

The stems are excellent basketry materials, bee plant.



Climbing flowers

WISTERIAS - Wisteria

Lablab bean



Pea



NASTURTIUM - Tropaelum majus



Shrubs

Aronia melanocarpa



Shrub 2 meters high and 3 meters wide.

White flowers in late Spring

Black berries full of vitamins between August and September.

Fruits after two years from planting.

Bee plant.

III.6 MASTER PLAN

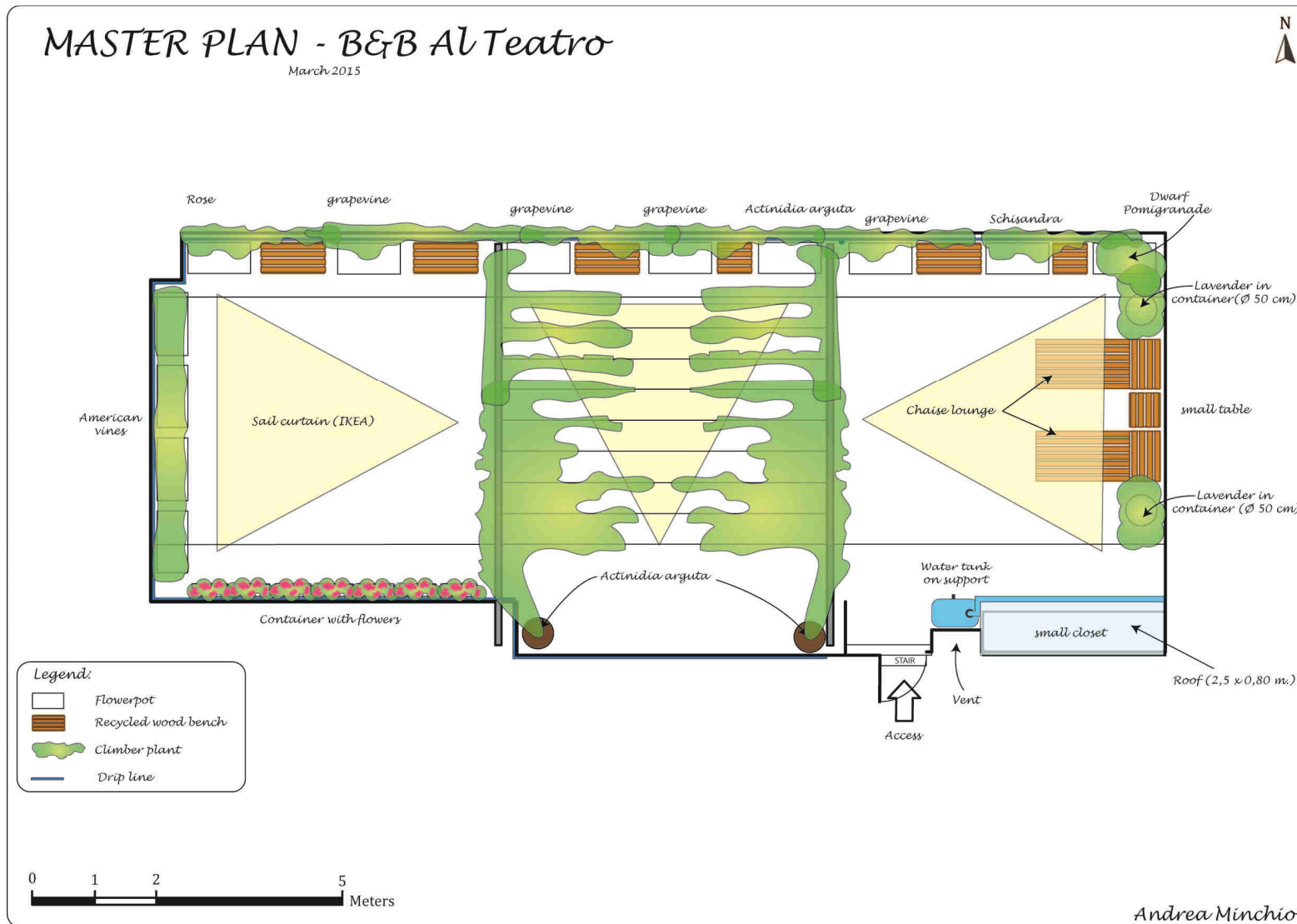


Figure 12: Master Plan for the B&B Al Teatro.

To shade the car park below the terrace the soil in the flowerpots have been regenerated by taking away the undesired plants (two *Ziziphus jujube* have been moved away), by reshaping the roots of the existing plants and by adding biochar, compost and rice chaffs to the existing soil.

I suggest to add some flowerpots with good soil and to buy some climbers (*actinidia arguta* and *schisandra chinensis*) in order to shade the car park view and to cover the existing structures.

I suggest to add two curtain (sail shaped) in order to have some shade and to make some workshop to create some benches and at least two chaise lounge for relaxing time.

On the existing small closet which stand on the south side near the access stairs, I suggest to build a roof, to collect the rain water from the roof and store it in a tank (200 liters) to put on a support in order to allow to use the water for watering the plants.

I suggest to add a flowerpots in the west side with two *Pathenocissus quinquefolia* in order to cover the wall while I suggest to add a piece of art on the East side wall (a good looking bricks wall) in order to appraise it.

I suggest to add two round flowerpots in the South side and to plant two *Actinidia Arguta*; the two hardy kiwi will grow on the existing structures and will create a very pleasure shaded area in the center of the terrace.

To add fertility in the containers for the future I suggest to start a wormery by creating a simple set of plastic containers (the recycled 25 liters containers of the wall paint are great) to host worms which will convert the B&B food scraps in rich humus. I also suggest to plant clover, alfa-alfa beans, peas and other n-fixers plants and flowers in order to have a source of Nitrogen for the climbers and shrubs.

I suggest to keep the flowerpots mulched and to install a new watering system composed of dripping lines connected to the tap water as a backup system and to use the rain water stored in the tank to water the plants during the hot season.

In the relax zone in the East side I suggest to add two flowerpots with lavender or other aromatic plants in order to enhance the relax.

The benches and the chaise lounge can be assembled using recycled wooden pallet. For the construction a workshop (skillshare modality) can be organised in order to build some of them and to acquire the skills to build the rest. Some ideas of benches made with recycled wood pellet are shown in the pictures below.



Figure 13: Example of recycled benches using pallets.

III.7 COSTS

The rectangular flowerpots cost 25.00 € each (4 are needed).

The rounded flowerpots cost 15.00€ each (4 are needed).

The plants cost from 5.00 to 15.00€ each (2 lavenders, 4 *actinidias*, 1 *schisandra*).

The water system cost around 100.00 €

The rice chaff bags cost 0.60€ (3 bags are needed)

IV IMPLEMENTATION

IV.1 2015

15 of January 2015: starting the regeneration of the soil in the flowerpots.



Figure 14: The soil in the flowerpot has been taken out and mixed with biochar, compost and rice chaff.



Figure 15: The roots system of the grapevines have been reshaped and the plants planted back in the flowerpot. Some flower bulbs have been added.

March 2015: some aromatic plants have been added to the flowerpots and also some mulch (rice chaff).



Figure 16: From left to right: the first flowerpot from the east towards the west with the Pomigranade shrub and a sage, the second with schisandra and marjoram.



Figure 17: From left to right: the third flowerpot containing a rose, garlic, the male actinidia Tomori and a rosemary, two grapevines and a marjoram.



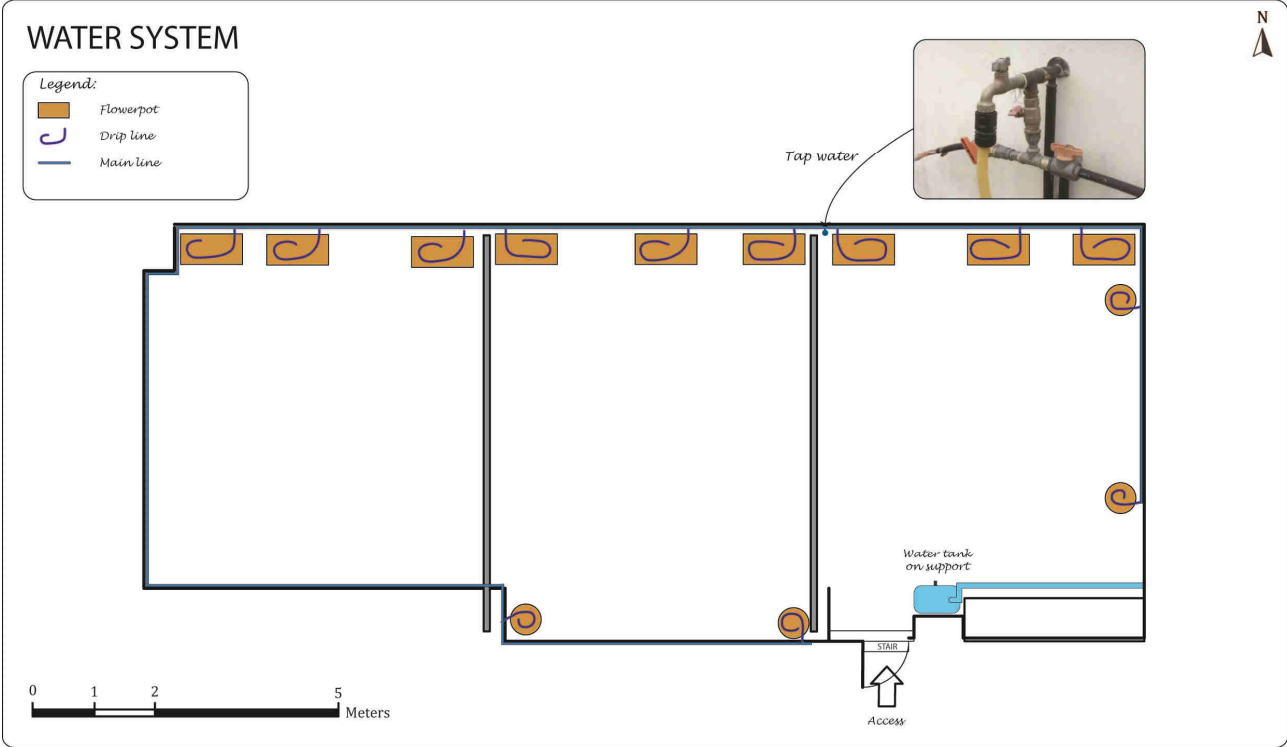
Figure 18: From left to right: two grapevines with flower (bulbs) and a solitary actinidia arguta Issai.



Figure 19: From left to right: two grapevines with garlic and rosemary and a rose with garlic and a thyme

4 – 5 of May 2015: all the flowerpots have been connected to a regenerated water system made of a main line of PVC tube (\varnothing 17 cm no holes) and several secondary lines inside the flowerpots

using the dripping tubes (\varnothing 17 cm, holes every 30 cm). There are two main lines starting from the tap water.



IV.2 2016

In spring an insect hotel has been added in order to attract beneficial insects, to help plants with pest control and pollination and also to add curiosity and instruct clients.



A cover has been added over the shelves. Next step will be to connect the cover to a water harvesting and storing system



At the beginning of May a workshop has been organised at the B&B Al Teatro to build a vermicompost heap by using recycled materials.

Now the B&B can start to use the kitchen scraps to feed the worms and to create a great product: the compost for the plants in the containers.

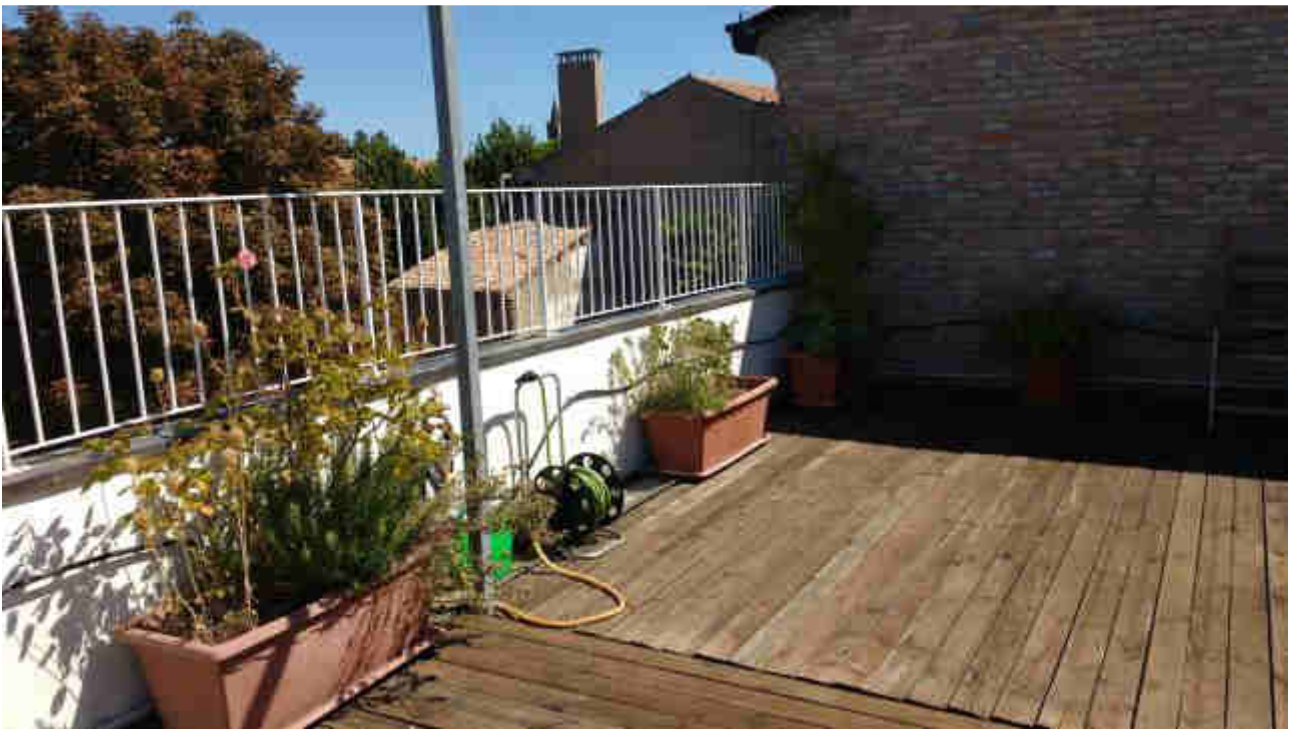




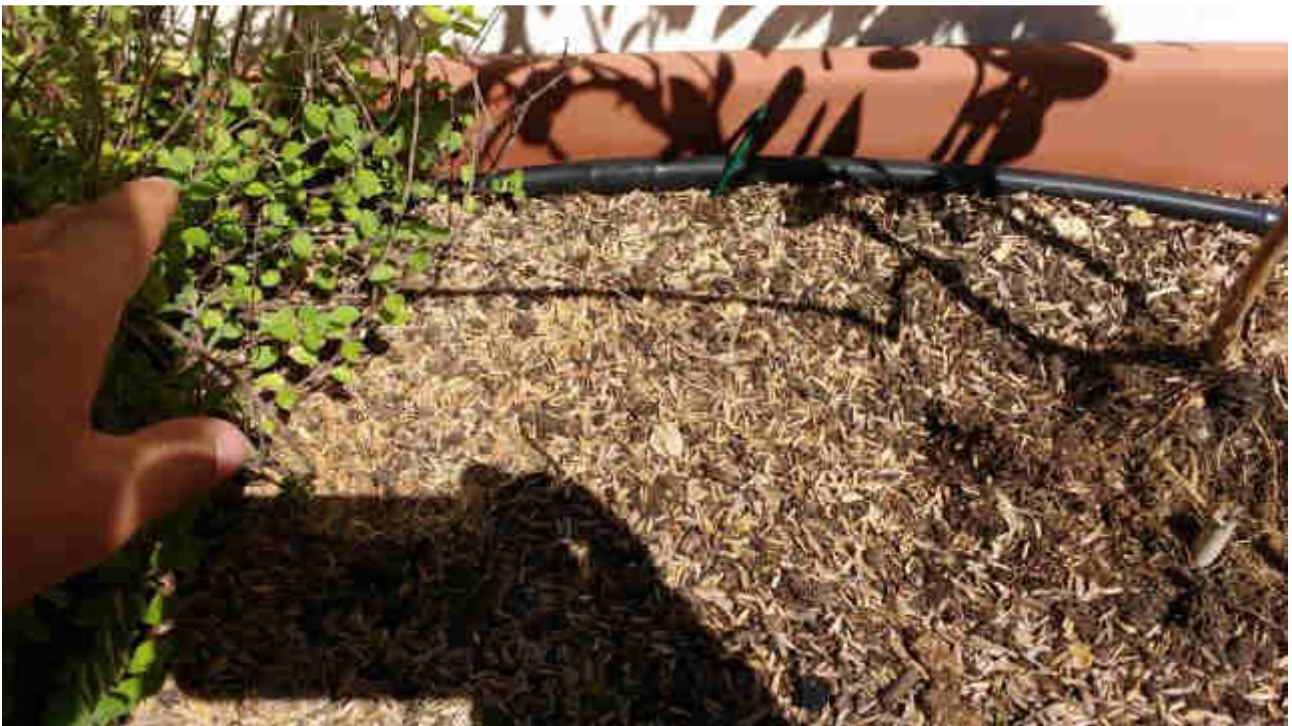
SUMMER 2016



Left: terrace in 2014, right terrace in 2016







Detail of the soil in the container.

V MAINTENANCE

SPRING

In spring add compost to the container and check for the mulch state, if necessary add some mulch.

SUMMER

At the beginning of summer check for the watering system, plants in container need water during summer time.

Collect the leaves during summer and especially during autumn. Add the leaves in the wormery or keep it for summer time for mulching or to add to the wormery.

AUTUMN AND WINTER

Climbers pruning.

Add some feed for birds

Remove tents

Every 5 years it could be necessary to remove part of the rooting system of the climbers in the containers and add some new and good soil to the flowerpots

VI EVALUATION

The designed solution for the terrace have been accepted by the client and she appreciated the proposed solutions.

The CLIENT INTERVIEW proved to be a fundamental tool for understanding the needs and wants of the client but this kind of format is still nor good enough for understanding and having information about the background and the vision of the client and also about the condition of the site.

The plant suggested for the design, in particular those to cover the fence are grooving well, they are not suffering from the sun and from the poor container soil, but at the same time they are not good enough to cover the fence. To better fill the fence with leaves to screen the parking lot I suggest to add some very fast growing plants like the *Lonicera caprifolium* or *Passiflora*.

The three years diagram of the minimum and maximum temperatures in the climate analysis proved to be very clear for designing solutions for the high temperatures of the terrace in summer. July and August proved to be the months with the highest temperatures and a special attention is needed to verify and control the watering system. Fortunately during summer the B&B is opened and there are plenty of attention to the terrace plants.

The survey phase has been very accurate, several photos have been taken and a draft map have been prepared. These are the right procedure of operation to carry on for surveying a small area like the terrace.

The design report can be realized in a more professional way. I will make a design on this to find a format to be professional, easy to fill, transferable to different kind of projects and not too much time consuming.

VII REFLECTION

This is a small design for a friend, the owner of a B&B in Ravenna. On the roof of the B&B there is a terrace with some plants and she asked me to design some new solutions for the terrace. This project has been important for me because Daniela, the owner, is a friend, but in this particular situation she was also the client and she asked me a professional consultancy. Therefore I had to be more professional than for other projects I made for myself or for friends.

From this design I have learnt how is important the relationship with the client and that is very important to understand, since the beginning, the real client's needs and wants. That's why I can say that the most important tool to be used with a client is the client interview. Clients also need to have suggestions and hints and is very important to learn how to create good relationships with them. I have learnt that it is better to use a more detailed format for the interview and that is a good option to ask the client to record the talk. Time is needed to prepare an interview fitting with every client before making the interview.

Daniela, the client, liked the design and the proposed solutions. She have implemented almost every proposed solution and she is waiting for the end of summer for connecting the shed roof to an harvesting system. We have realized that some solution can be realized organizing workshops (the wormery is an example).

The tubes of the dripping lines are black, and the water inside in summer will became very hot, this could be a problem for the plants, even if it is related only to the first water coming out the holes and also the water will pass through the mulching layer. A solution could be to paint in white the tubes, at least those with no holes.

The regeneration of the soil in the container is going on well, after one year the soil is not compacted and the plants are good. A more thick layer of mulch should be added to protect the soil from the rain events and prevent compaction.

The watering system is working very well but is still connected only to the tap water. There is a need for implementing a system for harvesting rain water and for storing it for later use.

The association of plants and climbers in the container is going well. An association of aromatics and spring bulbs have planted in the container with the grapevines. They are all thriving meaning that the association was fine and each plant is developing good connections with the others.

I suggested some "anomalous" plants which did not thrive in the terrace, I should have done more researches before suggesting these kind of plants.

Tips for survey

- Take as much photos as possible from any point of the site

- Take also photos of detail
- Sketch out a draft map of the site using steps for record distances and use a meter for detail
- Take any kind of note