

March 21



DESIGN PORTFOLIO

LE MAS DES OLIVIERS

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1. Introduction

I have always been interested in nature and environment. I studied environment at university and since then, I have almost always worked in environment (fresh water, marine ecology, and more recently climate change). I always knew that I could find a better way to live my life, more in harmony with nature.

When my husband and I bought our 1.3 ha section in May 2020, I knew that was it. I had to find a way to transform this bare piece of land into a wonderful place where we can live together without doing any harm to Mother Earth.

I was aware that permaculture could answer my needs, but had not many skills and I didn't know where to start. Therefore, I followed a Permaculture Design Certification in order to know what was possible.

I designed this farm, Le Mas des Oliviers, following my understanding of permaculture, my values, my vision and the goals I had set up.

2. Background

Permaculture understanding

When I started my journey in permaculture, I did know much about it ("it is a better way to farm" was my understanding). Since then, I learnt a lot a lot and I my understanding of permaculture is that it allows me to live a better life with a smaller impact on the environment. I can improve my health as well as my family's health while protecting Mother Earth. I now understand that everything is linked together, and I see myself (and my family) as being part of our environment, not being apart from it.

Values

Family, freedom, fairness, learning, discovery and happiness

Vision

"Offer a healthy lifestyle to my family as well as improving the environment's health"

Mission

My mission is to use my knowledge of permaculture and of the environment to increase my family's health and the environment's health while producing healthy food for my family and the community.

Stretch goals

When buying my section in Carterton and starting my permaculture journey, I had a few goals that I kept in mind:

- Have a healthy lifestyle,
- Produce most of the food eaten in my household,
- Be able to make a living from my farm (share yield and skills).

Permaculture ethics and principles

These are the three permaculture ethics:

- Care of the Earth,
- Care of People,
- Fair share.

The following twelve principles are the permaculture principles. They all (some more than others) have been considered in the design of Le Mas des Oliviers:

- Observe and interact,
- Catch and store energy,
- Obtain a yield,
- Apply self-regulation and accept feedback,
- Use and value renewable resources and services,
- Produce no waste,
- Design from patterns to details,
- Integrate rather than segregate,
- Use small and slow solutions,
- Use and value diversity,
- Use edges and value the marginal,
- Creatively use and respond to change.

3. Site analysis

3.1. Permaculture design questionnaire

Contact person	
Address	Le Mas des Oliviers
Email	
Preliminary goal(s)	I am the owner of the property I am working on. My primary goal is to feed my family with the yield of my farm. Ideally, I wish to be (almost) self-sufficient for fruits, vegetables and meat. When my farm will be well established and I am able to feed my family, I would like to extend it so I can offer/sell food to my community. I want this food to be healthy and tasty, without any chemicals. Also, I wish to share skills and knowledge with my daughter and my community.

Your Property		
1.	Size of property / lot	1.3 ha
2.	Do you have a copy of the tax map, plot plan or survey map of the property? If so, please attach	See map bellow
3.	Are you aware of any historic uses of this land such as farming, logging, etc?	Dairy farm
4.	What kind of property surrounds your property? (residential, business, etc.)	Lifestyle blocks (currently under development)
5.	Please describe the number and type of buildings on this land (including any outbuildings)	1 house and 1 pole shed are to be built (due in July 2021)
6.	Does your property have any desirable views?	Tararua range (North-North-West) views are very desirable (to be noted that Ruamāhanga plains (South-South-East) views are not bad either)
7.	Does your property have any undesirable views?	No
8.	Are there any special privacy or "screening" needs?	No need at this point (may be needed later once the other properties will be built)
9.	Do you know what type of soil you have? (clay, sandy, loamy, rocky)	Gravelly clayey loam
10.	Have you had your soil tested?	Yes
11.	Have you observed any drainage problems (wet ground, standing water, water in basement etc.) on your property?	No
12.	Have you noticed any areas of soil loss or erosion	No
13.	Any areas that are too hot/dry in the summer	Very hot and dry in summer on all the property
14.	Describe elevation changes on your property. Where is the low spot, the high spot and are there any slopes areas?	The site is almost flat. There is a gentle and regular South-South-East facing slope (<2%).
15.	Describe any unique features of the landscape.	Nothing unique on site apart from the views on the Tararuas
16.	Do you know where your septic system & leech field are located? Or where your sewer lines cross your property?	See map bellow
17.	Any specific site "challenges" or problems that you really want to solve or minimize? (Noise, privacy, drainage, poor soil, erosion, etc.)	The site is currently a bare piece of land. Therefore, everything is to be done. It will take a lot of time of efforts, but it is a great opportunity to be able to "write" something completely new. The wind is probable one of the main challenges on the property.

About You		
18.	Who lives in the home?	
19.	Do you need (now or in the future) to make your property accessible/usable by persons with disabilities or limited mobility?	No
20.	Does anyone living here have allergies (to plants, bee stings, etc) that you're aware of?	No
21.	How much time do you currently spend maintaining your yard or landscape?	About 1 hour per day Monday to Thursday and more Friday to Sunday (weekends)
22.	In the future, how much time would you like to spend maintaining your yard or landscape?	Same

23.	Do you employ a landscape or yard maintenance company or do you do this work yourself	All the work will be done by my husband and myself. We will have Wwoofers from time to time to help us
24.	What are some of your favourite outdoor activities that you currently enjoy on your property	Gardening
25.	What are some of the activities that you wish you could enjoy on your property in the future?	Show my daughter the wonders of a garden in a safe environment
26.	What types of company do you entertain? Adults/Children/Mixed? Friends/Family/Co-workers? Neighbours?	Mixed adults and children, mainly friends.
27.	Please describe any pets that you allow outside.	Two dogs (1 fox terrier and 1 spaniel)
28.	How long have you lived in the house?	We do not live on the property yet, but we will move on it as soon as the house is finished (due in July 2021).
29.	How long do you anticipate living here beyond today? Is the decision to stay or leave contingent upon any property and landscape-related issue?	It will be our forever home
30.	If this is a part-time residence, what times of the year will you be here regularly?	n/a
31.	To what degree are you interested in growing some of your own food?	<input checked="" type="checkbox"/> Very interested - fruits / vegetables / herbs <input type="checkbox"/> Somewhat interested <input type="checkbox"/> At a "hobby garden" level only <input type="checkbox"/> Not at all interested
32.	Do you conduct business from home? From a home office? Retail? Other?	I occasionally work from home. So does my husband.
33.	During which seasons of the year do you spend time in your yard?	I spend as much time as I can in the garden regardless of the season as long as the rain stays away.
34.	Does your lifestyle incorporate any particular spiritual or religious practice that you would like to mention?	n/a
35.	Do you see yourself implementing your permaculture plan fairly quickly, or gradually over time?	We will implement the plan as soon as we live on the property. Obviously starting from nothing, it will take years to implement (budget limitation, time limitation, etc).

About Your Home		
36.	How old is your home	New (2021)
37.	How is it primarily heated?	Fireplace + solar passive design
38.	Do you have a backup heat source in the event of an outage or fuel delivery problem?	n/a
39.	How is your hot water heated	Wetback with the fireplace + electricity
40.	Do you know how much electricity you use, on average, per day (see your electricity bill for average kWh/day)	n/a since the house isn't built yet
41.	How old are your windows	New (2021) - double glazed and uPVC to be well insulated compare to aluminium
42.	Do you feel like your home is well-insulated?	The house will be well insulated with natural wool (sheep) in the walls and ceiling and polystyrene in the floor.
43.	Where does your drinking water come from?	<input checked="" type="checkbox"/> Our own well (1m ³ /day) <input type="checkbox"/> Municipal water supply <input checked="" type="checkbox"/> On-site water collection / cistern <input type="checkbox"/> Don't know / not sure
44.	Does your neighbourhood/town have any special covenants or regulations governing how you can use your property/home for gardening, etc?	All materials used must be new.
45.	Are you interested in renewable energy for your home? (solar hot water, solar electricity, wind, etc.)	Sadly, we do not have the budget for solar panels, but the house will be wired to be able to install panels later in time. Therefore, we only need to plug in the panels when we will be able to buy them.
46.	Are you interested in an energy audit to determine how best to reduce energy consumption and become more efficient?	Because I am a Climate Change Advisor, I can do it myself. Obviously, we try to reduce our energy consumption as much as we can.
47.	Are you interested in learning about incentive for energy efficiency work or for renewable energy?	Because of my job, I am always up to date in this information.
48.	Any known structural problems with your house?	No

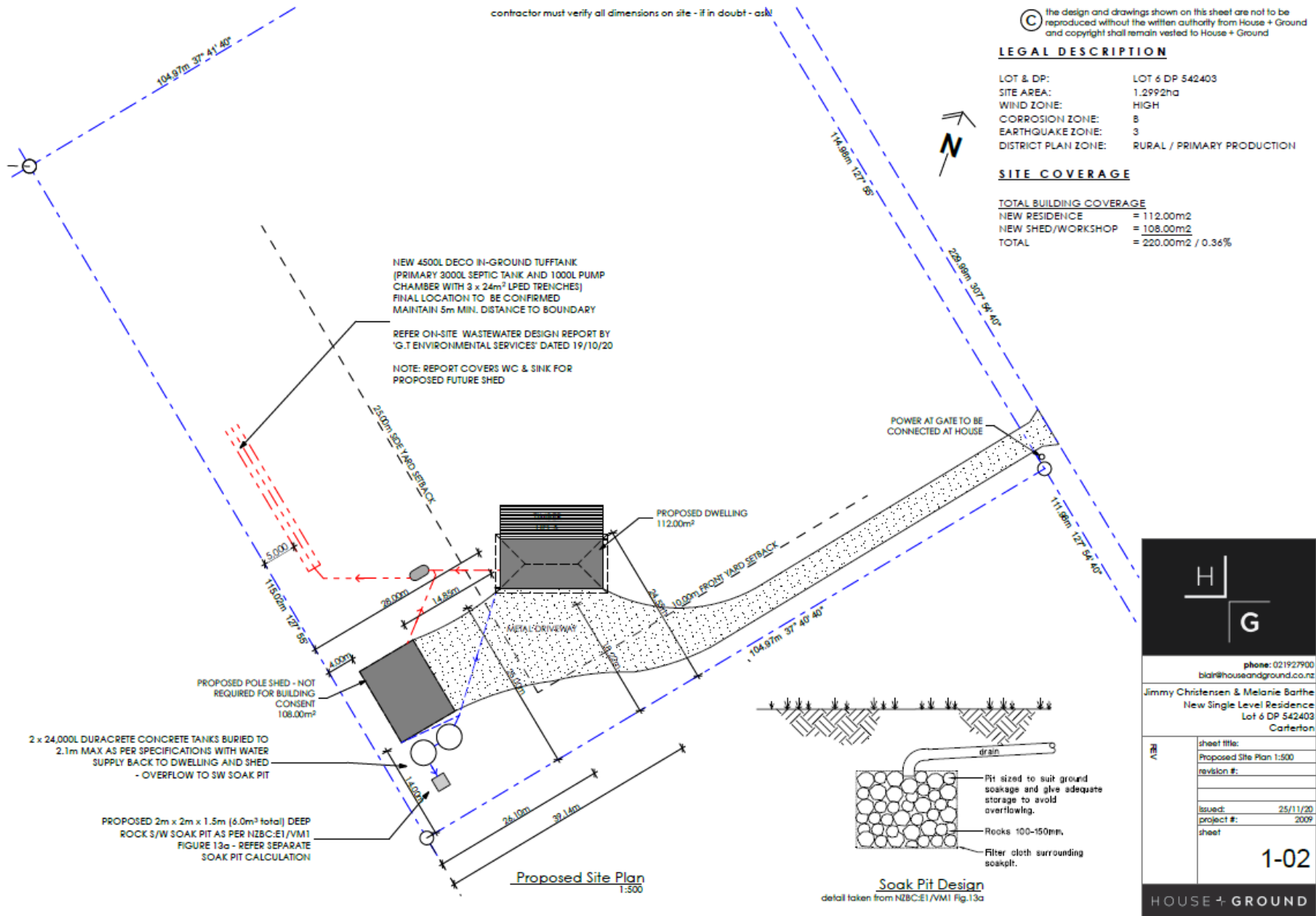
Garden Design Considerations		
49.	Do you have favourite styles or types of gardens?	<input checked="" type="checkbox"/> Edible perennials (fruits, nuts, berries, etc.) <input checked="" type="checkbox"/> vegetable gardens <input checked="" type="checkbox"/> Medicinal plants <input type="checkbox"/> Flower gardens <input checked="" type="checkbox"/> Culinary herbs <input type="checkbox"/> Cottage gardens <input type="checkbox"/> Formal gardens <input checked="" type="checkbox"/> Pollinator gardens <input type="checkbox"/> Moon/Night gardens <input type="checkbox"/> Other
50.	What "moods" or tones do you want your landscape to convey?	<input checked="" type="checkbox"/> Bright <input checked="" type="checkbox"/> Welcoming <input checked="" type="checkbox"/> Meditative <input type="checkbox"/> Other <input type="checkbox"/> Cheerful <input checked="" type="checkbox"/> Playful <input type="checkbox"/> Private <input checked="" type="checkbox"/> relaxing <input type="checkbox"/> Social <input type="checkbox"/> Ordered
51.	If you said 'yes' to edible plantings, what varieties are you most interested in? (apple, peach, berries, nuts, etc)	Many fruits, especially summer fruits (cherries, apricots, peaches, etc) and vegetables. Many Mediterranean herbs (thyme, rosemary, lavender etc.)
52.	Do you have any particular types of plants that you really love?	Mediterranean plants
53.	How much "lawn" do you want in your landscape and what activities will the lawn be used for?	We need a lawn in front of our house and deck in order to have a play area for our daughter (trampoline, etc.)
54.	Do you have colour schemes that you envision in your landscape?	No
55.	Which shapes/themes do you prefer in garden designs?	<input checked="" type="checkbox"/> Curves <input type="checkbox"/> Oval <input type="checkbox"/> Formal <input checked="" type="checkbox"/> Rustic <input type="checkbox"/> Circles <input checked="" type="checkbox"/> Informal <input type="checkbox"/> Tiered <input type="checkbox"/> Rectangle <input type="checkbox"/> Other
56.	What type of hardscape materials appeal to you?	<input type="checkbox"/> Flagstone <input type="checkbox"/> Slate <input checked="" type="checkbox"/> Gravel <input checked="" type="checkbox"/> Stone <input type="checkbox"/> Concrete <input type="checkbox"/> Wrought iron <input checked="" type="checkbox"/> Wood <input type="checkbox"/> Brick <input type="checkbox"/> Other
57.	Landscape structures/special features. Which of these would you like to incorporate into the design?	<input checked="" type="checkbox"/> Deck <input type="checkbox"/> Arbor <input type="checkbox"/> Gazebo <input checked="" type="checkbox"/> Garden paths <input type="checkbox"/> Sculpture <input type="checkbox"/> Cold frames <input checked="" type="checkbox"/> Herb spiral <input type="checkbox"/> Meditation <input type="checkbox"/> Playhouse <input type="checkbox"/> Other <input type="checkbox"/> Patio <input checked="" type="checkbox"/> Pergola <input checked="" type="checkbox"/> Pond <input checked="" type="checkbox"/> Gate/fences <input checked="" type="checkbox"/> Sauna <input checked="" type="checkbox"/> Greenhouse <input type="checkbox"/> Rock walls <input type="checkbox"/> Lighting <input type="checkbox"/> Tree house <input type="checkbox"/> Pool <input type="checkbox"/> Trellises <input checked="" type="checkbox"/> Water tanks <input type="checkbox"/> Fire pit <input checked="" type="checkbox"/> Hot tub <input checked="" type="checkbox"/> Kitchen gard <input type="checkbox"/> Bench <input type="checkbox"/> Play set <input type="checkbox"/> Outdoor kitc

Design Relationships (You, Your Home, Your Landscape Working Together)		
58.	Which utility" features do you need to have incorporated in your design to support your lifestyle/landscape?	<input checked="" type="checkbox"/> Compost bins <input checked="" type="checkbox"/> Firewood storage <input checked="" type="checkbox"/> Clothesline <input type="checkbox"/> Boat/camper storage <input type="checkbox"/> Bicycle storage <input checked="" type="checkbox"/> Trash/recycling bins <input checked="" type="checkbox"/> Tool shed <input type="checkbox"/> Other
59.	Is there a smooth flow for foot traffic from inside the home to outside the home	Yes, it will be
60.	Are parts of the home "too exposed' to cold winds or hot sun?	It shouldn't. The Northern side of the house will be protected by a pergola with a vine, so the leaves protect the house in summer and are gone in winter when we want the sun to warm the house.
61.	Are you planning renovations to the home either now or in the future?	No
62.	Is there any place in the landscape that you (or anyone living there) would consider "special" or even "sacred"?	No

Breakdown Goals & Motivations For Doing This Work					
	Very imp.	Somewhat imp.	Interested, but not a priority	No interest	Don't know
To create an overall permaculture design for our property	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To live more sustainably	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To create a landscape that requires fewer inputs of time, money and effort in term of ongoing maintenance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To have an edible landscape	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To create an aesthetically/visually pleasing environment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To more easily entertain in my home/yard	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To have a more energy-efficient or "greener" home	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To increase the value of my property	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
To reduce he operating costs (i.e. energy, water, etc.) of my home	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any Final Comments?					
/					

Table 1: Permaculture design questionnaire for Le Mas des Oliviers

Figure 1: Plan of the section and buildings



phone: 021927900
 blair@houseandground.co.nz

Jimmy Christensen & Melanie Barthe
 New Single Level Residence
 Lot & DP 542403
 Carterton

sheet title:	Proposed Site Plan 1:500
revision #:	
issued:	25/11/20
project #:	2009
sheet	

1-02

HOUSE + GROUND

3.2. Site characteristics

3.2.1. Climate

Winds

My section's closest weather station is East Taratahi. Dominant winds are:

- Northeasterlies: mostly gentle winds (1-20 km/hr),
- Southwesterlies: mainly gentle winds, but also strong winds (21-30 km/hr) and very strong winds (31-40 km/hr),
- Westerlies-Northwesterlies: mainly strong winds, but also gentle winds and very strong winds.

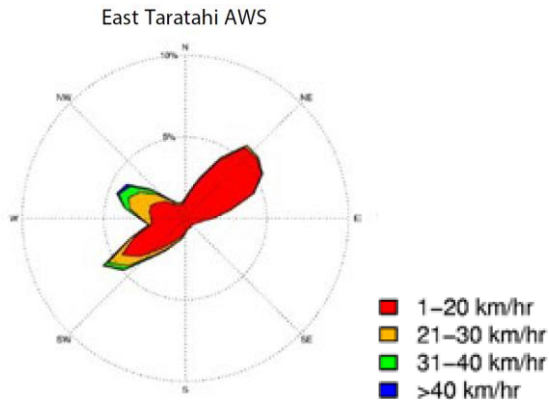


Figure 2: Wind sectors at East Taratahi

Source: NIWA

I need to mention that I did not live yet on the section and when discussing with neighbours, I was told that the dominant winds are Northwesterlies. Southerlies can happen and are very cold winds. I will need to assess the winds for a while after living on the section and discuss more with neighbours to understand the winds on my site.

Rainfall

The following table shows the rainfall in Masterton (1981-2010), located 13 km North-east from Le Mas des Oliviers. Le Mas des Oliviers being located at the bottom edge of the Tararua Range, we can expect having slightly more rain than Masterton.

Masterton receives 927.6 mm of rain every year. The rain is well distributed across the year, but the climate is slightly wetter in winter and dryer in summer.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	44.4	69.0	84.5	54.0	93.6	105.3	90.9	86.7	73.7	77.2	77.5	70.9
Rainy days (d)	7.1	7.6	10.1	9.2	11.0	13.2	14.1	14.1	11.7	12.8	10.0	9.7

Table 2: Rainfall and rainy days in Masterton (1981-2010)

Source: NIWA

Sunshine

The following table shows the sunshine in Masterton (1981-2010), located 13 km North-east from Le Mas des Oliviers. Le Mas des Oliviers being located at the bottom edge of the Tararua Range, we can expect having slightly less sunshine than Masterton.

Masterton receives 1982.1 hours of sunshine every year. Summer is the sunniest period of the year.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sunshine (hour)	238.6	204.4	169.2	155.6	132.0	99.9	114.9	128.6	148.0	184.0	185.6	221.3

Table 3: Sunshine in Masterton (1981-2010)

Source: NIWA

Temperature

The following table shows the temperature in Masterton (1981-2010), located 13 km North-east from Le Mas des Oliviers. Le Mas des Oliviers being located at the bottom edge of the Tararua Range, we can expect having slightly cooler temperature than Masterton.

The mean annual average temperature is around 12°C. However, the frosts are very common in winter (from April to November). They are mainly occurring early morning and it is very uncommon that the temperature stays below zero all day long. These frosts occur when the weather is clear. Therefore, snow is very uncommon.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temp (°C)	18.1	17.7	16.3	13.1	10.5	8.6	7.6	8.4	10.5	12.3	14.2	16.4
Min. Temp (°C)	11.8	11.4	10.6	7.5	5.5	4.0	3.1	3.7	5.6	7.1	8.7	10.7
Max. Temp (°C)	24.3	24.0	21.9	18.8	15.4	13.2	12.1	13.1	15.4	17.5	19.8	22.1
Frost (d)	0.3	0.2	0.7	2.3	8.3	10.5	12.9	13.2	7.4	4.8	1.4	0.4

Table 4: Temperature and frosts in Masterton (1981-2010)

Source: NIWA

Soil moisture deficit

There are between 40 to 50 days with soil moisture deficit every year on the site.

3.2.2. Topography

The site is located less than 2 km away from the foot of the Tararua Range (South-South-East of the range). The Kaipaitangata River runs 200 m South-South-West from the site. This river is dry most of the year. Le Mas des Oliviers does not have access to the river. Opposite to the Tararua range, there is the Ruamāhanga plain where the towns of the Wairarapa are located (Masterton, Carterton, Greytown, Martinborough and Featherston).

The slope at Le Mas des Oliviers is a gentle and regular South-South-East facing slope (<2%). It would best be described as flat since the slope is so minimal.

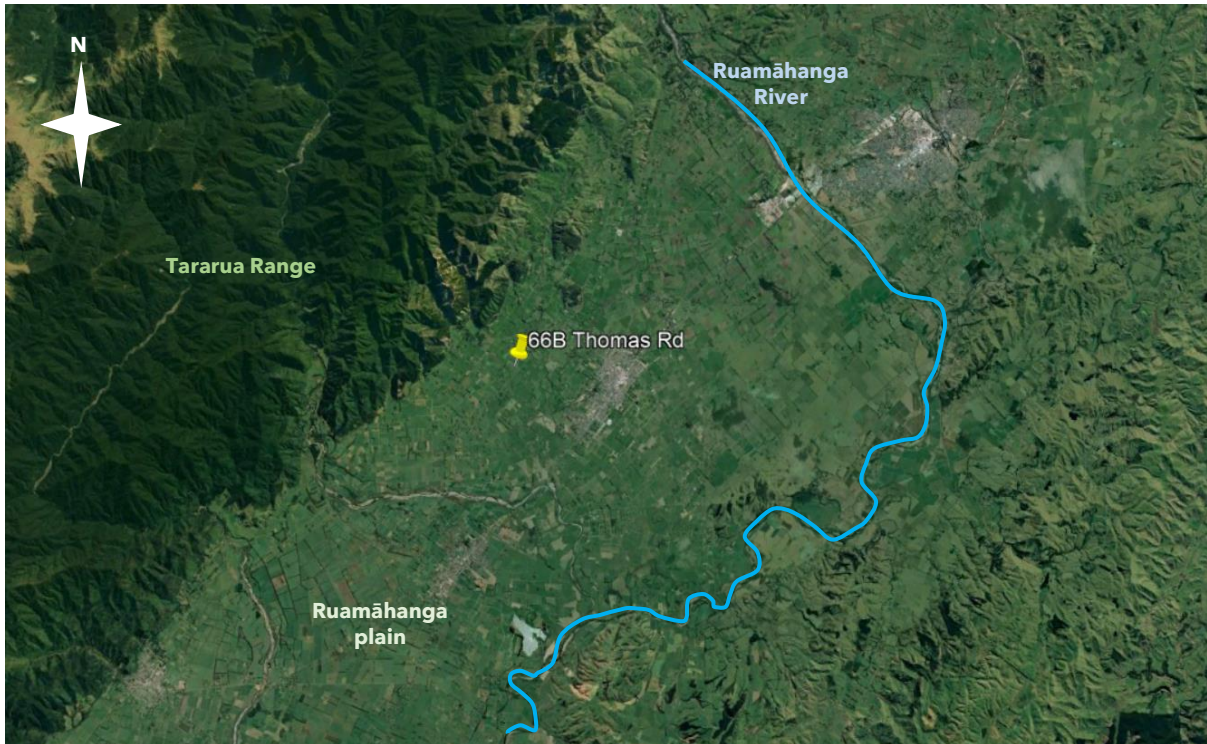


Figure 3: Location of Le Mas des Oliviers in the Wairarapa region

3.2.3. Other characteristics

Geology

The local geology of the site (GNS):

- Main rock type: gravel,
- Description: poorly to moderately sorted gravel with minor sand or silt underlying terraces, includes minor fan gravel,
- Subsidiary rocks: nil,
- Key group: late Pleistocene sediments.

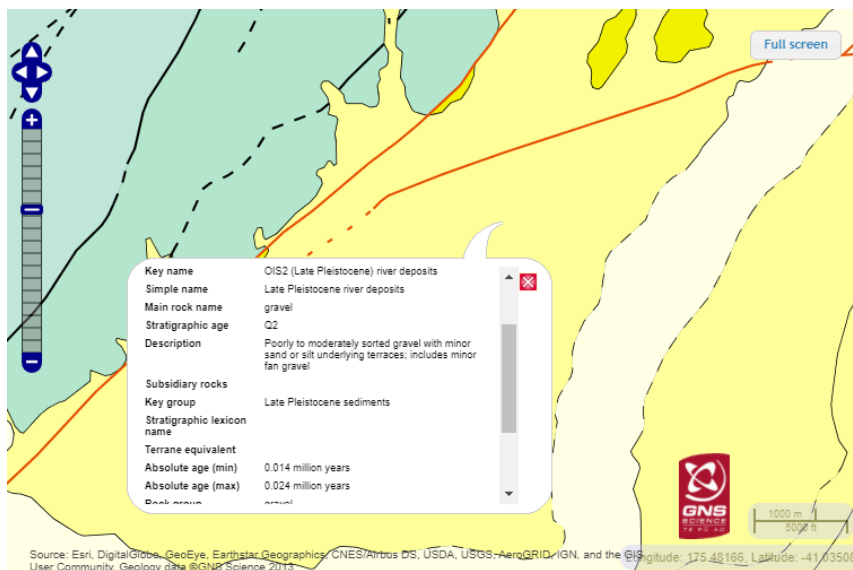


Figure 4: Site geology

Soil classification

According to the NZSC (NZ Soil Classification), my section has two different soils:

	Waikiwi_27a.1 (50%)	Kohinui_4a.1 (50%)
Soil order	Brown soil	
Soil group	Firm	
Soil subgroup	Typic	
Soil Family	Waikiwi	Kohinui
Soil sibling	27a.1	4a.1
Proportion	50%	50%
Depth class (diggability)	Moderately deep (45 - 100 cm)	Shallow (30 - 55 cm)
Potential rooting depth	60 - 80 cm	60 - 80 cm
Texture	Silt	Silt
Drainage class	Well drained	Well drained
Profile Available Water in 1 meter	105.6 mm	89.2 mm

Table 5: Soil classification at Le Mas des Oliviers

Texture graph

This graph shows the texture profile of the siblings found in the map unit. Each horizon is coloured according to its texture.

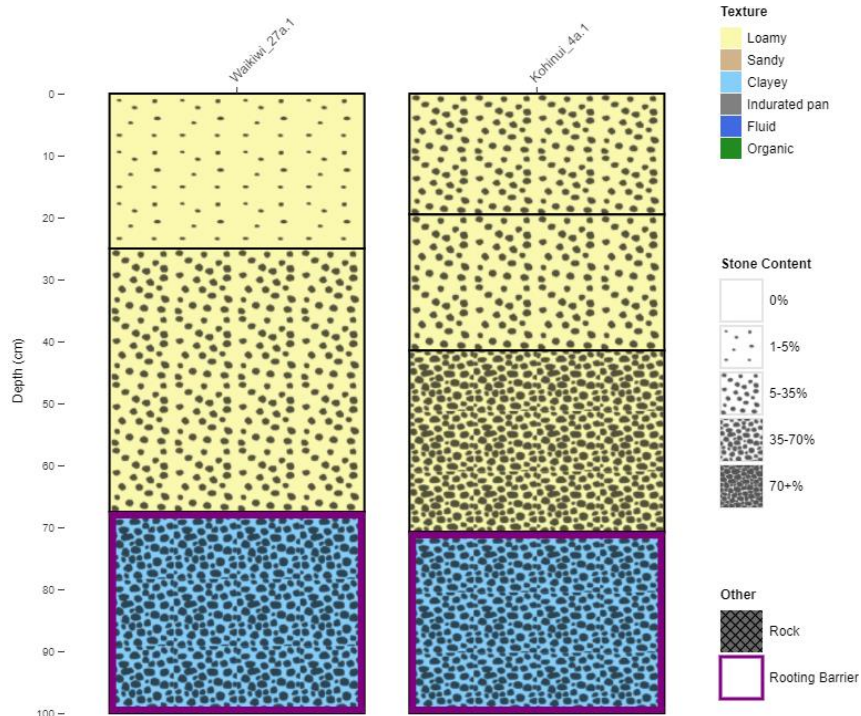


Figure 5: Texture graph of the soil at Le Mas des Oliviers

Permeability graph

This graph shows the permeability profile of the siblings found in the map unit. Each horizon is coloured according to its permeability. [Click here for more information on permeability.](#)

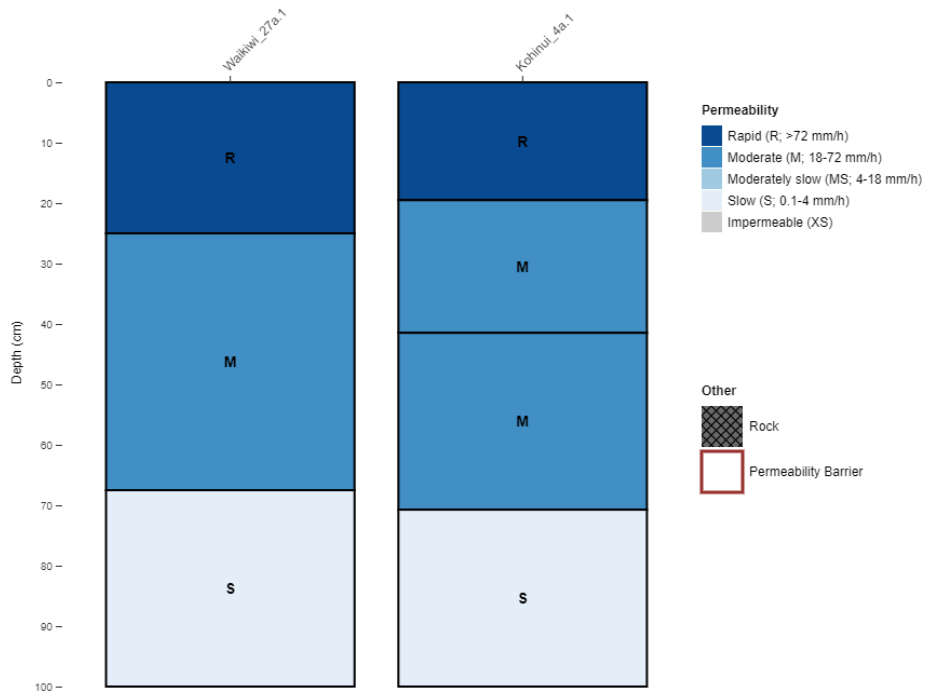


Figure 6: Permeability graph of the soil at Le Mas des Oliviers

Available Water Graph

This graph shows the available water profile of the siblings found in the map unit. This is capacity of the soil to hold water that is available to plants. Each horizon is coloured according to its percent available water content. [Click here for more information on available water.](#)

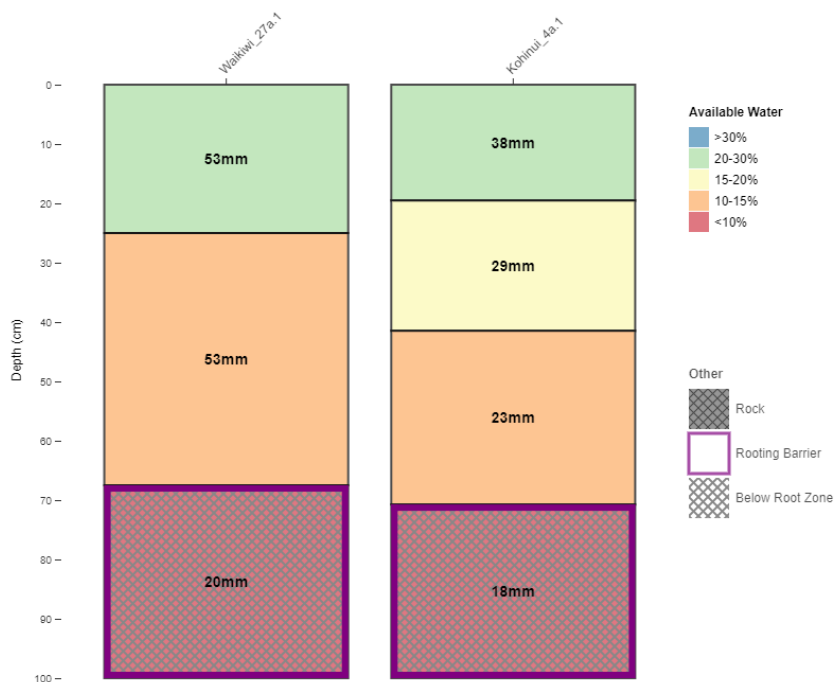


Figure 7: Available water graph of the soil at Le Mas des Oliviers

Soil profile

Soil samples taken on the property appear to be a gravelly clayey loam. A layer of gravel is located at 700-800 mm under the surface.



Figure 8: Soil samples at Le Mas des Oliviers

Land use capability

According to the Land Use Capability survey handbook, my section has a 1w1 LUC:

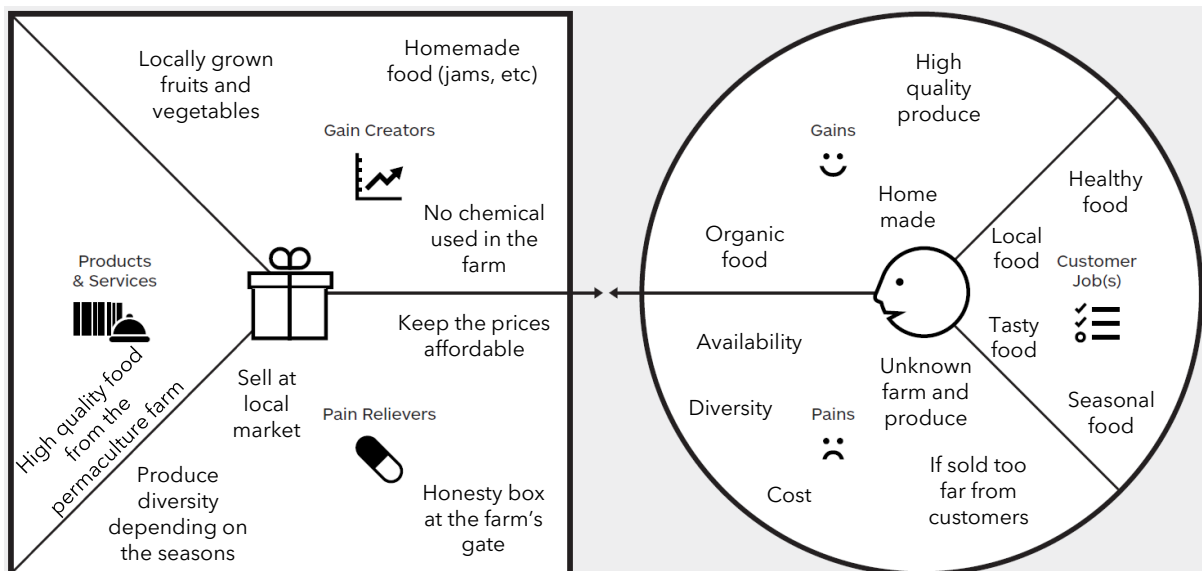
- LUC Class: 1 - Land with virtually no limitations for arable use and suitable for cultivated crops, pasture or forestry,
- LUC Subclass: w - soil wetness resulting from poor drainage or a high-water table, or from frequent overflow from streams or coastal waters first limits production,
- LUC Unit: 1.

Previous land use and surrounding land use

This site is a new subdivision and was previously used as a dairy farm.

There are no known influences of surrounding properties on my site. The surrounding properties are all lifestyle blocks (currently under development).

3.3 Value proposition



3.4. PESTEL analysis

The following factors may influence the implementation of the design as well as the outcomes:

- Political: Tax policy, labour law (e.g. Wwoofers status, self-employed status), council's support,
- Economic: Economic stability (e.g. borders shut due to Covid 19 and decreased amount of Wwoofers available in the country), inflation and interest rates,
- Social: Health,
- Technological: R&D, renewable energy technologies,
- Environmental: Weather condition, water availability, pests, climate change, pollution (air, soil, water), natural disasters,
- Legal: Covenant of the property, labour law (e.g. Wwoofers status, self-employed status), H&S, MPI regulations.

3.5. Range of suitable species

- Fruit and nut trees: pear, apple, cherry, apricot, peach, nectarine, peach, plum, fig, avocado (frost tender), persimmon, kiwi, strawberry tree, black mulberry, feijoa, lemon, orange, grapefruit, olive, grape vine...
- Nut trees: hazelnut, almond, chestnut, walnut...
- Perennial herbs: thyme, rosemary, oregano, lemon verbena, sage, mint, chamomile...
- Biennial herbs: Parsley...
- Annual herbs: basil, coriander...
- Flowers: pansy, viola, lavender, geranium, iris, lilac...
- Annual vege garden: tomatoes, courgettes, eggplants, melon, watermelon, pumpkin, cauliflower, broccoli, brussels sprout, beans, peas, parsnips, carrots, beetroot, garlic, onion, potatoes, corn...
- Perennial vege garden: artichoke, asparagus, berries...
- Native forest: flax, cabbage tree, manuka, kanuka, kōwhai...

4. Base map

The following map is a base map that shows:

- The boundaries of the sections,
- The slope,
- The house and deck,
- The pole shed,
- The two water tanks and the soak pit,
- The septic tank,
- The drip line after the septic tank.



Figure 9: Base map

5. Sector and zones analysis

5.1. Sector analysis

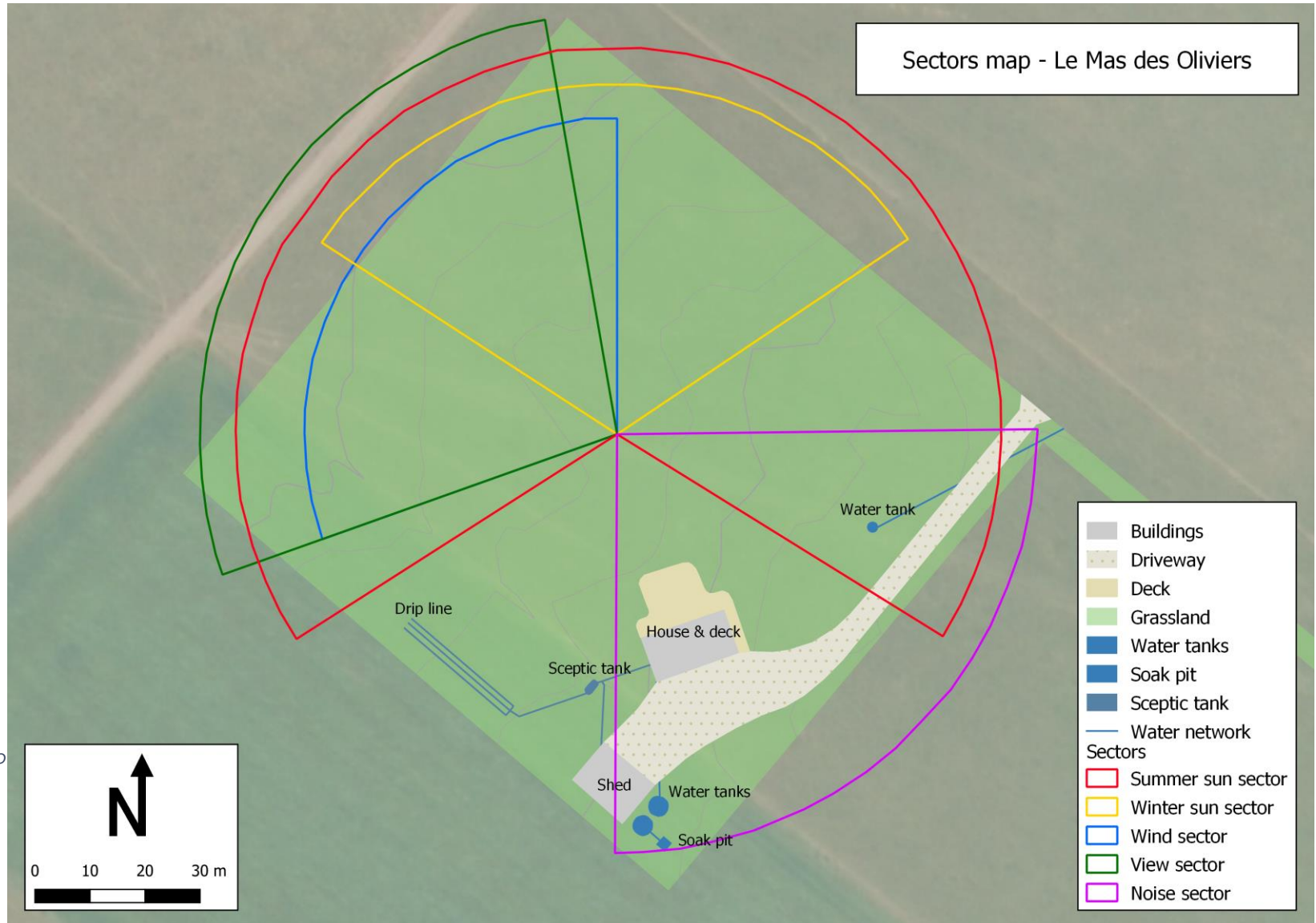


Figure 10: Sector map

5.2. Zones analysis



Figure 11: Zone map

The Figure 11 shows the permaculture zones I would like to create at Le Mas des Oliviers.

Currently there are no zones because the house is not built yet and the section is a paddock that was previously used for dairy farming.

6. Concept sketches

6.1. Zone 0: the house

Option 1: Permanent cover

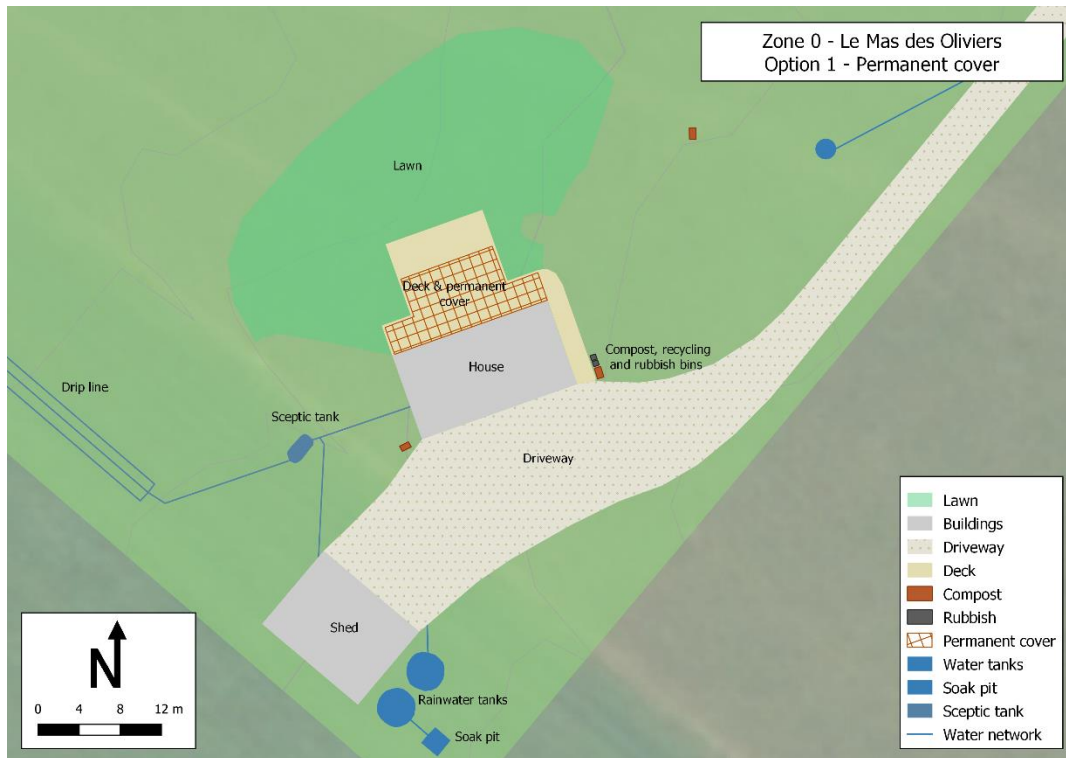


Figure 12: Zone 0 - Option 1

In order to protect the house and the deck from the sun, especially in summer, a permanent cover can be installed (see picture for example). This cover needs to be as wide as the house in order to shade the bedrooms as well as the living room. This option is great to protect the deck from the rain. However, it creates a shade all year round.



Pros:

- Very little maintenance,
- Protect the deck from the rain,
- Good shade in summer.

Cons:

- Shades the house all year around, even in winter when we want the sun to warm the house,
- The shade is not as cool as a green shade (from a plant).

Option 2: Planted pergola



Figure 13: Zone 0 - Option 2

In this option, the pergola will be planted with a wisteria. This option provides a great shade in summer with the leaves and flowers from the plant. Also, natural shade is always cooler than shade from a building. Because a wisteria is a deciduous plant, it will not shade the house in winter.

Pros:

- Cool shade in summer,
- No shade in winter,
- Beautiful.

Cons:

- Maintenance (pruning, cleaning, etc),
- Can suffer from the weather (e.g. frosts, droughts, etc),
- No protection against the rain.



Option 3: No cover over the deck



Figure 14: Zone 0 - Option 3

In this option, the house and the deck are not protected from the sun. This a good option in winter when I want to warm the house as much as possible with the sun. However, it is not good in summer when I want to cool the house.



Pros:

- No maintenance,
- No shade in winter.

Cons:

- No shade in summer,
- No protection against the rain.

6.2. Zone 1: kitchen garden

In Zone 1, two options were studied. They only consider the Western garden. The Eastern garden will be made of several beds for, mainly, perennial vegetables such as artichokes and asparagus and berries. Also, the compost facilities, animals and composting toilets are located in the same places for both options.

Option 1: Vege garden with chicken dome

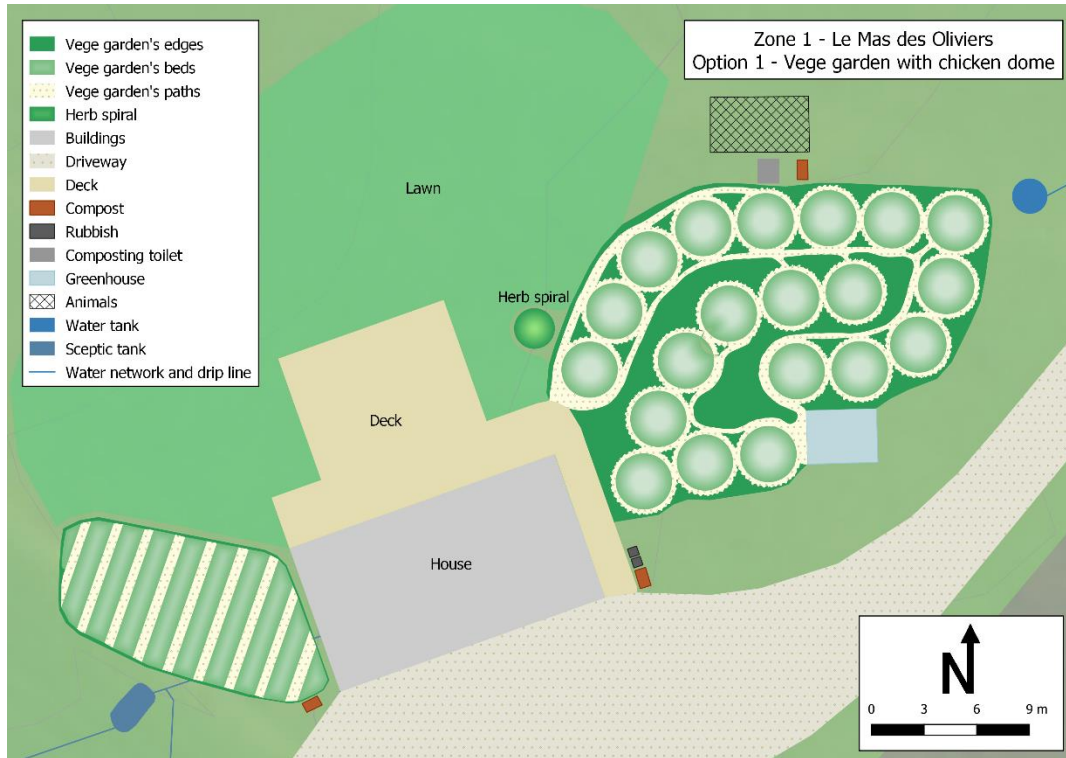


Figure 15: Zone 1 - Option 1

This garden was though around the chickens. The beds and the chicken domes (see picture) have the same size to make is easier. Having chicken domes allows the other cells not to be damage by roaming chicken. With this option, installing a drip line can be hard due to the shape of the beds. Because of the shape of the garden there are many edges than can be used to plant beneficial species.



Pros:

- Holistic and integrated system with chicken being part of the vege garden,
- Many edges to have beneficial species (pollinators, pest repellent, etc),
- Pretty shape due to the irregular angles of the spiral.

Cons:

- Drip line can be hard to install for irrigation,
- Loss of space between the garden cells.

Option 2: Mandala garden



Figure 16: Zone 1 - Option 2

This option was thought like a circular mandala (see picture). A pond will be located at the centre of the mandala to create a microclimate. Path will be located between each bed. This shape does not allow for many edges and integrating beneficial species could be difficult. Also, chicken cannot play a direct role in this garden because of the shape of the beds.



Pros:

- Drip line is easy to install,
- Microclimate created with the pond located in the centre of the garden.

Cons:

- Shape too regular to be very pretty (from my point of view),
- No edges to host beneficial species,
- Pond may be dry part of the year due to lack of water,
- Pond may attract mosquitos,
- Chicken cannot be directly integrated in the design.

6.3. Zone 2: perennial orchard

Option 1: Orchard and grazing system



Figure 17: Zone 2 - Option 1

In this option, sheep can graze directly under the fruit trees. Chicken can also roam free in this area. This requires a permanent fence to stop the animals going into the vegetable garden, the vineyard or the recreational lawn.

Pros:

- Grazers keep the land 'clean' under the trees,
- Grazers fertilise the trees with manure,
- Trees provide shelter to the animals,
- Only one trough needed in all the property (between Zone 2 and Zone 3).

Cons:

- Grazers damage the trees (especially young trees),
- Grazers prevent the establishment of all beneficial species next to the fruit trees (guilds),
- Permanent fence needs to be installed,
- Possible reduced soil quality.



Option 2: Food forest



Figure 18: Zone 2 - Option 2

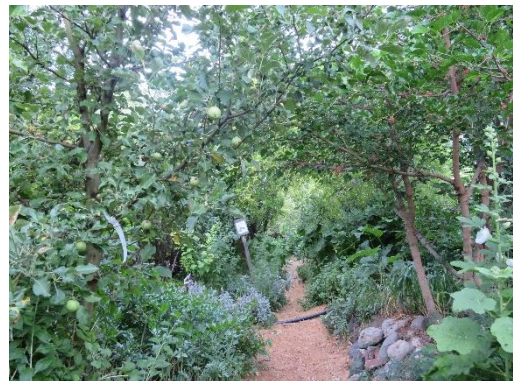
This option does not allow grazers so we can create a food forest that integrate fruit and nut trees with guilds associated. This option will offer a much better ecosystem once stable. However, the first years may be harder (until the forest is not established).

Pros:

- Fruit and nut trees are not damage by grazers,
- Establishment of guilds is possible with many beneficial species (pollinators, nitrogen fixers, miners, etc) and creation of a food forest,
- Increased soil quality,
- Increased carbon sequestration in the soil and climate change mitigation.

Cons:

- Maintenance, especially in the first years, to reach stability.



6.4. Zone 3: grazing system

Option 1: One paddock



Figure 19: Zone 3 - Option 1

This option only offers one paddock, permanently fenced. A few trees will be planted in order to provide protection for the animals and the orchard located next to the Zone 3. This option does not allow the soil to recover after grazing. Also, having stock on the place all the time increased soil compaction. Eventually, the soil quality decreases.

Pros:

- Simple fencing,
- Only one trough needed in all the property (between Zone 2 and Zone 3).

Cons:

- Decreased soil quality over time (compaction, plants cannot regenerate, etc).



Option 2: Holistic grazing



Figure 20: Zone 3 - Option 2

In this option, we will graze our grazing cells for a short period of time, with a high concentration of animals. Therefore, we can rotate (by using electric fences - see picture) the animals to help plants and soil regeneration and reduce soil compaction.



Pros:

- Increased health for the animals,
- Increased soil quality,
- Increased carbon sequestration in the soil and climate change mitigation.

Cons:

- Need a permanent fencing and electric fencing to allow rotation,
- Need two troughs so all the cells have a water access.

6.5. Zone 5: wilderness

There are no options in the Zone 5. This zone will be planted with native.

7. Final plan and description

7.1. Final plan



7.2. Zones



The Figure 22 shows the different zones that will be created at le Mas des Oliviers.

Zone 0 is the house and the shed. Zone 1 is the kitchen garden. Zone 2 is the perennial orchard. Zone 3 is the grazing system and Zone 5 is the wilderness.

Figure 22: Zones maps

7.3. Zone 0: the house



Figure 23: Zone 0 - The house and the shed

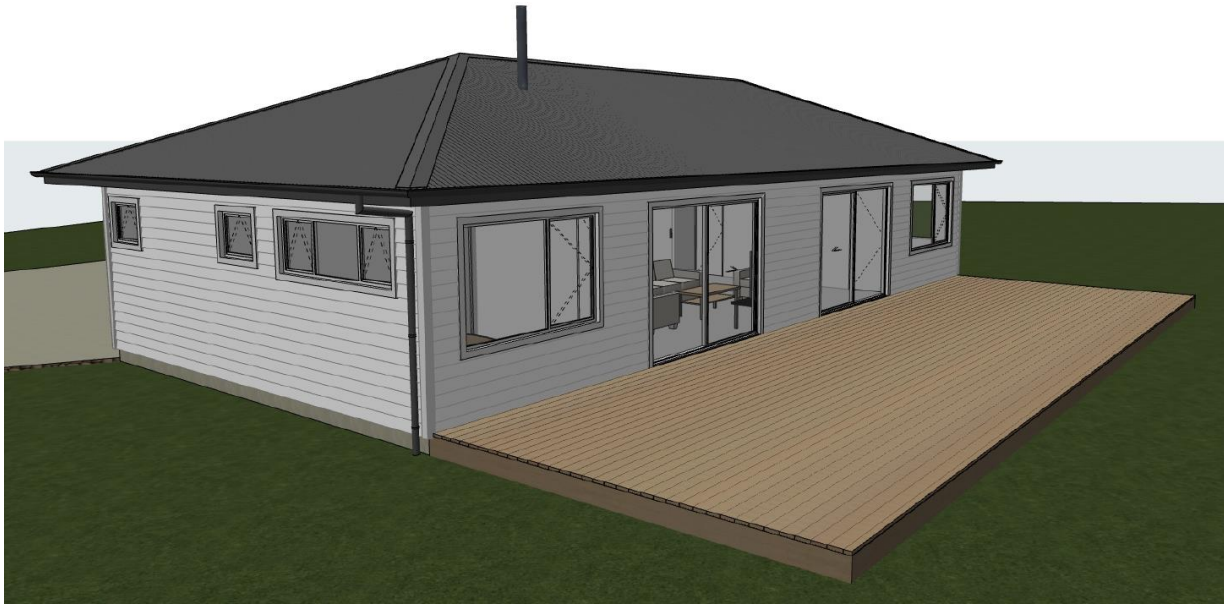


Figure 24: View of the house

The house is not built yet, but the building consent has been approved. This is a rather small house (100m²) compare to the houses currently being built in New Zealand.

Sun exposure

I designed the house considering sun exposure. The house is orientated 20° West from the North. Therefore, it will receive a lot of sunlight with a longer sun exposure in the evening than in the morning. Most openings will be located on the northern side of the house. There are very few openings on the southern side to avoid cooling the house in winter but because we can create an air flow in summer, we can keep the house cooler. Also, there is a large overhang of the roof that will protect the house from the sun in summer (when the sun is high in the sky) but will not shade the house too much in winter (when the sun is low in the sky). Finally, a pergola will be installed on top of the deck. I will plant a vine (a wisteria) that will offer the house a nice and cool shade in summer. Being a deciduous plant, there won't be any shade in winter.

Building materials

Due to budget pressure, I had to make choices in my building materials. Insulation will be done with natural wool (sheep) in the walls and the ceiling. Windows and doors will be double glazed and uPVC to avoid condensation problems that happen with regular aluminium frame joinery. The cladding will be made of wood. The deck will also be made of wood. We provide the wood ourselves. The planks were cut from a macrocarpa located in a neighbour property. The deck won't be chemically treated (macrocarpa does not need to be treated).

Heating system

I will count on the sun to warm our house as much as possible. I will also install a closed fireplace. This fireplace comes with a cooktop and an oven so we can reduce our energy consumption in winter by using our fireplace to cook. A wetback will be installed to warm the hot water cylinder. To reduce heat losses, the hot water cylinder is located right next to the fireplace. Also, curtains will be installed everywhere in order to keep the heat inside the house.

Cooling system

As explained earlier, we have a few opening in the southern side to create an air flow in the house to cool it naturally. Also, the curtains can be used to keep the warm out in summer. Coming from the South of France (which is a very hot region), I know how effective it is to close everything all day long and open the doors and windows for the night only.

Water collection

The rainwater from the house and shed will be collected in two 25,000 L tanks. This water will be our only source of drinking water. An activated charcoal filter will be installed in order to have access the treated water.

Waste management

Right next to the back door of the house, there will be three bins: a recycle bin, a refuse bin and a compost bin. These bins are located at the edge between zone 0 and zone 1 so the compost is easily accessible. It is also located in a place where it will not get too hot and dry (especially in summer).

Shed

The shed is a regular pole shed that will allow us to store our tools. There is no specific design to this building.

What else can be done?

Because our budget did not allow it, there are no solar panels installed on the house. However, the house will be wired for it and when budget will allow, it is going to be an easy "plug-in" work.

My house has only one bathroom. I plan, with my family to spend a lot of time outside. Therefore, it will be beneficial to create a composting toilet in the Zone 1.

7.4. Zone 1: kitchen garden



Figure 25: Zone 1 - The kitchen garden

Spiral vege garden (Easter vege garden)

This vege garden will be composed of twenty circular garden cells shaped into a spiral. I chose to use circular design for my cells for several reasons:

- I would like to use my chicken in the beds once harvested so the chicken can use and transform the nutrients from the garden. Therefore, the beds need to have the same shape and size as a chicken dome (3.2 m diameter circle),
- This shape allows an easy diversity of annuals plants with stratification. For example, I can put tomatoes (stacked) in the centre of the bed and smaller plants around such as basil, lettuces, etc,
- I planned twenty cells. Therefore, with three chicken domes, I can have a 6-monthly rotation that allows the plants to go through their full maturity cycle. I will have two cells left for more flexibility.

In order to save space, I organised my twenty garden cells like a spiral turning clockwise. A path made of mulch will allow access to every cells. Between cells and path there are many spaces that will be planted with species that are beneficials such as pest repellent plants and plants that attract pollinators (rosemary, garlic, basil, lavender, marigold, chamomile, sunflower, thyme, etc).

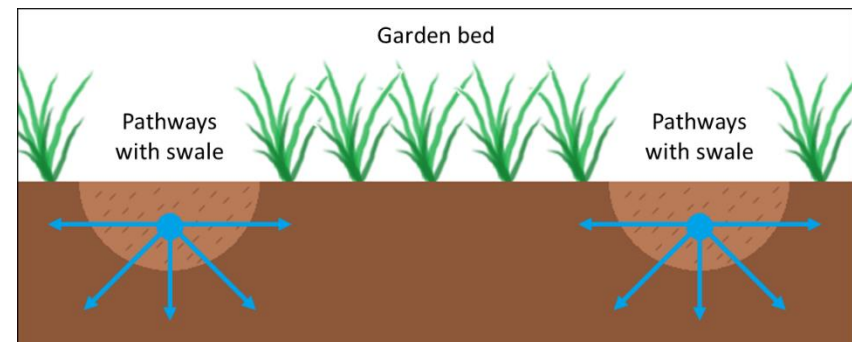
My property is allocated 1 m³ of water everyday (from a community bore). There is currently a 5,000 L water tank onsite. This will allow me to water my garden with a drip line. I will most likely buy a second tank to save more water from the bore.

Herb spiral

The herb spiral is located between the Spiral vege garden and the house so that is it very easy to go and pick our herbs as we need them. It will be a regular herb spiral (just over 2m diameter). Being from Provence, I will mainly plant "herbes provençales" such as thyme, rosemary, oregano, lemon verbena, sage, mint, chamomile etc.

Swales vege garden (Western vege garden)

This vege garden is located further from my water source. Therefore, I must be careful with my design and save water as much as possible. In order to do so, I will create swales that are parallel to the contour lines. The swales will be 50 cm deep and filled with mulch. The topsoil is reused in the garden beds. Inside the swales, a weeping tail will be installed to water the garden when needed. As much as possible this garden will be used for perennial vegetables such as asparagus, artichoke, raspberries, strawberries, etc. This will reduce the amount of water needed once the plants are well established. This garden will be connected to the groundwater tanks.



Greenhouse

The greenhouse is located near the Eastern vege garden and is facing North to increase the amount of sunshine received. The greenhouse will allow me to extend the growing season (especially for tomatoes since we love tomatoes in my family) but will mainly allow me to germinate the seeds that were collected the previous season.

Being located close to the water tank, the greenhouse can be watered with a drip line.

Animals

I already discussed the chicken in the Spiral vege garden. I also wish to breed rabbits. My family and I are reducing our meat consumption and we do not wish to eat commercially produced meat. Also rabbit meat is a healthy choice for meat. The droppings can be used in the garden once composted.

Composting toilets

As explained for Zone 0, the house only has one bathroom. Therefore, it will be convenient to build another toilet in the garden. The material from the toilet can (after maturation) be composted and used in the garden.

Compost facilities

I will have three locations for the compost:

- One in Zone 0 where I can compost all the food waste and other organic materials from the house.
- One located North of the Eastern vege garden where I can compost all the materials from this vege garden, from the Zone 2 located nearby and the manure from the animals. I will also be able to use the materials from the compost toilet once ready. This composting facility will be the major one where I can also do hot compost from time to time.
- One located South of the Western vege garden where I can compost all the material from this vege garden.

7.5. Zone 2: perennial orchard



Figure 26: Zone 2 - Perennial orchard

The olive tree alley (l'olivette)

The olive tree alley is mainly here for landscaping purposes. However, our family uses a lot of olive oil and we love olives so we can use the fruits from the trees. Also, between each olive tree, I will plant lavenders. This plant has many useful purposes: attracts pollinators, medicinal herb, culinary herb, landscaping purposes. Here again, I intend to use the yield from the lavenders. Finally, this alley will offer a screen on the edge of the property to hide it from the neighbours (at the moment, I still do not know where they will be located).

The orchard

Many different fruit trees will be planted in the orchard as well as a few nut trees. The nut trees will be located on the northern edge of the Zone 2 in order to protect the fruit trees from the wind. The Southern side of the orchard is protected by the olive trees. When planting all the trees, I will make sure the spacing is wide enough to reduce the risks of pest infestation and shading.

For the planting, I will start changing my ecosystem by planting nitrogen fixing plants (lucerne tree, lucerne, clover, etc). Then, I will be able to install a food forest by planting guilds that include: the fruit or nut trees, suppressors (suppress weed growth), attractors (attract pollinators), pest repellents, nitrogen fixers, groundcovers (or mulchers) and accumulators (plants that mine the nutrients deeper in the soil). This will recreate an ecosystem with much diversity. I also want a great diversity in my fruit and nut trees in order to have a different yield at different times of the year (e.g. peaches in summer, persimmons in winter, chestnut in autumn, etc). A higher diversity increases the system's health. All the trees that need to be covered with a net (to protect them from the birds when the fruits are ripe) will be placed together to make the job easier, at the Southern side of the orchard, next to the vineyard.

Regarding the access to water, there is a 5,000 L water tank fed by a bore at the southern side of the orchard. I do not plan to have a permanent irrigation system, but I understand the benefit of watering the trees for the first year (at least the first summer). It will be reasonably easy to water the trees from the tank. I do not wish to plant the whole area at once so it gives me the chance to understand my ecosystem and my section (which I never lived on) better and also will reduce water consumption (by staging the planting over several years, I can spread my water usage over those years).

All the pruning material will be either composted or mulched to be reused on the farm.

The vineyard

A vineyard will be planted on the Southern side of the orchard, close to the trees that need to be protected by nets. The vineyard will have a great variety of grapes. Also, roses will be planted at the end of each row. Indeed, they are an indicator of the vineyard's health (for powdery mildew).

All the pruning material will be either composted or mulched to be reused on the farm.

7.6. Zone 3: grazing system



Figure 27: Zone 3 - Grazing system

This zone occupies a large part of the section. It will be grazed by sheep. Trees will be planted in order to offer food and shelter for the animals and firewood for the house. I plan to plant lucerne trees, gum trees as well as a few native trees (cabbage trees). A row of bigger trees will be planted at the edge between Zone 3 and Zone 2 in order to create a wind shelter for the orchard located in Zone 2. To have a good quality food for my sheep, I will try to grow lucerne. Indeed, this plant has many benefits such as good feeder for animals, nitrogen fixer, increase carbon in the soil, increase soil quality (physical, chemical and biological properties), edible for human, etc.

The grazing zone will be divided in height grazing cells (around 500-600 m² each) so the animals can rotate from one zone to the other. This will allow the sheep to have access to good quantity of food while the vegetation recovers after grazing. Two troughs will be installed in a way that all cells will have access to water. There will be a permanent fence around Zone 3. The grazing cells will be fenced with temporary electric fences to allow more flexibility.

Apart from stock movement, this Zone should be low maintenance once the lucerne will be well established.

7.7. Zone 5: wilderness



Figure 28: Zone 5 - Wilderness

This zone will be planted with native species of New Zealand only. Along the fence, an edge of flaxes will be planted to give the house privacy (from potential neighbours) and hide the shed to the properties surrounding. I made the choice to put the Zone 5 here in order to use as much as possible the moisture and nutrients coming out of the drip line and reduce watering. Also, being relatively close to the house, it is a great environment to be surrounded by.

In the first place, the Zone 5 will be quite small. Eventually, I plan to extend this zone once the first stage will be well established. I am aware of many limitations (lack of water, time, budget) so I need to work by stages so I can achieve a great outcome. The extension will be done on top of Zone 3.

Because at the moment, only grass grows on the area, I will plant good primary species such as kowhai, Kanuka, Cabbage tree, Manuka, etc. This will hopefully attract birds that will spread more seeds around the area.

7.8. Water dynamics

Water storage

Rainwater

Rainwater will be harvested from the house's roof and the shed's roof. Two 25,000 L tanks located at the Southern corner of the property will allow to store this water. This water will mainly be used for domestic purposes (drinking water, cooking, shower, toilets). The property does not have access to reticulated water.

Underground water

The property has access to 1,000 L of underground water through a scheme in the subdivision. This water is stored into a 5,000L tank located near the spiral vege garden. We plan into purchasing at least one more tank in order to store more water so we can use it in the driest months of the year (in summer).

Tap location and irrigation system

Taps connected to the underground water tank must be installed in the property to have a quick and easy access the water. In the first place, two taps must be installed at the troughs in the Zone 3 (holistic grazing) so the sheep can have access to clean water at any time. A tap will be installed next to the Western vege garden (with perennial vegetables). Another tap will be installed next to the Eastern vege garden.

Weeping tails will be installed in the Western vege garden. Therefore, we need to be able to connect this system to the tap installed. A dripline irrigation system will be installed in the Eastern vege garden. This dripline can be connected to tap installed nearby.

Sceptic

The wastewater will be treated in a sceptic tank located between the house and the shed. A dripline will finish the treatment. The dripline follows the Southwestern boundary of the section.

Water runoff and flood

The site being almost flat (slope < 2%), there is very few runoffs. Le Mas des Oliviers is located away from flood hazard.

8. Implementation

8.1. Stretch goals and SMART goals

Stretch goals

As a reminder, here are the Stretch goals I set up before starting to design my permaculture farm:

- Have a healthy lifestyle,
- Produce most of the food eaten in my household,
- Be able to make a living from my farm (share yield and skills).

SMART goals

- In the next year, I will start building and planting my Zones 0, 1,2, 3 and 5, following good permaculture practices and a planning to increase my family's health and to start feeding my family with healthy food,
- In two years, I will keep developing my permaculture farm based on the feedback I received from my environment in order to increase my family's health and to keep feeding my family with healthy food,
- In three years, I will finish building my farm but keep adapting it to the feedback I receive from the environment in order to increase my family's health and to keep feeding my family with healthy food,
- In four years, I will start developing my network to share and/or sell my left-over yield with my community in order to start making an income out of my farm.

8.2. Planning and implementation strategy

This planning has been set up to achieve my stretch goals and SMART goals:

- Year 1:
 - o Zone 0: Plant the wisteria over the pergola,
 - o Zone 1: Create six-seven cells in the Spiral vege garden, build the Swales vege garden and plant the perennial vegetables, create the herb spiral, install the composting facilities, buy a few chickens,
 - o Zone 2: Start planting nitrogen fixing plant as well as a few fruit and nut trees with guilds,
 - o Zone 3: Install the permanent fence around the zone 3, plant the trees that shelters the animals et the orchard, buy a couple of sheep,
 - o Zone 5: Plan the edge of flaxes and start planting kōwhai.
- Year 2:
 - o Take feedback from the environment and adapt the system to this feedback.
 - o Zone 1: Create six-seven more cells in the Spiral vege garden, buy a few more chickens, buy rabbits,
 - o Zone 2: Keep planting fruit and nut trees with guilds,
 - o Zone 3: Plant lucern, organise the rotational grazing,
 - o Zone 5: keep planting native trees,
- Year 3:
 - o Take feedback from the environment and adapt the system to this feedback.
 - o Zone 1: Create six-seven more cells in the Spiral vege garden, build the composting toilet,
 - o Zone 2: Finish planting fruit and nut trees with guilds,
 - o Zone 5: Finish planting native trees.

- Year 4:
 - o Take feedback from the environment and adapt the system to this feedback.
 - o Share my left-over yield and share knowledge with my community
- Following years:
 - o Take feedback from the environment and adapt the system to this feedback.
 - o Start selling my left-over yield to my community (local market) and start to have an income from the farm.

8.1. Observe and interact

One of the twelve principles of permaculture is "Observe and interact", take feedback from the environment and adjust your system according to the response.

I built this design even though I never lived on the section. I know that the first years will be all about learning. I will most probably have failures. This is my role to learn from these failures and adapt my system. I understand that the design I created is much more a beginning than an ending.

I created this design because it is what I would like to see on my section and what could work to achieve my goals. However, living the experience of the design may be very different from what I imagined. I am ready for this, I am ready to adapt my design to elements I may have misevaluated (under evaluated, over evaluated, forgotten, etc).

This permaculture principle is obvious in the implementation strategy "Take feedback from the environment and adapt the system to this feedback".

8.3. Limiting factors

Time

Time will be the most limiting factor. Indeed, I am already a busy mother and full-time worker. I can put around one hour every weekday (Monday to Thursday) in my garden, more in the weekends (Friday to Sunday). My husband can spend more time in the garden than me.

I know that getting help will be very important. I used to be a Wwoffer and now, I love to host Wwoffers. In the first time, Wwoffers can use our guest's bedroom but quickly we will build a little studio with bathroom and kitchenette. I always find the experience of having a Wwoffer very interesting. Not only they are of great help, but also, I like the social experience of it.

Having an implementation strategy will help spreading the tasks over a few years.

Budget

I will reduce the costs involved in setting up the design by coordinating it with the building of the house. For example, when the digger will be on site for the house's foundations, I can ask him to create the swales (thankfully, the digger driver is a friend of us).

For the plants (especially all the trees and lavenders), we are already growing "babies" from cuttings. Therefore, the costs will be reduced to a minimum.

For other materials (e.g. chicken house, chicken dome, greenhouse, posts and wire for the vineyard, nets, etc), I will as much as possible buy everything second-hand. To do so, there are a few great groups on social media I can use. I can also use TradeMe. Also, I have time. I do not need to buy everything straight away. Therefore, finding second-hand material becomes easier.