2022

Design Portfolio

Contents

Contents

Permaculture Design Portfolio

Introduction:

Introducing Me and my Goals

As I turn 65 years of age this year, and am hoping to reduce my hours of full time employment, I have become more aware of the fragility of the future, and the ever increasing cost of living. We have recently moved to a "new" property, and with the knowledge that this will most likely be the last property we will own; I ask myself, "*how will I leave a legacy for the future generations, how best can I manage the land and resources so as to cause less harm and do good. How can I best steward the property that has been put under my care for a whatever time we have on this lifestyle property".* My goal is to consciously create an environment that is sustainable, that mimics the patterns and relationships found around me in nature, while yielding an abundance of food, fibre and energy for the provision of our needs, as well as the needs of those around me, (my whanau), and to produce enough to share with others in my community. My stretch goal is: Within 5 years I will have built a sustainable environment, planted a food forest and vegetable gardens and have established the bones of the property to harness the energy around me. As I am getting older, I also need to consider accessibility around the property, ensuring that the property does not require high levels of physical maintenance and is in harmony with nature. "*The only ethical decision is to take responsibility for our own existence and that of our children.*" *— Bill Mollison*

My personal strengths: According to Clifton Analyses my top 5 Strengths are:

1) **I am a Problem Solver –** with this strength I will be use the permaculture design concepts to problem solve. I will observe and interact by observing my environment. I will identify seasonal changes in terms of wind, water, and sun. I will catch and store energy once I know more about the energy systems and how these impact my property – sun, wind, water, the topography of the property; and the natural resources around me. I will ensure that my soil is fertile so as to enable me to plant and yield food through fruit trees, vegetables, native trees and trees that grow well in my climate and zone so as to obtain a good yield. I will also use the principle of patterns to design to assist me in designing zones for my property. I will use the forest as a design model when creating the food forest and integrate rather than segregate elements together. In developing an awareness of the importance of relationships in the design of self-reliant systems, two statements in permaculture literature and teaching will be central to my planning:

   - Each element will perform many functions
   - Each important function is supported by many elements

2) **Secondly, I am a Philomath** – which drives me to learn new things. To increase my yield, I will need to learn concepts such as seed saving, propagation of plants, storing and collecting water, using the natural resources such as solar power, creating healthy soil, and protecting my crops and plants. I will also learn more about the natural properties of plants and how they can aid healing and interact with other plants in a meaningful manner (i.e. companion planting).

3) I am a **Believer** with the inherent values of "*doing the right thing*". My values are the compass that drives me. I am open to the application of self-regulation and feedback. I want to learn from others with knowledge so have joined a few local groups with similar interests – ie: Food Foresters, Self-sustainable Gardening groups; Fruit growers Groups etc. I have also completed some online courses and workshops through – The Healthy Food Patch; and Koanga Gardens. I have also attended a workshop on Worm farming and established my own bins and have registered in a certificate in Plant Propagation techniques.

4) As an **Optimist and Self Believer**, I have a positive spirit, and will see things through even when they seem too difficult. As I have a strong faith, I am not concerned about the future but am aware that I have a God given purpose and am excited to be able to use and value renewable resources and services around me. Permaculture design makes the best use of renewable, natural resources to manage and maintain yields, even if some non-renewable resources are needed to establish these systems. I will use chickens and animals to assist

me to prepare the ground and maintain its health, bypassing the need for non-organic fertilisation. I have created worm farms and basic composting systems to aid me in achieving this goal. Recycling occurs with food and all products that we need to purchase and are unable to grow. I want to use small and slow solutions to achieve my goals.

The Myer Briggs assessment describes me as a **Defender Type Personality**. "*Though sensitive, Defenders have excellent analytical abilities; though reserved, they have well-developed people skills and robust social relationships; and though they are generally a conservative type, Defenders are often receptive to change and new ideas".* My Strengths include being observant; patient; imaginative; loyal; hardworking with good practical skills.

Background:

Permaculture understanding

When I started my journey in permaculture at the beginning of this year, I did not know much about it, except that it was a way to improve the soil and do less harm to the land. Well I have since had the privilege of gaining a deeper understanding of what Permaculture is, and what it is not.

Bill Morrison states; *"Permaculture (Permanent Agriculture) is the conscious design and maintenance of cultivated ecosystems which have the diversity, stability & resilience of natural ecosystems. It is the harmonious integration of landscape, people & appropriate technologies, providing good, shelter, energy & other needs in a sustainable way. Permaculture is a philosophy and an approach to land use which works with natural rhythms & patterns, weaving together the elements of micro climate, annual & perennial plants, animals, water & soil management, & human needs into intricately connected & productive communities"*

I now have a deeper understanding of the principles of Permaculture and wish to weave these through my design as I continue to grow and learn.

- Care for the earth
- Care for people and
- Reinvest surplus instead of wasting it.

Permaculture is systems thinking and regenerative in design. Permaculture design provides a pathway to mitigate and reverse the damage created from current land-use practices, through the regeneration of these agricultural and urban ecosystems**.** Regeneration is far more than simple renewal or restoration. It calls for the integration of aspects of ourselves as designers and as human beings. It demands that we reunite the art and science of design because we cannot succeed at sustainability if we fail to acknowledge human aspiration and will as the ultimate sustaining source of our activities. Throughout the course I have learnt how various systems impact on each other, and the approach guides us to mimic the patterns and relationships we find in nature, and in using the principles and ethics, I can improve my wellbeing and that of my family and environment. My goal is to use the knowledge gained, and to become self-sustaining in 5 years, to produce enough food for my family to eat, and yield a surplus in which to earn additional income. I have also had the opportunity to complete a certificate in Plant Propagation which has been a great asset to this course.

12 Principles of permaculture are:

1. **Observe and interact** I will observe the angles of the sun and how this impacts the land; the forces of the wind and how that moves across my land, and the flow of the water across my land. I will consider which plants do well in my region and what wildlife ventures onto my property. I will observe how the seasons change and what grows well in my microclimate.
2. **Catch and store Energy:** I can do this by collecting resources when they are abundant (i.e. harvesting rain storage, creating swales on sloped areas, management of flood zone areas) and use them in times of need (drought). I am keen to harness the wind as well during the winter season. I will also work towards increasing water catchment through the installation of rain water tanks. I will also catch dopped leaves and use these for composting.

3. **Obtain a Yield:** To ensure I am truly getting useful rewards as part of the work that I am doing. I can achieve this through planting foods that the family will eat, and food that I can bottle and preserve, or dehydrate for future use. I will use seasonal to grow food and to store seeds for future use. I will trial a variety of foods and keep notes of what grew well, and what failed. I have completed 2 online courses through the Koanga Gardens – Garden Planning Workshop and Growing Nutrient Dense Food) https://koanga.org.nz/) as well as completing a course through The Healthy Patch https://thehealthypatch.com.au/ that focussed on growing food from seed and seedlings, as well as providing nutritional growing environments, and planting the seasons.
4. **Apply self- regulation and accept feedback**. I need to discourage inappropriate activity to ensure that systems can continue to function well – ie not to use harmful chemicals on the land or crops, ask for advice from others who know and apply this knowledge to improve the land.
5. **Use and value renewable resources and services:** To make the best of nature's abundance and to reduce our consumptive behaviour and dependence on non- renewable resources. - I will reduce the plastic I use in everyday living; I will compost food scraps and feed some to my worm farms, my animals and also use the worm tea to fertilise my plants and trees. I will recycle all my paper and cardboard as mulches for weed control. I will grow appropriate plants that can be used to chop and drop or used to make fertilizers. I will also develop suitable composting systems on the farm and intend completing a workshop in compost making in 2023.
6. **Produce no waste:** By valuing and making use of all the resources that are available to me, I need to ensure that nothing goes to waste. I will need to learn to harness all the energies on the property in a meaningful manner.
7. **Design from patterns to details:** I need to step back and observe patterns of nature and society. These patterns form the backbone of Permaculture designs, and I will fill the details in as I go on and develop my site and plans. I will play around with ideas on paper first, before committing to planting.
8. **Integrate rather than segregate:** By putting the right things in the right places, relationships will naturally develop between them and they will support each other. i.e. growing shade plants under canopy plants, growing wind resistant plants as shelters, underplanting the canopy as in nature. Also considering fruit trees that grow well together in guilds and underplanting companion plants, such as perennials and herbs that will feed the tree naturally. I have completed a course in Garden Planning by Koanga Gardens https://regenerationproductions.org/course/garden-planning/ and will use the planting charts to guid me when planning the food forest – Zone 2.
9. **Use small and slow solutions:** Small and slow systems are easier to maintain than big ones, making better use of local resources and this will produce more sustainable outcomes for the farm. Taking time to reflect, and make small changes as required. I will plant the fruit and nut trees first to enable these to get established first, and reflect on how they do in the places the are planted.
10. **Use and value diversity:** To avoid monocultures I will be planting a variety of plants and varieties of fruit trees so as to avoid a disaster if one crop fails. I will intersperse native trees within the food forest, and grow climbers up tree trunks as I would see in nature. I am also intending on growing mushrooms in my food forest and vegetables, especially legume crops to feed the soil.
11. **Use the edges and value the marginal:** I acknowledge that the interface between things is where the most interesting events take place. I will plant wind breaks around the edges, and use native plants to encourage wildlife.

    I will be using these principles throughout my portfolio

2. SITE ANALYSIS

2.1 Property Description and location
2.2 Climate
2.3 Soil
2.4 Topography
2.5 Influence of previous land users
2.6 Existing structures and their influence
2.7 Sun angles

2.1 Property Description and Location:

Property description: The property that we have purchased is in Te Pahu in the Waikato. It is rural and the land is roughly 5.3 hectares in size. We are surrounded by dairy farms and fabulous mountain ranges and views. The property has a river on the western border with a low lying flood zone in the bottom paddock. We have started planting the banks with native trees and are fencing this off from cattle. The river has trout in it. The house is facing in an easterly direction, and gets direct morning sun. There are existing buildings on the land, but as it is was a deceased estate, the boundary fences are in a poor state and the land had been leased for some time, and has been overgrazed by a local dairy farmer, with no respect to the impact of his cattle on the property. Stock have been allowed to ramble into the waterways and create havoc in the native forests. The property has a main dwelling, outside sheds and a large barn, and a very large greenhouse that was in the past used for commercial growing of bulbs and later for growing tobacco.

2.2 Climate Patterns

2.2.1 Rainfall Range:

- **Climate Zone:** 2
  Earthquake Zone: Zone 1
  Exposure Zone: Zone B
  Lee Zone: No
  Rainfall Range: 80 - 90
  Wind Region: A

The Waikato region, centred around 38 degrees south, is exposed to prevailing west and southwest winds from the Tasman Sea. These bring mild, humid conditions.

No location is more than 80 km from the sea which means temperatures are quite regulated. The north central Waikato region tends to have warm, humid summers and mild winters. Sheltered and elevated inland places experience extremes of hot and cold.

The average annual rainfall is 1,250 mm. This is generally enough for agriculture but there is potential for drought during summer.

Areas with high rainfall are shown in darker blue areas on the map. Areas with the least rainfall are shown in pale blue:

2.2.2 Winds

Winter Winds: Strong westerly/SW winds **Wind Zone:** Very High – 50m/s in winter. This wind cuts across the open paddocks towards the house. There is very little shelter from the wind on the western side of the property where Zone 1 will be developed. The greenhouse provides some shelter to a small section of the area.

*** Shelter plants will need to be considered when establishing this area of the design – but need to low enough so as not to block out the view. Shelter belts can also be developed in the paddocks to form a windbreak before it comes through to Zone 1. We are also intending replacing the current Barberry fences with native plants (a longer term plan). Plants to consider are Lowland Ribbonwoods, Pittosporums, Akea Akea, Flaxes and cabbage trees. Lower plants will include Hebes, and berry bushes.

https://www.southlandcommunitynursery.org.nz/restoring-your-patch/planning-your-project/shelterbelts/

Summer Winds: Warm gentle humid easterly winds that do not create any concerns.

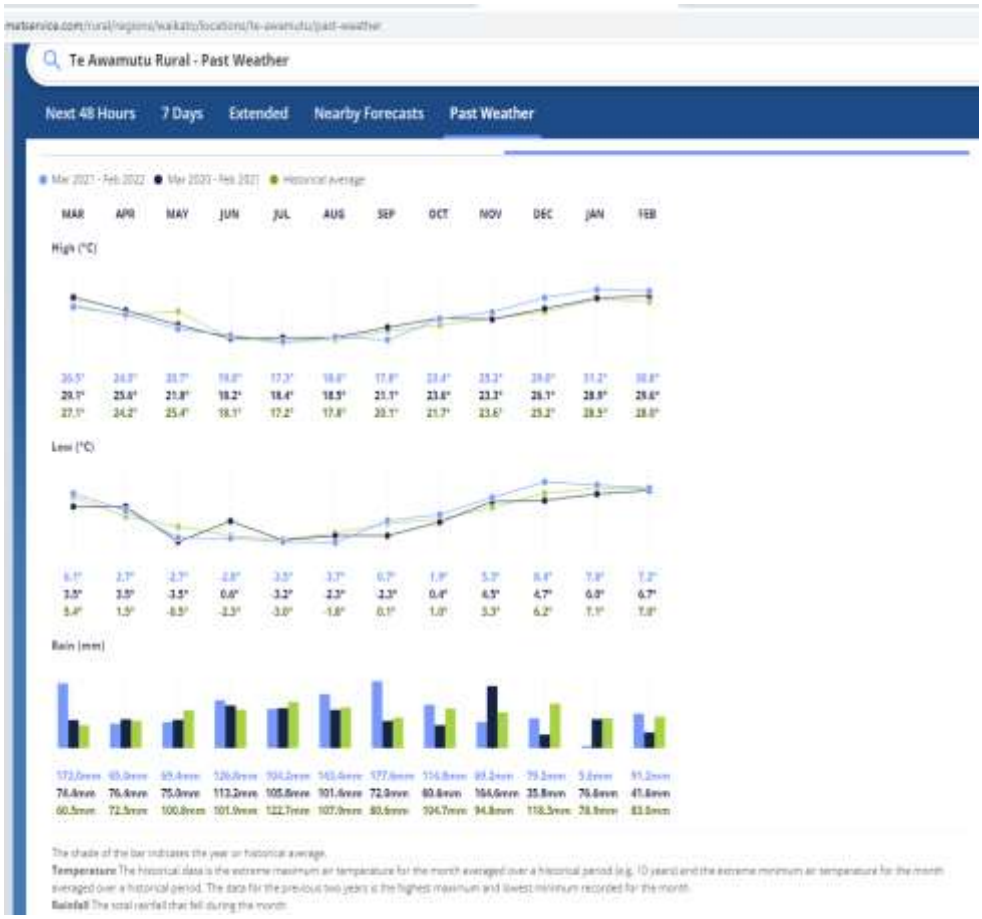
2.2.3 Temperatures and Rainfall – average taken over the past year.

Temperature Historically:	**Rainfall:**
Summer: 27-28 Degrees	83mm – 118mm per month
Winter: -3 degrees to -1.8 degrees.	100 mm – 122mm per month

Winter rainfall is usually good but in summer, the rainfall is not always reliable. We will be keeping track of our daily rainfall and currently have 11 months tracked so far.

*** Some frost is present in winter and needs to be considered when choosing and placing plants. The climate is temperature. This year we had an unexpected frost snap in September which killed a lot of the growing tips of my plants, as well as some of the native plants we had planted along the river areas – lesson learnt – to watch the weather forecasts and act accordingly in the future. Alternatively reconsider suitable options to avoid losses.

*** Water storage needs to be considered for use on the property. The property is currently on bore water. Summer rainfall can be unpredictable and the land can be dry from late December through to the end of March. As we are new to the property we are unsure of the reliability of the bore supply, but the neighbours ensure us that there has never been issues here.



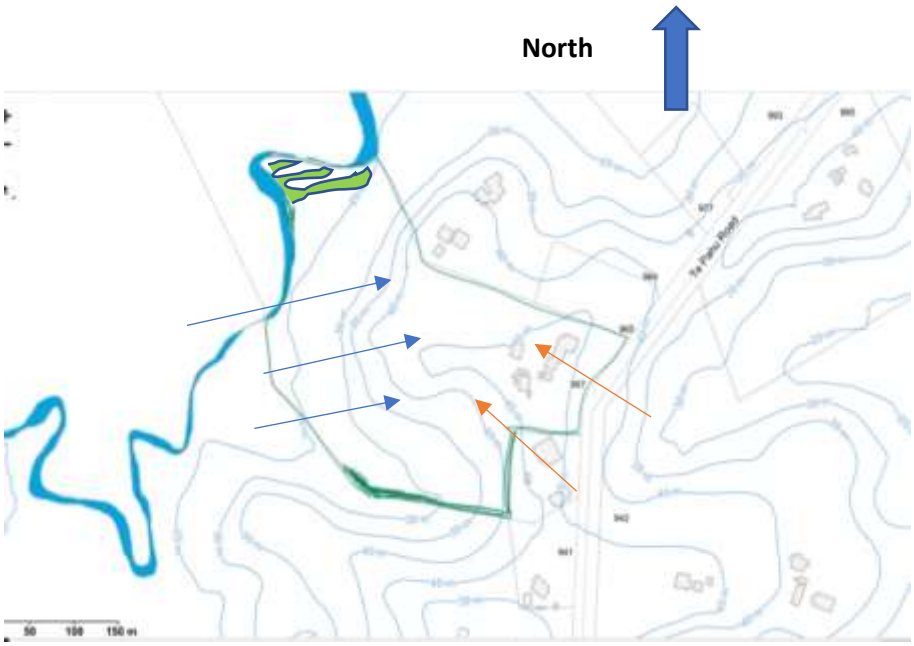
2.3 Topographical features and rainfall

Key:

Flood zone

Wind – Winter westerly

Summer: Easterly



Water moves through the property from east to west. There is a flood zone in the western side of the property along the river bank. This floods in winter. Heavy winter storms come through from the west.

*** Trees and planting in this zone need to consider seasonal flooding. The following guidelines will be used in decision making around appropriate trees to plant in these zones.

- https://www.doc.govt.nz/globalassets/documents/conservation/native-plants/waikato-ecological-restoration/planting-guide-3-lower-waikato.pdf
- https://waikatoregion.govt.nz/environment/biodiversity/planting-guides/

2.4 Contours and volumes of water movement through the property

The house lies on the 45m contour and the land slopes down towards the river to a 20m contour. The slope is fairly gradual but there is run off from some of the paddocks, especially in winter.

Water Dynamics . When considering our property, we have access to bore water, as well as tanked water. The troughs are gravity fed from the bore, and the water to the house is pumped from the holding tank. We are intending adding water storage systems to irrigate the zones 1 and 2 as well as providing water to the greenhouse. Along the western border of the property is a river, with a winter flood zone. As we are increasing our crop production in the food forest sections (Zone 2), we are unsure of the reliability of the bore water supply, so will be adding tanked water to ensure we have a sustainable resource of water in summer to water this zone. The tanks will also have overflows to redirect water into swales or wicking beds, so as to capture excess water flow. The contours on the land are gradual but one of the grazing paddocks has a significant slope and cattle have caused erosion in this paddock (see below)

Future Solutions:

- Creating swales in this paddock with suitable planting and to direct the flow of water – this is a longer term project as it will require earthworks.
- Ensuring the cattle only graze this paddock for short periods, and not in winter when the slope is slippery and erosion more likely.
- Soil management throughout the property

2.5 Soil conditions and site

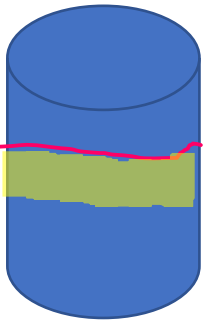
Basic soil tests were completed in the food forest paddock with the following outcomes:

https://www.youtube.com/watch?v=UoD-cUMkRZY

- Jar filled half way with soil (soil was sifted)
- Fill jar with water and liquid soap- seal and shake

- Heaviest materials sink to the bottom – sand and grit
- Silt layer (loam)
- Top – clay layer

Results:

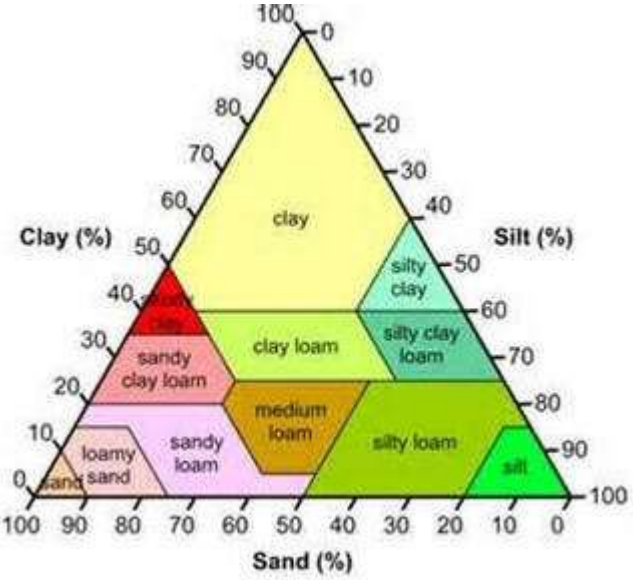


Soil sample 55mm

Clay 2 mm

Loam/Silt – 13mm

Bottom – sand and grit 40mm



- Clay: 2/55= 0.036 = 4%
- Loam/silt: 13/55= 0.23 = 23%
- Sand 40/55= 0.7 = 70% (too high)

The sand layer is too high so more compost and manure is required in the beds to increase fertility and ability for the soil to maintain moisture. My soil appears to be sandy /clay loam mixture.

Ideal is

40% sand – keeps soil aerated, root penetration and water to be accessed by the soil quickly- too much allows nutrients to be washed from the soil quickly and the beds to dry out.

40% Loam – to increase ability of the soil to hold nutrients

20 clay % - good for allowing water to be retained on the soil (too much soil becomes water logged).

Some ways of building soil in Permaculture are to use holistic grazing; adding compost, using biochar, crop rotation, adding worm tea and worm castings to the beds, sheet mulching and incorporating no tilling methods of agriculture. I will also be adding chicken tractors to the property in the future. Adding suitable trees and plants that will fix nitrogen and others that can act as a chop and drop mulch. Building soil is my priority in the larger scheme of things. My goal is to establish thriving soil ecosystems which are fed a rich and diverse source of organic matter to restore fertility and function. The soil will be protected by the following:

- Management of the water – all zones
- Avoiding compaction of the soil through good stock management practices (Zones 3 and 4)
- Management of soil erosion (Zones 3 and 4)

- Use of no dig gardening in all zones
- Adding trees to all zones
- Adding chicken tractors to Zone 2

Future solutions:

- Creating composting bins – hot composting systems will be added
- Continue with in bed worm farms in all the garden beds
- Swales and planting in water run off areas in zones 3 and 4
- Planting – reforestation in Zones 3 and 4 and flood zone
- Biodiversity in all zones
- Inclusion of animals in all zones

2.6 Influence of previous land users

The property was purchased from a deceased estate and the elderly couple had not worked the land for around 10 years. The property had, over the past 5 years, been grazed by a local dairy farmer. No work had been done on the fencing and stock have been allowed to graze into the native bush area, and waterways, as well as overgrazed the property and compacted the soil. There has been no management of the Californian thistles and they have taken over many of the paddocks. The greenhouse has not been used for 5 years, but had previously been used for growing Calla Lilies, then later for the production of tobacco. Calla lilies, mint and blackberry bushes have sprung up everywhere in Zone 1 around the home as well as in the greenhouse. Boundary fences are overgrown with Barberry. The soil in the greenhouse is sandy and is of a very poor quality. It also requires a significant amount of work to reinstate the irrigation and electricity systems as these are no longer connected. There is a large water tank alongside the barn that has been disconnected from the bore water supply and the barn has no gutters on the roof. The following will be required:

*** Reinstating the irrigation system and water supply to the greenhouse and supply of electricity for fans and humidity control

*** Placing gutters and a downpipe on the barn, and capturing this water into the unused water tank needs to be considered to enable irrigation of Zone 2 in the food forest. Future water tanks for further storage to capture water from the storage shed and house. Water is currently being captured into large barrels until tanks can be installed.

*** Enhancing the soil in the greenhouse and Zones 1 and 2

*** Dealing to the thistles in Zones 3 and 4

*** Restore the forest and riparian areas with natives and protect the waterways through fencing off these areas.
*** Fence off areas where the water flows form the paddocks down to the stream and plant these areas so as to avoid cattle pugging these areas.

2.7 Existing Structures and their influence – Zones 0 and 1 and 2

The home is a large cedar board home with wrap around decks. There are mountain views to the north and south, and west, and valley views to the east. The home faces the east with magnificent sunrises in the mornings. On the property is a greenhouse that provides some protection from the westerly winds, but otherwise that side of the house is exposed to the winter rain and winds. There is a large old barn, pig pens/animal shelter, a cold store unit that is being used as a garden shed, a container and a single shed, currently being used as a home gym, but has the potential to be used as a small farm shop. The barn also provides a good wind break from the westerly winds to the paddock alongside the house and Zone 2.

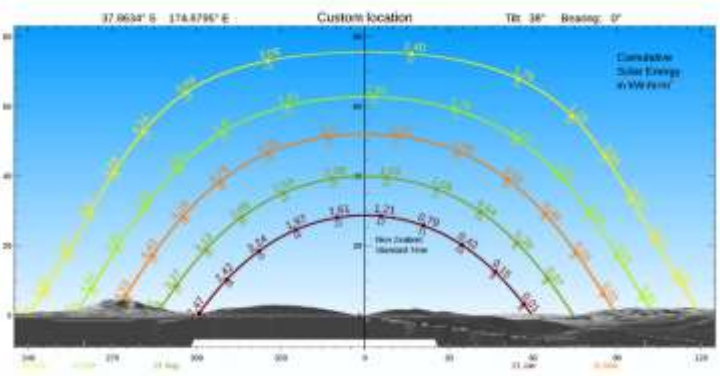
2.8 Influence of surrounding land use:

The surrounding land is farmland, and open spaces with very little shelter for animals. There are however banks of native areas scattered in the region. The region is surrounded by Mt Pironga which provides the regions with its own microclimate. We will often have rainfall, when 20 kms down the road, it is sunny. We also have a lot less frost than close by regions. Excessive dairy farming has over the years had an impact on the waterways. The local farmers have however gone a long way to establish riparian planting. Our immediate neighbours manage the thistles and are keen on regenerative farming principles. We also have an active community involved with predator control and regenerative forestation projects.

2.9 Sun Angles

Mar Equinox:	21.03.2022 04:33 NZDT
Jun Solstice:	21.06.2022 21:13 NZST
Sep Equinox:	23.09.2022 13:03 NZST
Dec Solstice:	22.12.2022 10:47 NZDT
Declination:	1.523°

Right Ascension:	0h 14m 3.70s



3. User Requirements

3.1 Land owners goals

The goals and motivation for engaging in this process are as follows:

- To create an overall permaculture design on my property including all zones and to practice regenerative farming by introducing mixed pastures in Zones 3 and 4 of the property
- To live more sustainably and within 5 years to live mostly off the produce from the land and animals on the property
- To create a landscape and environment that requires minimal inputs over time, and areas that are friendly for older people – ie raised beds and automatic watering systems
- To have and edible landscape including native plants as well as plants with the potential for medicinal use.
- To have a more energy efficient environment and home
- To increase the value of my property and leave a legacy to future dwellers
- To reduce the operating costs on my property as both my husband and I enter retirement this year.

4. Site and Base Maps

4.1 Base Map 1

The following map identifies the drone views of the property in **March 2022**. The house and **Zone 1** have been identified in blue. Orange is **Zone 2.** Wind directions, and sun angles will be discussed, as well as suggested plantings. Immediate goals include the following:

- Remove shade cover blocking kitchen window view
- Removing rusted shed
- Clear out rubble and rubbish from Zone 1
- Clear out all existing garden beds from weeds and rubbish
- Compost and mulch existing beds
- Trim all overgrown fruit trees

Remove shade cover

Property as per March 2022. Zone 1

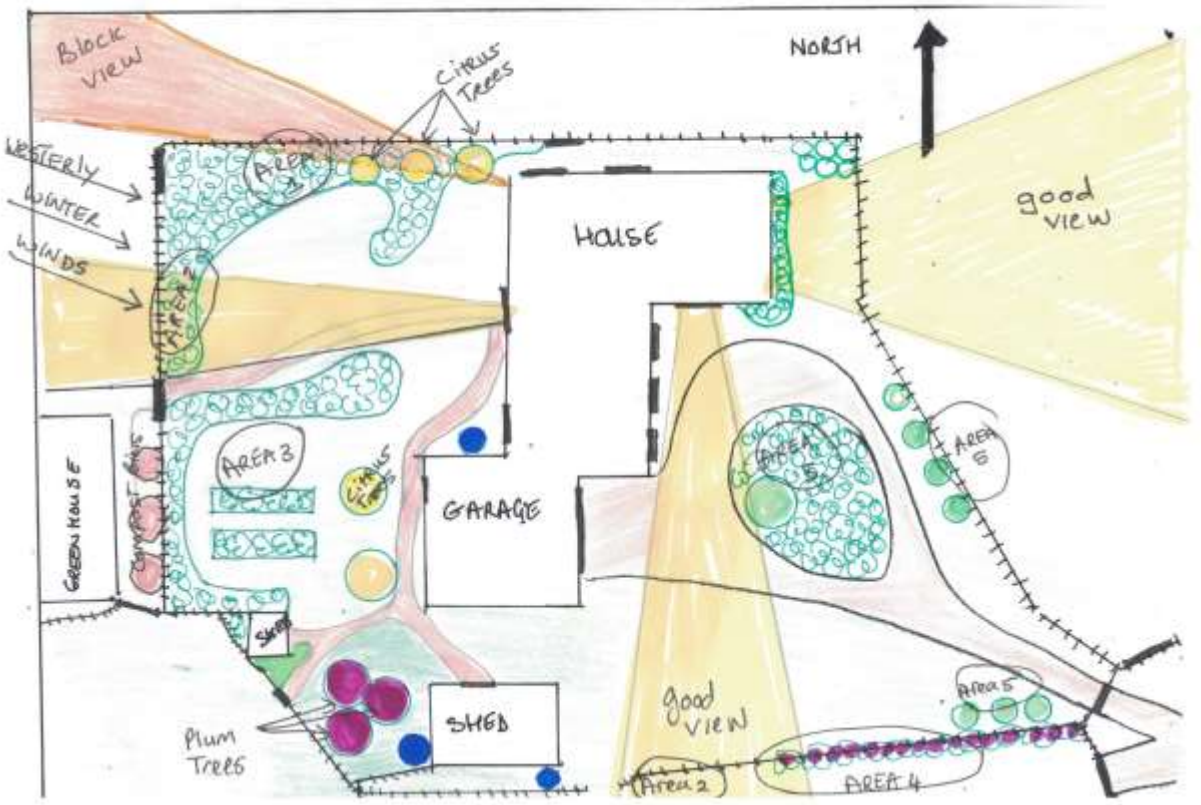
Remove rusted shed on south side

Overgrown back yard with blackberry and long grass, some fruit trees present. This is where Zone 1 will be established.

Blackberry bushes

Overgrown beds

- **Block certain** views from neighbours and weather
- **Keep good views**
- **Create annual garden beds**



Property is North facing- Above is outline of areas in Zone 1, with concept sketch/ideas for planting

Key

- **Good Views**. It is important that the views are maintained and that planting does not block out the views that are enjoyed from the home. Some open areas will also be created to allow incoming energy such as sunlight**. Zone 1** will be the kitchen garden and lower growing shrubs will be planted as well as raised garden beds for vegetables, so as to capture maximum energy from sunlight. Raised garden beds will face north and be placed away from the house so as to reduce the impact of shadows caused by the house as the sun travels from east to west over the home. The large citrus trees in **Area 3** will be pruned back to allow for more sunlight to enter the garden. A tin construction will be removed next to the plum trees to allow extra light to enter this area, and plum trees will be pruned, and one removed as there are three in a very small area.

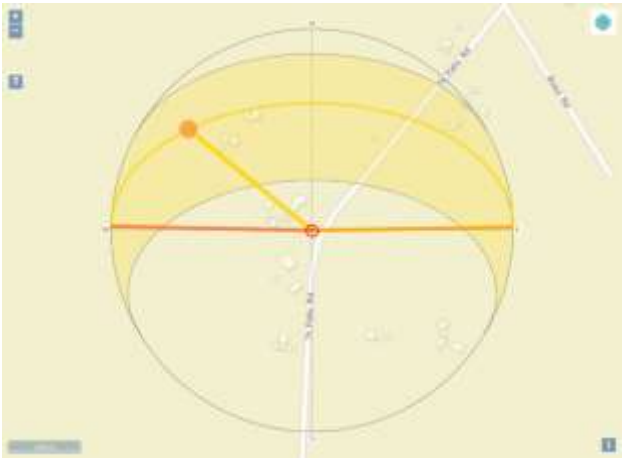
- **Block views in Area 1**- Unwanted views are those of the neighbours' sheds and their home. Suitable plants will be used to screen these areas from the views and to add privacy to the back garden.
- **Strong winter winds from the west - Area 1** provide windbreak from the westerlies to protect both the home, and the garden. By blocking the strong energy from the wind, plants will be protected. Deciduous trees will be trimmed back to provide additional light in winter (the citrus and plum trees).

- **Areas 2 : Good views** need to be maintained and enjoyed from the home. Shrubs need to be creepers in nature, or lower growing.
- **Area 3: Proposed Vegetable gardens** (Zone 1) – raised beds and supporting beds to be considered or no dig gardening.
- **Area 4 Climbing plants for fences leading to food forest.** It is important that the fences are utilised for vertical growth so climbers will be used so as to keep the view from the house.
- **Area 5 - Native trees/ plantings on fence line and centre garden to provide shade and privacy** from the road as well as to entice native birds and bees.

Sun and impact on property

The sun creates shaded zones in summer especially on the east side of the house. Shade tolerant plants need to be considered for this area. There are also windows on the eastern side of the home, with good views so plants need to be low in height. Zone 1 receives good sunlight throughout summer and winter. Existing trees such as the plum trees in Zone 1 cause shade in Summer but as these are deciduous allow for light to enter the garden in Winter. Zone 2: Taller trees (nuts) need to be planted in the northern aspect of the food forest so as to avoid shadows being cast over fruit trees.

- The removal of a storage shed (July 2022) has increased access to light and provided a space for a future water tank.



4.2 Water capture

Zone 1 and Zone 2 have a low contour so there is not much flow of water energy off the land. It is however important to capture as much water as possible so as to channel this to **Zones 1 and 2.** Water energy can be channelled off the barn roof into a water tank. The roof does not have gutters, so these will be installed to enable water to flow into the existing water tank. A pump will be connected for watering Zone 2 from this tank. Eventually it is hoped that an irrigation system can be installed for summer watering.

Chanel water from the house and the shed into additional water tanks to irrigate Zone 1

- A Micro Irrigation Watering system will be created to water **Zone 2** in the Food Forrest will be considered.

https://www.youtube.com/watch?v=hGltbFrUEsk

4.3 Zone maps

In Permaculture 5 different zones are discussed.

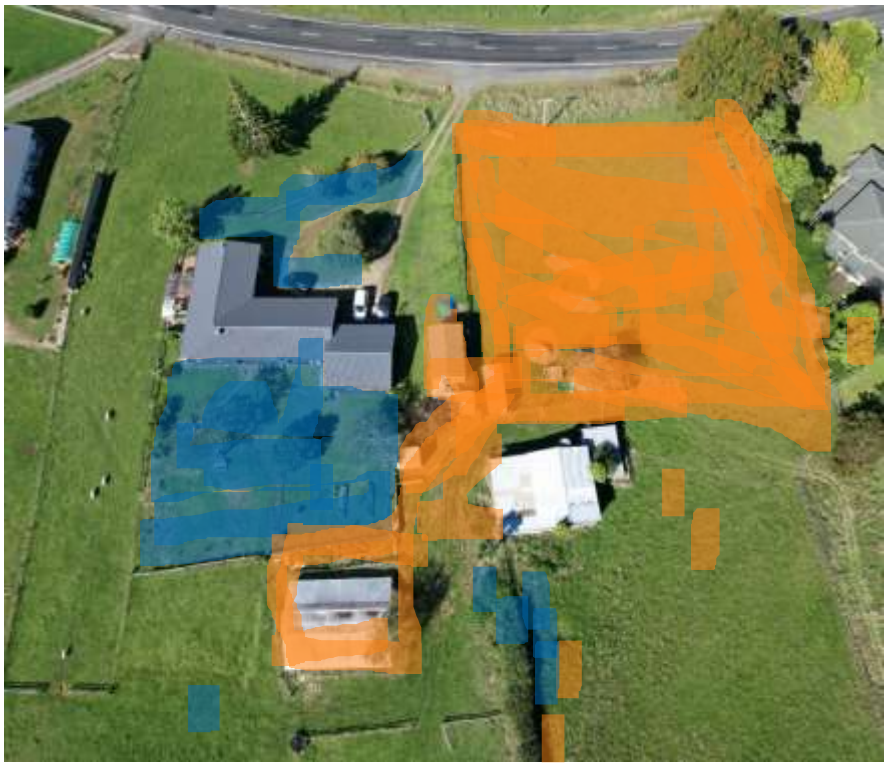
Zone 0 is identified as the house and garage. Food waste will be composted both into compost bins and worm farms and bins, in Zone 1 and 2. Active recycling takes place in Zone 0. All paper and cardboard will be used as sheet mulching and in the vegetable beds and food forest, as mulch. Food from the farm is brought back into the house to be used and recycled, or fed to stock. Vegetables that are picked are first washed outside over a Tubtrug , through a laundry basket that acts as a sieve. The water collected in the Tub is recycled back into the garden beds. The home is cedar cladded, and

windows are double glazed. There is a large fireplace, and we are intending installing a wet back system in the future. The charcoal from the fireplace is used as biochar. We use dropped trees, and pine cones for firewood and store the wood in the hay barn. Some logs will also be used to edge the guilds of the food forest to avoid grass growing into the beds, until the areas are established.

In Zone 1. On the eastern side of the house in Zone 1, I will be establishing a garden that attracts bees, as well as plant bulbs and annuals and scented shrubs as this is the main entrance to the home and property. On the western side of the house, I will be establishing my annual kitchen gardens, herbs and some fruit trees. I will also be using native plants with medicinal properties in this area. A worm farm will be set up in this zone. I have drawn inspiration from patterns of nature (spirals) in the design to link areas with each other. A few key fruit trees have been planted - two cherry; two pear, two dwarf apples, and there are four existing citrus trees and three plum trees. I will be underplanting low growing natives for wind breaks as well as some medicinal plants in this zone. I will also add some annual and perennial flowering shrubs and plants to enjoy, and to attract bee life. I have built two raised garden beds for vegetables (August) and additional beds are planned (September). I will also be growing vertically up and across structures. Along the paths will be planted herbs. The area will be a no dig system with sheet mulching. Vegetables such as marrows will be planted in the garden beds as soil protection. The compost bins will be established behind a screen between the garden and the greenhouse (December/January). For easy access this area will be sheet mulched as I will need to regularly access the area with a wheelbarrow.

Zone 1 **Zone 2**

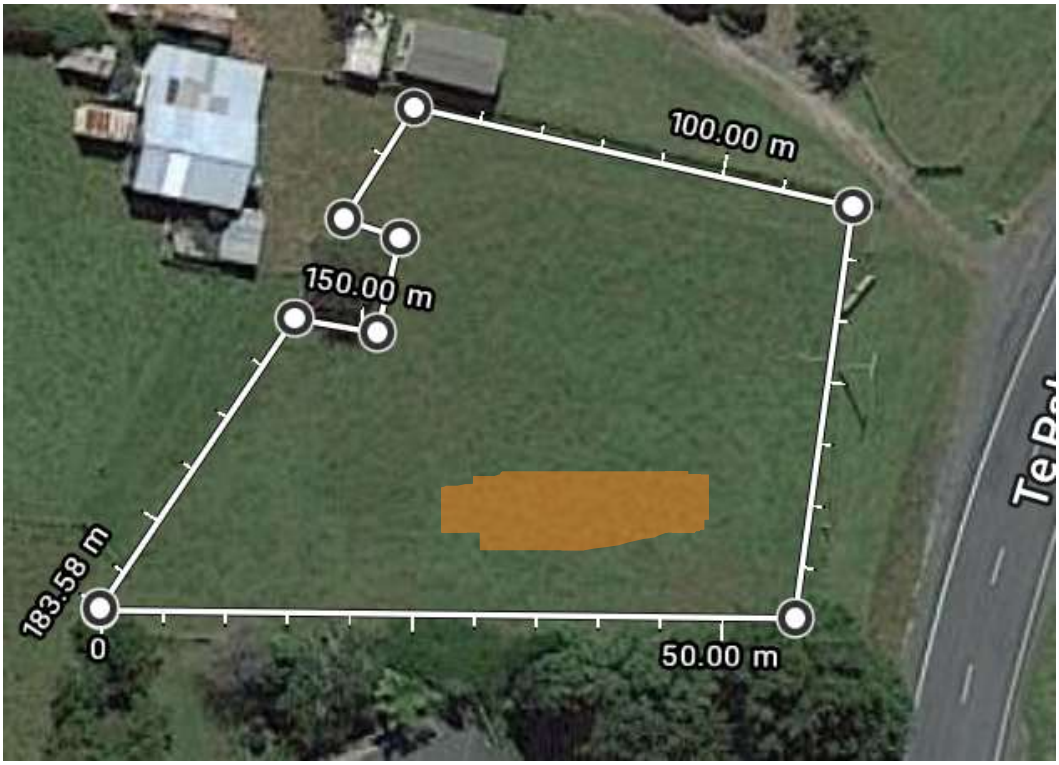
Zone 1 Annual gardens Food Forrest



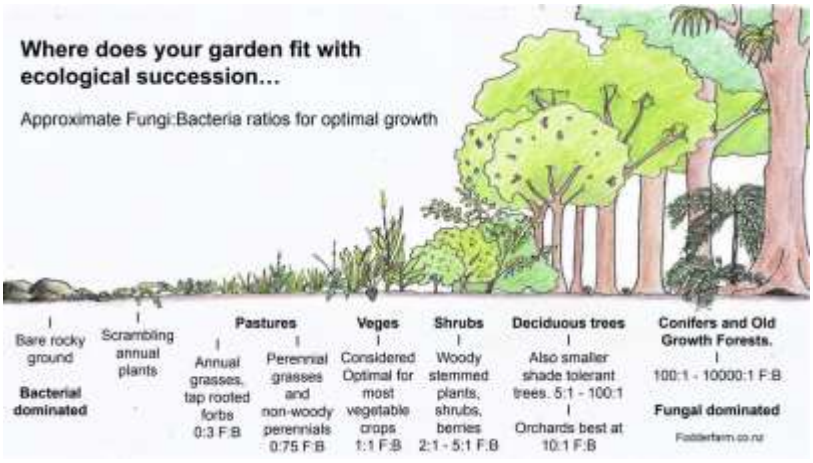
Zone 2 . This zone will be established as a food forest and perennial orchard, containing nut trees, fruit trees, climbers, berries and also some native shrubs as wind breaks on the western side. This is a little further away from the house but still very accessible and will be visited frequently. I am also considering planting vegetables such as root crops; climbers, and running plants to initially cover the ground and to provide nitrogen to the soil. I will be converting the animal shelter into a chicken coup (2023) and plan on having a chicken tractor for grazing. Zone 2 will also include the greenhouse,

compost bins and mulch piles. The storage shed will eventually be turned into a small farm shop where produce and crafts will be sold. I will be using sheet mulching initially in the food forest, so as to reduce the growth of grass and will be using fruit guilds in the forest garden. The ground will be prepared with compost, manure, wet cardboard and then a thick layer of wood chip mulch. So as to enable organisms to survive the layer of compost and manure will allow food for the organisms while the cardboard breaks down. I will also be using *No Dig principles*.
https://www.youtube.com/watch?v=A9Wq32IRrPQ

https://www.youtube.com/c/CharlesDowding1nodig



A food forest is the ongoing presence of perennial plants (such as fruit and nut trees, medicinal plants shrubs and flowers, and self-seeding annuals). The food forest has 7 layers and in Permaculture, mimics a forest edge that is planted with edible plants.



Fruit and tree guilds will be used in Zones 1 and 2

All guilds will include the following:

1. **Nutrient accumulator / nitrogen fixer** - These plants naturally provide in-the-ground fertiliser for others nearby. One type forms a symbiotic relationship with bacteria that allows for nitrogen to be taken from the air and put into the ground around the roots. Legumes, such as beans and peas, are examples of this type of plant. Others push tap roots deep into the ground to pull up trace elements and other minerals. The Dandelion falls into that group. Toby Hemenway, in his book *Gaia's Garden*, has a list of eighty-four plants that are nutrient accumulators for one or more of a dozen different nutrients. Some are typically considered weeds, such as dandelion, Lamb's quarters, vetches, red root pigweed, chamomile, strawberry; lupines; peppermint; lemon balm; chickweed; comfrey; peas, ice cream bean carob. Others are well known herbs, like chives, parsley, alfalfa, and fennel. And some are even typically used for their flowers, including flowering dogwood, geranium, marigold, lupine, primrose, and tansy. Maples, black birch and beeches are also good accumulator trees. Squash and pumpkins can also be grown as fixers, as well as peanuts and amaranth. I am intending using the three sisters planting in Zone 2.
2. **Insectary/Attractors** - These plants provide easy food for many insects, thus quickly attracting a large variety of insects to their vicinity. Having a wide variety helps promote the balance, so that no one insect species gets out of hand and goes on an eating rampage through my garden. Among the insect horde that these plants invite to your garden are species that like to munch on those bugs that potentially become garden pests. Also invited are pollinators - insects that go from one flower to another, spreading pollen and enabling the plant to produce fruit. Examples include Yarrow, dill, fennel, mint (which I will contain); dandelion, comfrey, sunflowers violas, cosmos, citronella, lobelias, lemon balm, creeping thyme, bergamot; coriander, rosemary; broadleaf sage etc. Using flowers in my food forest will encourage bees and beneficial insects to pollinate the fruit and nut trees. Plants from the Asteraceae family appear to be listed frequently. Smelly flowers and herbs is (lavender) the way to go. I have been gradually adding to my plants through propagating cuttings from locals, planting seeds and purchasing plants from local plant stands.
3. **Mulch maker** - Mulch makers build soil by providing a carpet of organic material on top of the soil. While all plants drop debris, the plants with soft leaves are preferred as mulch makers because their leaves compost the fastest, thus benefiting the soil more quickly. It is also beneficial if the plant can handle being slashed down multiple times in a growing season. Comfrey is a favourite mulch makers, as well as rhubarb; and artichoke. These will be planted in the fruit guilds and seeds will be grown in the greenhouse.

The slash-crop. The system uses an edible meadow guild as a slash-crop. This guild can be planted into existing vegetation without tilling, mulching or otherwise removing any vegetation. The guild, in addition to growing biomass for slashing, includes many edibles like garlic, walking onions, various chive species, many herbs, amaranth, camas, and several other crops. The crop will be slashed once the spring flowers have died back. The mulch will be raked into piles and left to dry and brown.

4. **Pest repellers** - This group of plants will help to repel or prevent insect pests and/or fungal diseases. Examples include radishes as companions to squash and cucumbers by repelling a variety of beetles. Companion planting will be considered in all areas of the vegetable gardens and food forest. Nasturtiums, marigolds, and smelly herbs such as basil, dill, mints and chives are listed amongst these plants. Seeds will be sown in punnets and planted out into the suitable beds. I have found great information from a few books on companion planting and continue to learn as I go.
5. **Space sharers** - Plants that take up space both above ground and below ground are space savers. Space sharing is where different plants can grow very close together because their roots look for nutrients at different levels or where their stems and leaves have different growth habits. This is one reason that the Three Sisters pattern works so well: squash plants sprawl out over the ground, the corn stalks grow vertically above the squash, and the pole beans trellis up the corn.
6. **Suppressors** – these are plants that have bulbs and suppress grass growth into the beds and are best planted under the drip line of the trees. I will include alums, chives; leeks, garlic and daffodils and other flowering bulbs. I will also include mint and other creeping plants, but

will need to ensure they do not become invasive. Initially all borders of the guilds will need to be manually kept in check. A border of logs could provide some avoidance of grass creep into the beds.

Within my food forest I will also be planting fruit guilds

These guilds are described in Kay Baxter's book, Design your Own Orchard.

- Deciduous/ Temperate Guild: The trees in this guild will tolerate the heaviest soils, and windy positions (peaches, nectarines, apples, plums, pears), and are tolerant of fluctuating soil conditions – wet/dry. They like a deciduous herbal lay - comfrey, clover, parsnips, spring bulbs (around the drip line), violets, borage, yarrow, tansy, nasturtium and vetch. Cows parsley will be planted especially under the apple trees, as they are great at attracting small wasps which eat the lava of the roller caterpillars and codling moth larvae. Apples also like to be underplanted with yarrow, chamomile, borage, clover, chicory and cornflower. The Koanga institute has a lovely mix of herbal ley which will be used.
- Citrus Guild: This guild requires a sunny hot position and free draining soil. They always need moisture. Citrus are shallow feeders and do not like being waterlogged or too dry. They love lots of mulch and manure. They enjoy a ground cover of Mediterranean herbs.
- Subtropical Guild (can be used in microclimates once garden is established). These include bananas, avocados, paw, tamarillo; sugar cane; passion fruit.. Need warmth, humidity and shelter. Shallow fibrous root system. Need hummus and mulch. Groundcover tends to be leaf mould, branches, pruning's and mulch. These plants will only be considered once the forest is more established and can provide a microclimate for sub-tropicals to flourish. Some sub topical plants will be grown in the greenhouse where the humidity is higher and the impact of frost can be controlled
- Mediterranean Guild : These plants love the heat. Like drier conditions- figs, olives, almonds, peaches on peach rootstock; grapes. They love the aromatic herbal lays including artemisia, thyme, lavender, rosemary; salvia and escolschia. Accumulators include artichokes, chicory; lavenders, rosemary, wormwood. Herbaceous plants include tree lupins, vetch.

Other guilds that I will include are Nut tree Guilds (From Midwest Permaculture https://midwestpermaculture.com/**).**

- Hazel Guild – planting 2 trees for pollination is required. Mushroom logs; berry bushes, currants; lovage, comfrey; elderberry; some ginger varieties. Groundcovers - clover
- Walnut Guild - Gooseberry plants; currents, dwarf cherry trees. Mulberry can reduce the size of the tree if planted on the drip line. Raspberry grows well with Walnuts. Spring bulbs (Daffodils) and Daylilies; as well as Hosta's
- Almond Trees – These will be included above in my Mediterranean Guild

Rongoa Plants that will be included in Zones 1 and 2

Traditionally, Māori has a holistic approach to healing. It Includes the mind, body and spirit – mauri (spark or life force), tapu (natural law) and wairua (spirit). Whakapapa (genealogy) was also a factor to consider in the healing process. Tohunga, the medical practitioners or healers of the Māori world, passed their knowledge down through the generations, and modern Māori healers still use many of the concepts and practices. Rongoā is still used extensively today – many of the medicines from plants are used to fight infection. It was, and still is, important that the gathering of rongoā plants be carried out in a sustainable way to ensure that there will still be some the next time it is needed. A goal of mine is to do a course so as to be able to use these plants medicinally. The following plants will be used in zones 1 and 2. Koromiko; Kowhai; Harakeke; Pohutukawa; Puriri; Kwawkawa; Manuka. I have enrolled in a Rongoa Medicinal Workshop in Term One 2023 (Titokieducaiton.co.nz); and am excited to see where this takes me, having been in the medical field for so many year.

An orchard herbal ley will be planted around the base of all the fruit trees when planting, and the grass around them will be removed as grasses compete with fruit trees, and can suppress its growth when young. Sheet mulching will be used in larger areas. Comfrey will be planted around the drip line of the trees as they produce long tap roots and are nitrogen fixing, plus the earthworms seem to love

the long tap roots. As the leaves break down, they will provide a top soil for the food forest. Herbs that will be used in the food forest include borage, lemon balm, sage, chicory clovers, and bulbs. I will also be planting members of the Umbelliferous family such as parsley, carrot, parsnips, coriander and dill to protect my fruit trees from pests (my understory and ground covers).

Zone 3 will be used for grazing of livestock; growing mushrooms in the forested areas, and placing bee hives. I will also be using larger native plants as shelter belts for animals and also to attract birds. The current hedges will be replaced with natives in the future. We will be using the Broadacre Farm Module system for the management of these areas.

Replace hedges

- Mixed pastures will be introduced into **Zones 3 and 4**. These will provide a range of forages that are palatable at different times of the year. Herbal pasture leys will be planted that include Alfalfa, Dill, Dandelion, Caraway, Chicory; Fodder Beet, Burnet, Poppy, Red Clover, Parsley, Fennel, Sorrel, Yarrow and Minutina. Kings Seeds. The grasses will be grown to maturity and longer than usual before the browsers are moved through the paddocks. https://www.kingsseeds.co.nz/shop/Field+Selection/Field+Crops/Herbal+Ley+for+Grazing+Animals-4240-2.htm provide a herbal ley option. Cattle and sheep will be grazed on the land and rotated between paddocks. Wesco Seeds also do an Agrisee Mix which is a diverse pasture mix. https://wesco.co.nz/products/classic-wesco-seed-mixes/agrisea-mix/. Seed drilling will be used for planting. Thistles are grubbed throughout the year, that's husbands job. https://beejays.com.au/news/broadacre-farming-practices/#:~:text=At%20its%20core%2C%20broadacre%20farming,%2C%20maize%2C%20sunflower%20or%20safflower.
- Rotational Grazing: The concept of rotational grazing will be used in the paddocks where the cattle are moved between paddocks every day and sheep are moved in behind them, again moved from paddock to paddock. We will ensure that the paddocks are not overgrazed. Pastures will be allowed time to grow and rest before animals are set through them again. As we do not own our own herd of cattle, we have access to graze the neighbours dairy herds as and when it suits us. High densely packed dairy grazing will occur 2x a year (mob stocking).

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Flood zone

- Zone 4 – **Native timber forest and water planting**, trees for firewood . This area will not be accessed on a regular basis. There is a flood zone in this area so thoughtful planting will take place with native trees in this zone. The zone has a river so fly fishing can also be considered.

Native Plants will include the following:

Canopy trees: Kahikateas, Totara; Tawa; Northern Rata; Rewarewa

Understory: Mamaku; Ponga; Mahoe; rangiora; Heketara; Mingimingi; Karamu

Grasses and ferns: Rasp fern; lance fern; forest sedge.

Climbers on canopy trees: Kahakaha; Rata vine; Bush Lawyer.

https://www.doc.govt.nz/globalassets/documents/conservation/native-plants/waikato-ecological-restoration/planting-guide-3-lower-waikato.pdf

Flood zone plants will include the following:

Area will be divided into 3 plant zones:

1. Standing in Water – Bamboo Spike Edge, Raupo and Carex Secta
2. Boggy and prone to flooding – ToeToe; Mingimingi; Swamp coprosma; Cabbage tree; Pukatea; Manuka and Harakeke
3. Moist soil – Karamu; Kahikatea; Rimu; Mahoe; Matai; Pate and Pokaka; Sedges; Ribbonwood; Lacebark.

https://www.waikatoregion.govt.nz/environment/biodiversity/planting-guides/wetland-planting-guide/

https://www.waikatoregion.govt.nz/assets/WRC/Services/publications/other-publications/Wetland-factsheet-3-Planting-guide.pdf

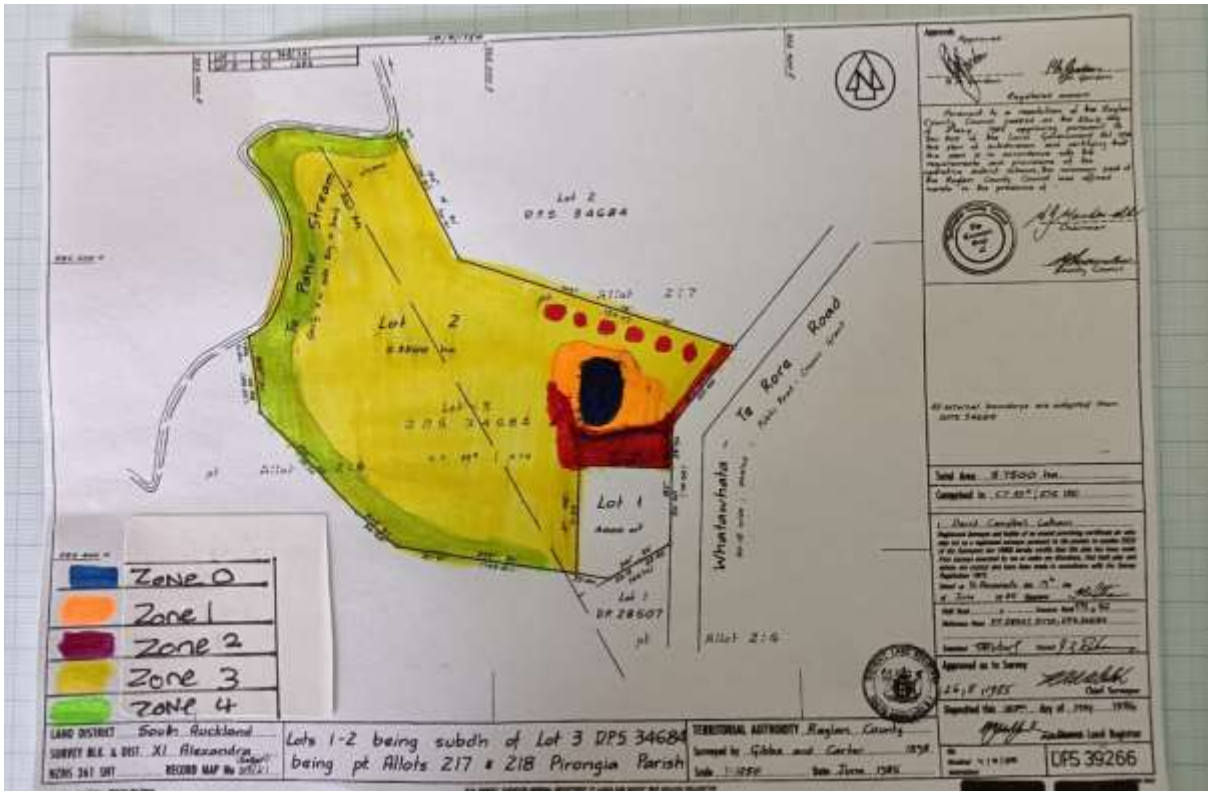
Flood zone

The edges of **Zone 4** will be act as a corridor for wildlife to **Zone 5,** by including extensive planting of native plants and natural habitat.

- **Zone 5 Wildlife Habitat**. (river and forestry areas as well as mountain ranges) and will not be managed by myself, but its impact on my property will be considered. We use these areas for hunting and tramping, as well as being engaged in bait trapping and predator management through DOC and our community projects. This zone provides the habitat for small animals and insects that are safe in their natural habitat.

https://nativeplants.co.nz/index.php/2020/02/27/plantingaripariannzone/

5. Concept sketches



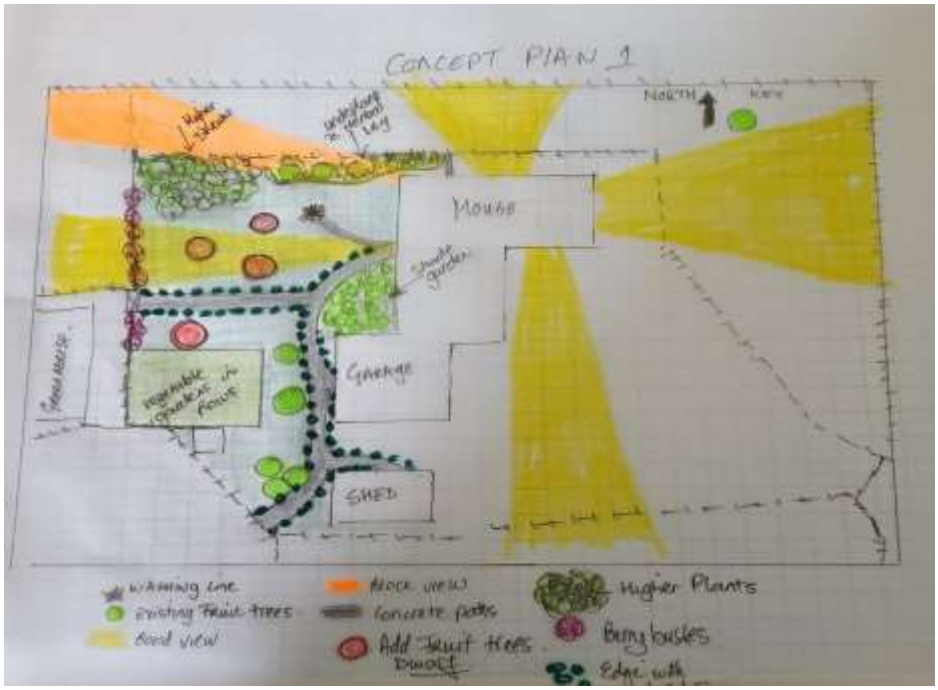
Zone 0 is the house

Zone 1 Western side of house – (The eastern side may be developed at a later date, but is currently used for grazing for sheep).

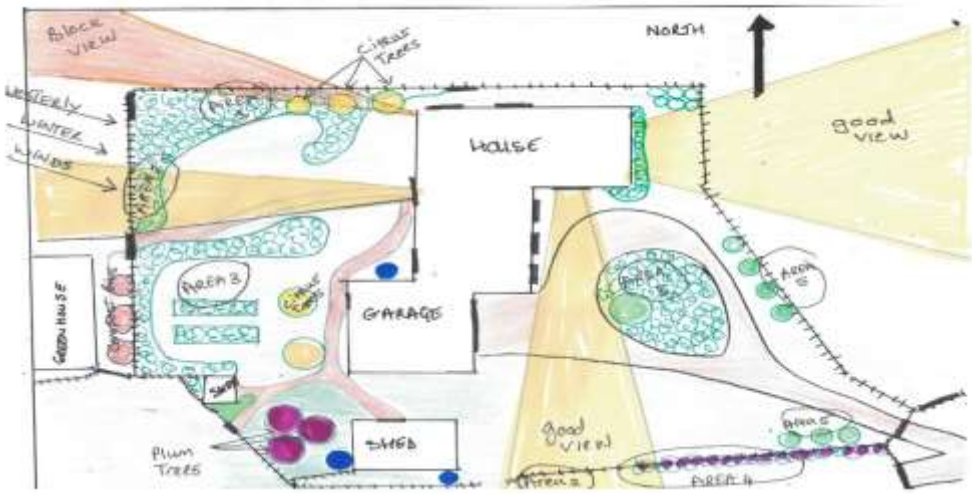
Original view 3/3/ 2021 at purchase

Zone 1

Concept Sketch 1



Final Concept Sketch



Over the last year I have observed the site and started to create my annual gardens in Zone 1 as per final concept sketch above:

1. The rubbish has been removed from areas 1 and 2 (this was a dumping area for everything and covered in grass overgrowth). The garden beds have been established, fruit trees planted and shrubs as per concept plan above.
2. The old, rusted tin construction alongside the shed has been removed and recycled. This has been replaced by a shade cover which I repurposed from the back yard (used to be a cover for the barbeque area) to house my seedlings while hardening them off. I still need to install a water tank . I have used old wooden pallets to construct a storage area for my seedlings.

Area 1 and 2 I have planted the borders with windbreaks as per my final concept plan and have created an area with both a combination of fruit trees, medicinal Māori plants and flowering shrubs. I have also created a bed with Protea and Erica as these remind me of home (South Africa). The ground is sheet mulched with cardboard and compost.

Areas 1 and 2:

Rubbish has been removed, beds are being created – sheet mulching**.** I have observed the weather and the sun angles and reused materials that I have found.

Windbreaks with plants and temporary panels – Produced no waste through recycling rubbish that I have dug up. I have used spirals and curved patterns found in nature. Carboard, paper and mulch has been used in the beds and in garden worm farms have been set up.

Area 3: I have constructed raised garden beds from wooden pallets, as well as recycled roofing iron that I found in a pile of rubble when clearing up areas 1 and 2– these are now my vegetable garden beds. I need to still install a composting system as I am currently using an old black bin. I have inserted homemade inground worm farms (buckets with holes) in all my beds and have a separate worm farm nursery. The buckets were accessed through a food

company selling on used buckets. https://www.youtube.com/watch?v=37yz2sMjHlE. Temporary catchment of water is in place through two large barrels – catching water from the house and the shed, until tanks can be installed. I am putting in place small and slow solutions, and reflecting on how nature reacts to my intervention. All beds have been significantly compacted and sheet and cattle manure has also been added, after a period of maturation in composting areas.

Greenhouse: This is my work in progress

This area is being used to propagate my seedlings and cuttings, and to grow plants earlier than season dictates. I am using small and slow solutions, experimenting with what grows well and what does not. The greenhouse requires a lot of work in the future as there is currently no irrigation system in place. I am collecting rain water from the roof of the greenhouse into temporary storage tanks, and using this to hand water the beds and seedling trays. I have purchased recycled plugs from a local farmer and am also accessing free pots from the nursery (recycled pots). I am putting into place the following permaculture principles – slow and small solutions; observe and interact, catch and store energy. I have also noted that the western side of the greenhouse is far too hot and sunny for seedlings as the dry out too quickly – but this area is great to dry out my onions. This area could be a great area for the potting tables and storage of pots and trays .
The roof of the greenhouse is opened in hotter weather, and during the winter, the doors and roof were kept closed so as to keep the heat inside. I did however find three feral kittens in the greenhouse over winter- and had to feed them as I think the mother was “locked out”

when I closed the doors. One is now our house cat and the other two were accepted by the SPCA as we managed to tame them and have them desexed. I have placed flowering plants in the front beds to attract insects to pollinate the vegetables. Recycled bread trays are being used to place my pots onto (accessed from a siter in law who has a café). The beds are gradually being composted (I have done 3 out of the 8) using horse manure, garden compost, blood and bone, seaweed extract, work castings, sheep poo and coffee grinds from the local café. My first lot of planting has been peas and beans so as to become nitrogen fixers and I will chop and drop once harvested, and dig them into the beds. I have obtained a significant yield already in the greenhouse from peas, beans, a fantastic cauliflower crop – it was great to be able to shut out the white butterfly.

November 2022: The tomatoes, marrows, zucchini and melons are now growing crazy and are needing to be staked and strung up. I have also planted sunflowers in the greenhouse beds to attract insects and bees. Through observation I am learning what plants love the heat and what plants do not. I am also propagating my seedlings and have experimented with a variety of seedling mediums that I have created, taking note of what has and what has not worked well. My seedlings are taken from the greenhouse once they have developed a few leaves, and placed for a few hours outdoors, then inside again to harden them off. From the greenhouse they go into the shaded area to grow on then planted out. I observe and wait for a few overcast days to harden them off so that it only takes a few days and not a full week. Catch and store. I have collected Flax and Kowhai seeds from the property and have successfully managed to grow these on into small seedlings. I have also taken cuttings from a variety of other native plants on the property and am successfully growing these into small plants. I will be turning a fenced area on the property into a small native nursery to grow our own plants for reforestation along the river and boundaries. I am also using the greenhouse to dry my onions and garlic that I have harvested. Through observation, the west side of the greenhouse was too hot for seedlings, but perfect to dry my onions.

The following work is still in the pipeline:

- Create a potting area in the greenhouse
- Create a system for storing all the mediums for growing plants (currently in bags and buckets
- Install water supply and an irrigation system in the greenhouse
- Continue to fertilize the remaining beds for growing plants
- Create raised shelves for storing seedlings (currently stored in beds on the ground)
- Clean out the two large tanks previously used for fertilisers and create natural fertilisers using plants from food forest – ie comfrey tea, compost tea, seaweed kelp tea. I need to spend some time investigating best options- slow and steady learning. I will also contact the local permaculture group and gain their feedback and advice.

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Area 4

I have planted this area with a variety of berry bushes which will be able to climb up the fence. I have recycled old pool fencing to form the climbing support as well as recycled an old farm gate. On recent discussions with my husband, we may consider removing this fence and moving the berry bushes into its own protected berry garden – still considering this but in the meantime I will eat the berries that the birds do not get to first.

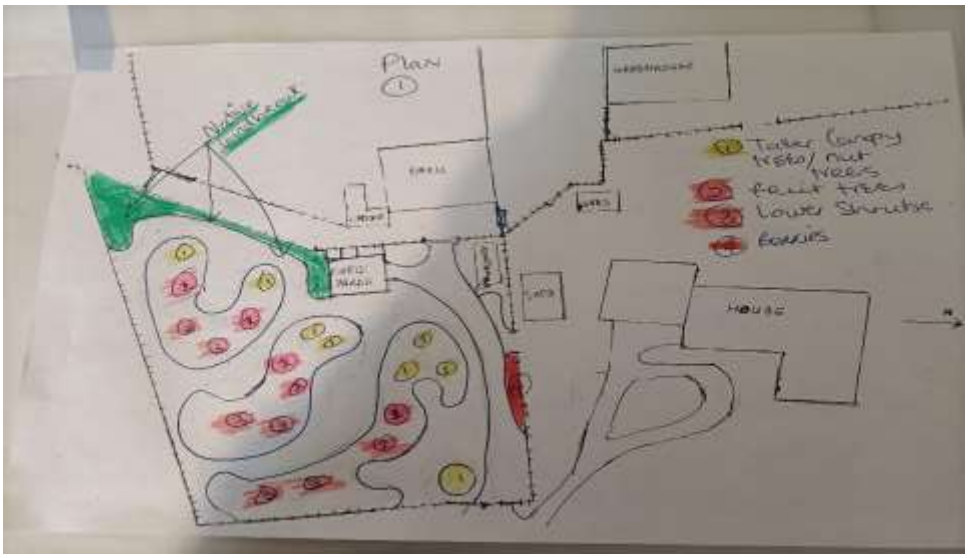
Area 5

I have planted three native trees that will provide some privacy – Rewarewa. It is fast growing, is evergreen to provide some shade for summer, has flowers so as to attract birds and bees and provides seed pods for further propagation. Inner part of the bark has medicinal properties.

Zone 2 is the food forest will be developed within the marked area below

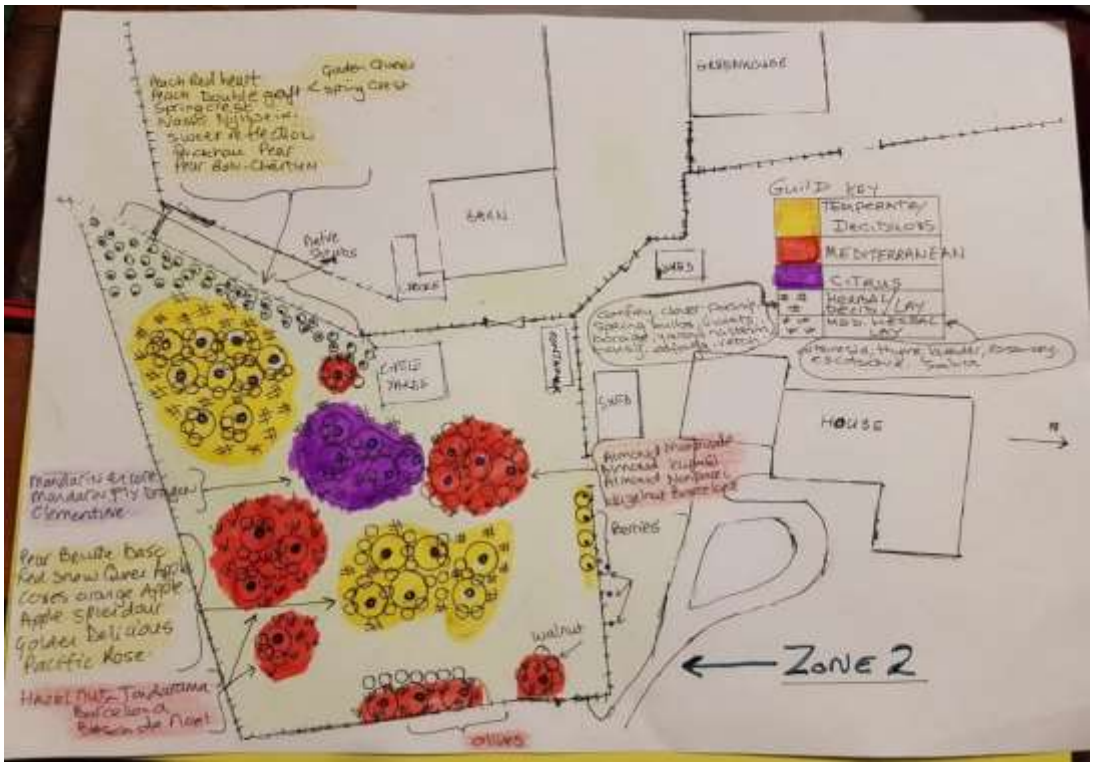
Original site view 2021

Concept plan 1:



Concept plan 2:

Below is the concept map that I established after playing around with a few options and using Kay Baxter's Garden Design Book as guide to how many trees and plants I can grow within this area. I have started planting my fruit trees as per final concept plan and have slowly been adding the next layers. I have also been sheet mulching the areas and combining the fruit trees to form my guilds. I am using permaculture principles of using renewable resources (accessing mulch from local arborist, accessing local cardboard from the furniture shops and florist, using composted scraps and inground worm farms). Poly culture will be used and a variety of fruit trees that fruit at different times will ensure a continued yield of food. Earth care is important to me as I develop this area and work towards developing a living soil. The produce will be used to look after my immediate, then extended family, as well as to share with the local community and church whanau. Excess food will be preserved for use at a later date so as to avoid waste. Excess food will be also be shared with others who are not able to access this or cannot afford it. As I develop this area, I will be open to creatively responding to changes and adapting to the cycle in the food forest.



Fruit guilds will be used in this zone – as per Kay Baxters' book – Design Your own Orchard and Koanga Garden Guide
https://books.google.co.nz/books/about/Koanga_Garden_Guide.html?id=KPqrNQAACAAJ&redir_esc=y
https://www.plantandshare.co.nz/product/design-your-own-orchard-koanga/.

Final Sketch 

Mediterranean Guild – including nut trees

Native shelter belt being established

Temperate/Deciduous Guild – Peach, Nashis and pear trees have been planted. Sheet mulching and guild needs to be established in this area.

Citrus Guild in the background, 3 sisters planted on left side (fenced off)

So far I have all my fruit and nut trees planted and have used them as my canopy layer. I am now planting my shrubs for each fruit guild, and adding ground covers to protect the soil. With every 2 fruit trees I aim to have a nitrogen fixer, shrubs that are insect attractors, mulch makers, pest repellents and weed suppressors. I have also tried to include native plants where possible and have created a native windbreak along the fence line. My biggest challenge so far is to stop the grass and weeds growing into the beds. I am planning on edging the borders initially with wooden logs that we are accessing from fallen trees on the farm. Some of the guilds still need to be joined, mulched and underplanted. I still need to connect the areas with sheet mulching to create my final concept plan. The fruit trees also require sheet mulching to stop the grass growing into the roots. This will be my first priority before joining the trees to form the guilds. Kay Baxter has recently brought out a revised edition of Designing and Managing Forest Gardens, which I am to purchase soon. Through connecting with others in the community, I have been able to share and access plants for the gardens.

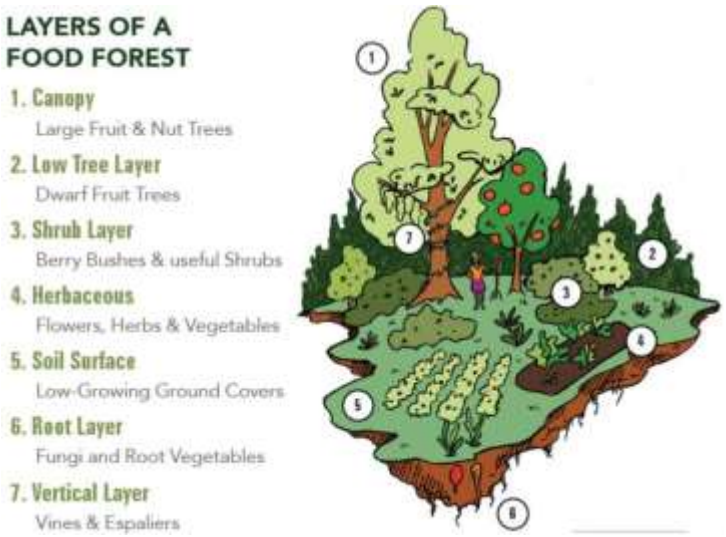
I am using my greenhouse to propagate the following for the food forest:

- Comfrey seedlings, tagasaste cuttings, herbs; geranium cuttings, chamomile, vetch, cardoon; gooseberry plants, berry cuttings and artichoke. As these grow, I am transplanting them into the guilds – many get eaten by the rabbits so I have had to cover these with netting until they are more established. I have found out that the rabbits love comfrey and catmint, as well as young shoots of herbs and vegetables. Snails and slugs have also had a fair share of young seedlings.
- I have recently planted the three sisters in one bed to include vegetables into the food forest. I have placed an animal netting around this to stop the rabbits nibbling the plants, until they are more established. All the seedlings were grown in the greenhouse and include the

following: corn, beans and a variety of squash and butternut. I have also planted amaranth and sunflowers on the borders as bee attractors and insect repellents from the food.

- https://www.almanac.com/content/three-sisters-corn-bean-and-squash

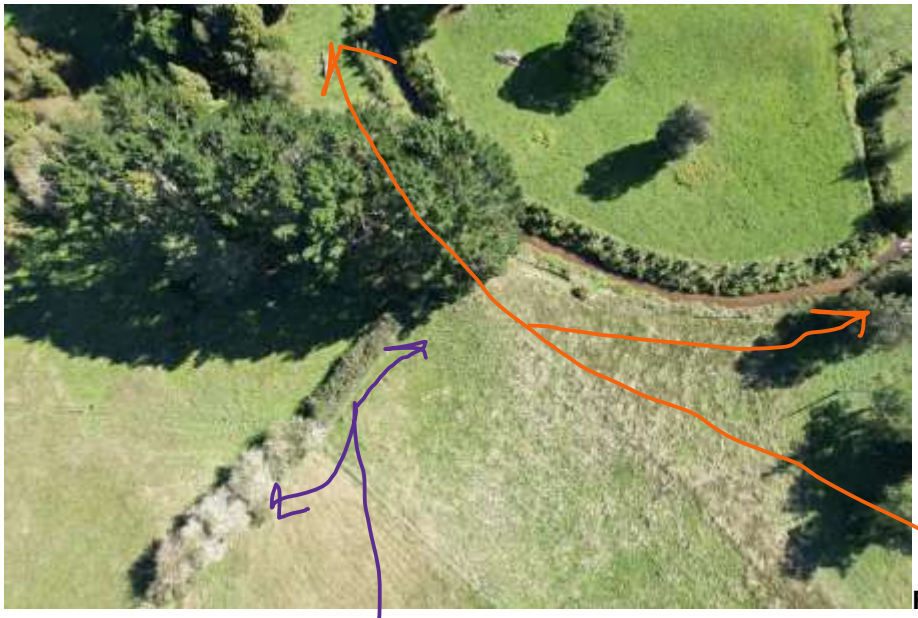
- In another bed I have planted some peas on a climbing frame (I have not yet established the layers of the food forest, and only the fruit trees are in that guild so am using the space for planting vegetables and feeding the soil. Companion vegetables that will be planted include celery, spinach, beans and peppers.



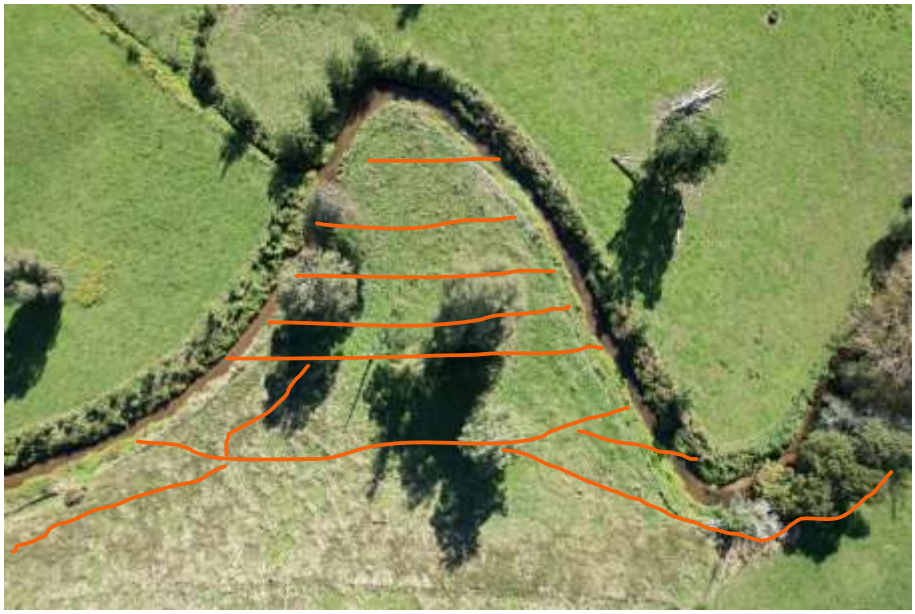
Concept sketches for Zones 3 and 4

As these areas will be used for regenerative farming, and reforestation, attention has been given to fencing, riparian planting and keeping stock out of the water ways. Native planting along the river is the primary focus for the next 4 years. Hedges will also be replaced with native plantings.

Native planting and reforestation



Riparian planting for flooding and replace hedges with native plants in the future



Replace hedges with native plants – 4 year plan

Manage erosion of this paddock with wholistic and regenerative farming practices.

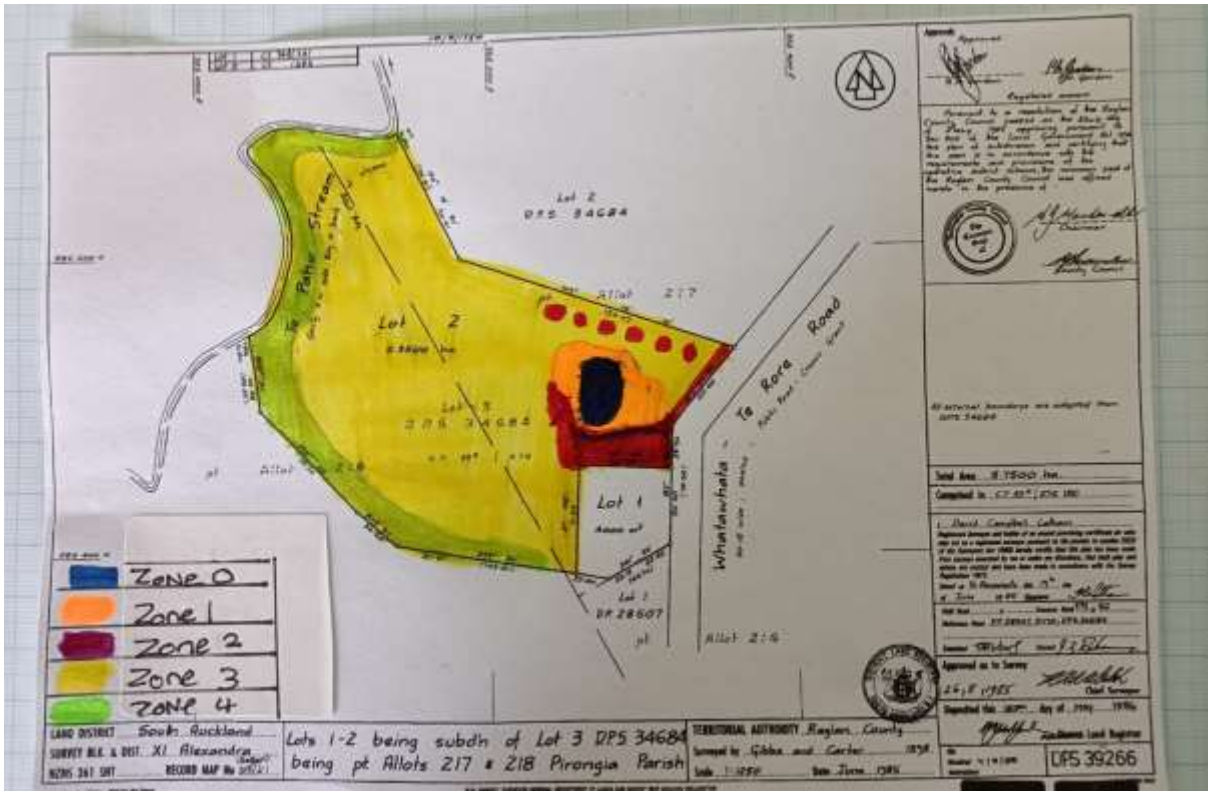
Update October 2022: Zone 3 and 4 : We have finally electrified and repaired all the fencing around the farm, to ensure that animals do not enter the water ways or natural forested areas. We have also fenced off three sections where water naturally drains off the property, to a small river catchment, and are planting these with natives. Our first 500 plants went in this year, and some lessons were learnt with flooding and frost. An order is in for the next 500 plants. We have used the planting guides from the council as a base for our decision making and planting. I am also hoping to continue to grow my own native plants so as to reduce the expense of purchasing plants.

https://www.waikatoregion.govt.nz/environment/biodiversity/planting-guides/wetland-planting-guide/

https://www.waikatoregion.govt.nz/assets/WRC/Services/publications/other-publications/Wetland-factsheet-3-Planting-guide.pdf

6. Final Plan

I have attempted to introduce the final plant throughout the sections in this portfolio, so as to provide an idea of where I started, and where I am hoping to go towards. Below are the zones in my design



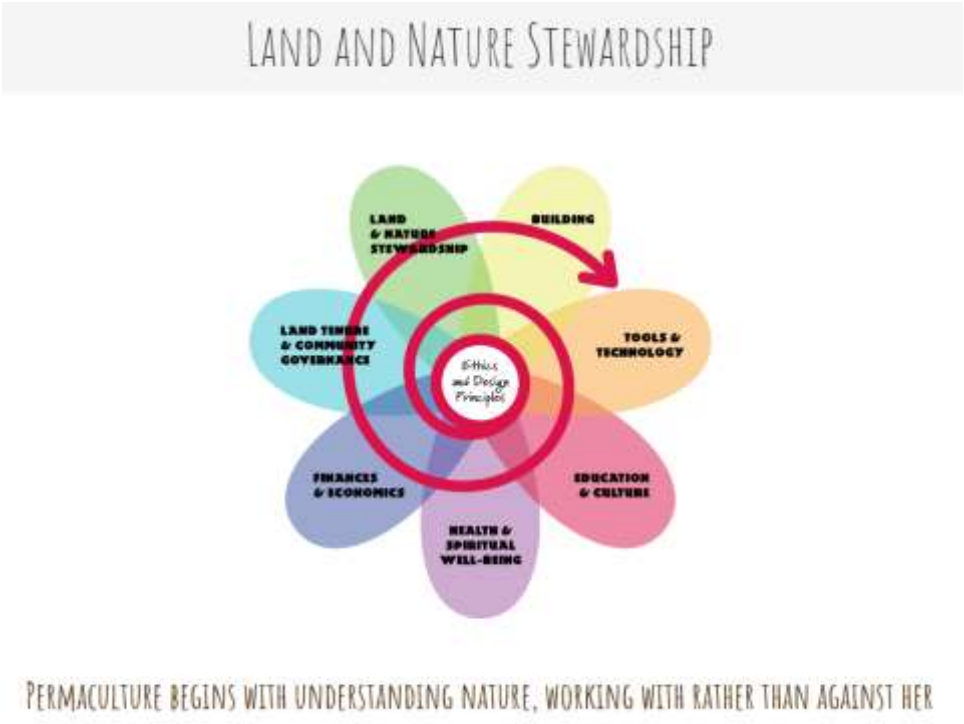
7. Description

In this section I will discuss my interpretation of permaculture design. Permaculture is the growth of agricultural ecosystems in a self-sufficient and sustainable way. The simplest definition of an ecosystem is that it is a community or group of living organisms that live in and interact with each other in a specific environment. Permaculture draws inspiration from nature and develops synergetic systems based on crop diversity, resilience, natural productivity and sustainability. I have attempted to use the principles and techniques of permaculture in my design, and used the ethical principles (preservation of the environment and biodiversity; willingness to build a community for individual and collective well-being and sharing of resources and equitable redistribution of excesses (for the benefit of humans and the environment) to guide the decisions that I make. I have attempted to take time to understand my property and the impact that systems have on it and its potential. "*Permaculture is an approach to land management and settlement design that adopts arrangements observed in flourishing natural ecosystems. It includes a set of design principles derived using whole systems thinking. It applies these principles in fields such as regenerative agriculture, town planning, rewilding, and community resilience. Permaculture originally came from "permanent agriculture",[1] but was later adjusted to mean "permanent culture", incorporating social aspects. The term was coined in 1978 by Bill Mollison and David Holmgren, who formulated the concept in opposition to modern industrialized methods instead adopting a more traditional or "natural" approach to agriculture".* *https://en.wikipedia.org/wiki/Permaculture*

7.1 Design principles have included the following:

- *Observe and interact* I have and will continue to take time to engage with nature to design solutions that suit a particular situation and my property
- *Catch and store energy*: I have and will continue to develop systems that collect resources at peak abundance for use in times of need – especially water
- *Obtain a yield*: I am emphasizing projects that will generate meaningful rewards (food forest, annual and perennial gardens, native forestation, greenhouse use etc.).
- *Apply self-regulation and accept feedback*: I will discourage inappropriate activity(such as overgrazing paddocks and the use of chemical sprays) to ensure that systems function well.
- *Use and value renewable resources and services*: I will make the best use of nature's abundance: reduce consumption and dependence on non-renewable resources.
- *Produce no waste*: I value and employ all available resources: waste nothing.
- *Design from patterns to details*: I have and continue to observe patterns in nature and society and use them to inform designs, later adding details. I am still hoping to create some spirals in the food forest.
- *Integrate rather than segregate*: I want relationships to develop between my various design elements, allowing them to work together to support each other.
- *Use small and slow solutions*: Over the years, I have used small and slow systems to maintain, and to make better use of local resources, and produce more sustainable outcomes.
- *Use and value diversity*: Diversity reduces system-level vulnerability to threats and fully exploits its environment. I have ensured that I have a diverse range of fruit trees and vegetables growing, and use companion planting where possible.
- *Use edges and value the marginal*: *The border between things is where the most interesting events take place.* These are often the system's most valuable, diverse, and productive elements and I will take care of these borders and boundaries to encourage a passage through my property for wildlife.
- *Creatively use and respond to change*: A positive impact on inevitable change comes from careful observation, followed by well-timed intervention. I will continue to observe and make changes where needed, and continue to learn from, and share with others

7.2 I have used land and nature stewardship principles to guide my decision making.



Land and Stewardship

- **Bio intensive gardening:** I will be making, and using compost, double digging where needed, or no dig systems. I will be companion planting for natural pest control to produce the maximum amount of food in the minimum area. I will also be using vertical gardening to best use space most effectively. I will avoid the use of mono cultures/ and grow a diversity of food and plants on the property – especially in Zones 1 and 2. I will be using renewable resources – plants that can replenish themselves and keep the soil rich (chop and drop) and also use of cardboard and paper, as well as mulch that will break down and add microbes to the soil.
- **Forest gardening:** This will be primarily in Zone 2 but will also encroach into Zone 1. I will be planting and producing food from trees, perennial and annual plants. I will be using the 7 layers of the food forest. The principle of producing no waste will be important in this area- only grow what we like to eat, share with others, bottle, dehydrate and share excess. Integration rather than segregation - my garden will be part of a wider network of community gardens so we can share resources, ideas, and excess.
- **Seed Saving:** I will collect and store seeds with the aim of maintaining certain strains including heritage seeds. Produce no waste and encourage diversity.
- **Organic agriculture:** I will learn about and use natural fertilisers, and pest control management principles.
- **My property will be biodynamic and natural and rely on permaculture principles –** using good planning and know- how. I will continue to learn through attending courses, sharing with others who are like minded and watching You Tube clips etc.
- **Water will be harvested –** dams, water storage and swales will be used throughout the property. Flood zones will be managed through revegetation and fencing off from stock. Natives will be planted in these areas.
- **Wholistic grazing** will be used, and revegetation of the property, including the use of herbal pastures.

Building

- Water will be harvested and re-used

- Repurposing of existing structures – use of the shaded cover over the seedlings

Tools and Technology

- **Reuse and creative recycling –** I have repurposed old roofing iron for garden beds, as well as old wooden pallets. We has also refurbished our old wooden burner in the lounge and are using chopped firewood form the property for burring in winter. The local arborist drops off his tree cuttings which I am repurposing for mulch in the food forest. The local florist provides me with cardboard boxes for sheet mulching. Biochar is used from the wood burner as a soil improver.

Education and culture – I will continue to learn and rethink how and what I am doing**.**

- **Propagation certificate** – I have completed a certificate in propagation, to enable me to save seeds, propagate plants, and grow seedlings so as to increase the yield of my land.
- **I have enrolled in a Te Ronga course for 2023**
- I am completing this **Permaculture Certificate**
- I have gained extensive knowledge from the books photographed below**:**

- I am an action learner and reflect on what I have planned and what worked and did not work out.

Health and Spiritual Wellbeing

- I am wishing to complete a course in Māori Rongoa and using native plants for healing.
- I have a strong connection to my faith and practice Christian spiritual practices

Finances and Economics

- **Farmers markets and community actions:** I have joined the local community permaculture groups, attended markets and share my produce with others.
- **WWOOfers –** We have joined the system and will have woofers helping out on a regular basis on the farm

1. **Self-sustainable -**We hope to be mostly self-sustainable in 5 years.

Land Tenure and community Governance

- **Involvement in local groups –** Pest management, farmers markets, food foresters, Facebook; purchase food (eggs, fruit, plants) from local stands in the community. Share excess food at local outlets in the community.
- **Working collaboratively with others -**share excess, share knowledge and share resources.
- **Planting native trees and pants**

8. Implementation Strategy

My implementation strategy takes place over a 5 year period and are listed below:

Timeline

Plan for October 2022 – December 2022 (Year 1)

Zones 1 and 2

- Clear Zone 1 and 2 – remove all rubble and rubbish
- Clear Greenhouse and remove old plants and rubbish
- Research the land – observe, test soil, observe weather etc
- Plant main fruit trees after 6 months in Zone 2
- Build vegetable beds Zone 1 by the Spring 2022
- Capture water in temporary systems Zones 1 and 2
- Create worm farm Zone 1
- Fence Zone 2 off from stock
- Start mulching soil in Zones 1 and 2
- Connect pump to water tank alongside shed to use existing water
- Create beds for plants around border of Zone 1
- Start planting Guilds and food forest layers in Zone 2
- Complete course on propagation and use greenhouse for seed starting.
- Connect with social networks in the area on Social Media

Zones 3 and 4

- Complete electrifying boundary fences Zones 2, 3 and 4
- Start planting natives Zone 3 and 4
- Connect water to troughs in these zones

January 2023 – December 2024 (Year 2 and 3)

Zone 1 and 2

- Reinstating the irrigation in the greenhouse and supply of electricity
- Placing gutters and a downpipe on the barn, and capturing this water into the unused water tank needs to be considered to enable irrigation of Zone 2 in the food forest.
- Install water tanks for further storage on storage shed and house. Catching water from gutters until tanks can be arranged.

- Enhancing the soil in the greenhouse and Zones 1 and 2
- Creating composting bins – hot composting systems
- Continue with in bed worm farms in all the garden beds
- Create berry cage in Zone 2
- Complete chook house and add chook tractor to Zone 2
- Complete enclosure /shade house for native plant propagation and nursery, as well as seedling propagation
- Install beehives
- Continue with layers in the guilds and food forest
- Continue seed saving and seed propagation
- Continue propagating plants as they grow
- Installation of irrigation systems to Zones 1 and 2

Zones 3; 4 and 5

- Ensuring the cattle only graze the eroded paddock for short periods, and not in winter when the slope is slippery and erosion more likely.
- Install mushroom growing in the forested areas. Inoculated logs to be considered
- Replant boundary hedges with natives – considering Silver Pasture farming concepts https://www.regenpreneur.com/uploads/3/9/4/8/39486393/silviculture.pdf
- Sow diverse and resilient mixed crops for grazing – to include clovers, herbal lays. "*Mixed pastures should provide a range of forages (grasses, legumes and herbs) that are palatable at different times of the year. They should be nutritious, containing adequate levels of proteins and carbohydrates, minerals, trace elements and allelochemicals. A chemically diverse range of species and a diversity of rooting depths that can bring minerals up from different layers in the 2 soil will contribute to a balanced diet in grazing animals. Diverse pastures are more likely to withstand climatic events and with sensitive grazing regimes will build soils".* Including options such as Yarrow; Caraway; Chicory; parsley; Tansy, dandelion; clovers; Burnet and Ribwort plantain. file:///C:/Users/Cecilia/Downloads/Rongoa%20Pastures%20-%20Research%20Report,%20Johnson%202015%20(1).pdf

January 2025 – December 2026

Zone 1 and 2

- Continue with layers in the food forest
- Be self-sufficient from Zones 1 and 2 for all grown foods
- Use shed for small stall to sell produce and plants
- Continue to grow seedlings and propagate plants for Zones 1,2,3, and 4

Zones 3; 4 and 5

- Continue to plant and manage these areas, develop a hut in Zone 4
- Replant boundary hedges with natives
- Creating swales in this paddock and planting**,** to direct the flow of water – this will require earthworks .

The resources that I have used for this course are extensive. I have enjoyed the course tremendously, and have learnt so much in a year. I have also purchased many books and have become a keen You Tube enthusiast. I cannot wait to see how my design matures as I have more time to spend on my property over the next 5 – 10 years and take inspiration from those who have done this before me.