UNDERSTANDING OUR SITE

Permaculture Tasmania

PLANNING OUR GARDEN...

needs, site and sector analysis... the basis of good design

When it comes to designing our home or community garden, we apply protracted and thoughtful observation through:

- **needs analysis**—which defines the needs of the gardeners and what they want from their gardening experience
- **sector analysis**—which identifies the energies such as seasonal winds and rainwater runoff coming into our site from outside and influencing conditions onsite
- **site anaysis**—the characteristics we find on our site.

We observe the big patterns first:

- **where the sun** rises and sets and how it casts shadows across our site
- h**ow wind moves** through the site throughout the year and whether it is strong and cold and could potentially damage what we plant, or in what seasons it is mild
- h**ow water moves** through our site when it rains.

This is sector analysis. The big patterns affect conditions in our garden site. Sector analysis identifies the direction these forces come from through the year, their condition and how they could affect our garden.



Then we turn our attention to our site, where we plan to make our garden. We make a site analysis. This involves observing the sun path through the year and how it casts shadows; how water moves across the site; what type of soil we have; what is already growing on our site.

This information helps us make sensible design decisions. **For example,** we can place garden beds where they receive enough sun through the year, put water storage near the areas that need watering, locate compost where it is easy to reach from both the kitchen and the garden.

Once we understand these patterns, we can plan the details:

- where to put garden beds
- the paths, storage, compost
- fruit trees and water systems.

The idea is to **place related parts** close together so they support one another. **For example**, keeping compost near the garden beds it will feed but easily accessible from the kitchen.

We can also think about how **important functions** like water harvesting can be supported by a range of measures such as loosening our soil to enable water infiltration and storage, building raised bunds around fruit trees or digging swales (shallow infiltration trenches) to detain water so that it soaks into the soil.

These analyses provide the information we work with in making our garden. We also use what we learn from the site to **choose what we will plant.** Different plants can help control pests, improve the soil and provide vegetables, herbs and fruit across the seasons. By observing the site carefully and making small, gradual changes, we can test ideas, learn from what happens and adapt our design over time.

PLANNING AND CONSTRUCTING OUR GARDEN

STAGES	GARDEN ACTIONS

Planning the garden

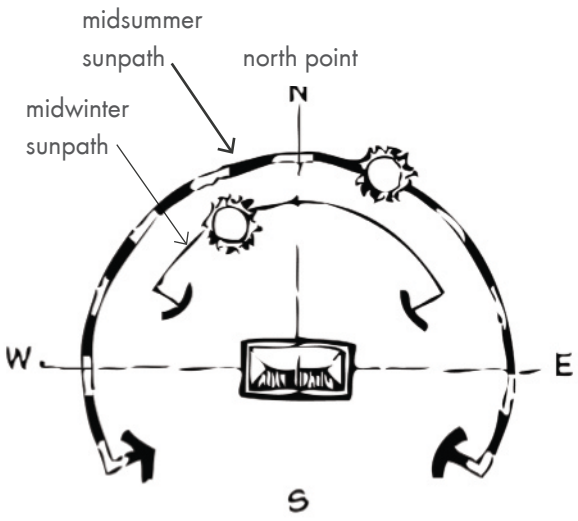
Needs analysis, an element in social design

We start the garden design with a needs analysis. This is sometimes called social design bcause it is about the needs of people as a group. We might already have thought about this in an informal way if the garden we are to build is only for us. If we are assisting others to design and build their garden then it is important that we start by finding out what it that they want from the garden and from the gardening experience.

Needs analysis is especially important in designing community gardens as people may have different assumptions and expectations about what participation in a community garden will be like.

Needs analysis asks about the needs of the household or community gardener group. In surveying needs, we ask:

- **what uses**, apart from gardening, is to be made of the site?
  - when redesigning our backyards, this might include outdoor entertainment, children's play area, storage shed, clothes drying and so on
- **what do people like to eat** that we can grow in the garden?
  - these must be plants that will grow in our climate and that we have space to grow
- **what experiences** do people want in the garden?
  - earning? social activity? sharing with others?
  - this is an important question when designing community gardens as people may have different expectations of the garden and of the experiences they would want from it
- **what time do people have** to construct and maintain the garden?
  - this will govern how ambitious we are in our garden plans
  - when gardens are too large for the time and skills of those using them they risk falling into neglect.

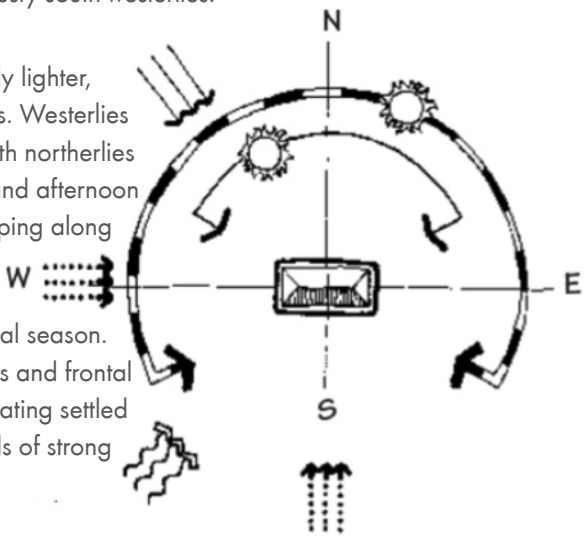


SUN PATH AROUND BUILDING

Spring: Often the windiest season. Strong north-westerlies ahead of cold fronts, followed by cold, gusty south-westerlies.

Summer: Generally lighter, more variable winds. Westerlies remain common, with northerlies bringing warm air and afternoon sea breezes developing along the coast.

Autumn: Transitional season. Increasing westerlies and frontal systems bring alternating settled weather and periods of strong winds.



Winter: Stronger, more persistent westerly and north-westerly winds. Frequent cold fronts bring rain, showers, south-westerly winds and snow at higher elevations.

GENERAL WIND PATTERNS IN TASMANIA

STAGES	GARDEN ACTIONS

Planning the garden (cont.)

Sector and site analysis

After working out what we want from the garden, the next thing we have to do is to think about the site where we will build it.

In doing this, we note influences coming onto our site from outside of it—sector analyis—and the characteritics of our site itself—site analysis. We first have to find the direction of north and mark this on our base plan, our drawing of the garden (see next section Designing the Garden). This helps us orient our plan and the information we document on it.

Sector analysis

- identify the influences and materials coming onto our site from outside
  - **seasonal winds**, their direction in the different seasons, strength, temperature
  - **seasonal rainfall**—how much falls and in what seasons?
  - **sun and shade pattern**s through the seasons—this helps us choose where to put our vegetable garden as vegetables need a minimum five to six hours of light a day; think about winter when the sun is lower in the sky and throws long shadows, including those from neighbouring buildings and trees.

Mark this sector information on our base plan.

Site analysis

- **What type of soil do we have?**
  - clay? sandy soil? loamy soil—a variable blend of clay and sand?acid, alkaline or neutral soil? what pH?
- **topography (slope)**
  - steep land, genty sloping or flat?
  - what is its direction of slope (north, south, east, west or points in between)?
- **drainage**
  - how does rainwater run off the site?
  - does runoff pool anywhere? are there areas of moist soil?
- **existing vegetation**
  - is it healthy? do we want to retain it?
- **existing structures**
  - paths, sheds, buildings etc; what condition are they in and do we want to retain them?
- **services**
  - are there underground gas, water, wastewater infiltration trenches, sewage pipes or power with maintenance easements crossing the site?
  - are there overhead electricity of broadband cables that cross the site?

We add our site information to our base plan and make use of it in planning our garden so that it receives adequate sunlight, is protected from damaging winds and occupies well-drained soils.

Designing the garden

Develop the base plan

This shows our garden site as it is.

We make a scale drawing of our garden on a large piece of paper or in digital drawing software, marking in:

- the direction of north, so that we know the direction our sunlight comes from and how shadows will fall across our site
- the length of our boundaries
- existing vegetation
- structures, such as buildings and paths
- the directions of prevailing winds
- areas of boggy soil
- the direction of slope
- underground utility easements.

STAGES	GARDEN ACTIONS
Designing the garden (cont.)	
Develop the concept plan	Our concept plan locates where we will put the major components in our design—vegetable beds, orchard, chickens etc. On the base plan on which we have marked the information revealed during sector and site analysis, we develop our garden design ideas. We design in opportunities for the gardeners including those identified during needs analysis, locating them where their needs for ease of access, access to sunlight, topography and protection from potentially damaging winds best places them. The vegetable beds are placed according to the sunlight available and away from moist, boggy soils and so that they avoid harsh, strong, hot or cold winds. The orchard or forest garden we place so that shade cast by the trees and shrubs in winter wll not overshadow our annual vegetable beds. In the southern hemishpere the forest garden is best located to the south of the annual vegetable beds and, where there is space, may have a windbreak edge of hardy shrubs and trees to protect the fruits. One way to develop our concept plan is to cut out pieces of paper labeled as the things we have decided to include in the garden: vegetable beds, herb beds, orchard area for fruit and nut trees, chooks, storage, composting, propagation area and so on. By placing these in different locations on our base plan according to the opportunities and constraints disclosed during our site analysis we try different combinations to find that which best suits our site's conditions and which will work effectively and efficiently. **A few tips:** ❋ locate culinary herb and vegetable beds—components of Zone 1 in permaculture design's zoned landuse system—where they are close to the house or community garden shelter but receive sufficient sunlight, including during winter; in permaculture design this is known as relative placement—it's all about easy access for monitoring and harvesting the garden ❋ fruit and nut trees can be placed beyond the vegetables, if space allows, as we will visit them less often; this is Zone 2 in permaculture design's zoned landuse system ❋ if you plan to install chooks, a good location is between the vegetable beds and orchard or within the orchard where they can roam for limited periods below the trees, although this could limit the potential to grow other crops there ❋ compost bins should go close to the kichen, a source of waste materials, and close to where the compost will be used, the vegetable garden, which will also produce material for composting; they may be placed where the vegetable beds and orchard area meet, if that is not too distant for convenient access from the kitchen; compost may be placed in different locations in the community garden ❋ in small, inner urban home and community gardens limited space makes it necessary to compress the Zone 1 vegetable garden and Zone 2 fruit trees in close proximity.
Draw up a final plan	Having chosen the layout that is likely to work best, given the conditions of sunlight, wind, drainage and so on that influence our site and that we discovered in the site analysis phase, we now draw up our final plan. This is based on the arrangement of features we chose to include in the concept plan, and notes the size and scale of the different features. It will become our working plan that we use to guide the construction of our garden. This done, we estimate the materials we might need—paving, compost, mulch, garden edging and so on—how much of each we will need and when we will need the materials on site to allow our work to proceed in an orderly, staged manner.

PLANNING AND CONSTRUCTING OUR GARDEN

STAGES	GARDEN ACTIONS
Constructing the garden	
	It is time to turn our ideas and plans into reality. We adopt a systematic approach to our garden construction project so that we need do things only once (ie. we make fewer mistakes that have to be fixed), so that we are efficient (in the use of materials and energy) and so that it is well constructed (less maintenance will be needed). Now, we chunk the work—what chunk has to be done first, then what chunk next and so on. Some work has to be completed before the next stage can be started—soil improvement before planting, for example. This gives us our work breakdown structure. It's a systematic approach that provides a sequence of activity for the construction of our productive garden.
Choosing materials	❀ where available, consider reused or recycled material for paths ❀ if using timber, choose recycled or plantation timber.
Water harvesting and storage, irrigation	❀ if possible, install a rainwater tank to collect roof water from the community garden shelter for use in the garden ❀ purchase water conserving irrigation equipment, such as drip, microspray or leaky hose technology. Water small gardens by hand using a trigger hose (to conserve water by directing it precisely where it is needed).
Paths	❀ **construct paths** if existing paths are to be removed, replaced or supplemented
Construct the garden beds	❀ **construct garden beds**—depending on the garden type, we might mound the soil into furrows which will be planted; form raised garden beds supported by sturdy, low-maintenance edging or use purchased containers; or cut a shallow trench around the bed and mound the soil in the growing area ❀ make the garden no wider than can be reached from the edges—about two arm widths wide, so that we can easily reach the centre and not have to walk on the soil and trample our crops ❀ alternatively, install narrow access paths or stepping stones in a wider garden.
Improve the soil	❀ **improve the soil**—in the areas where we will make our garden beds, and in the orchard area where our fruit trees and shrubs will thrive, we add organic fertilisers to the soil (eg. compost, dynamic lifter, blood and bone, biochar), if needed — in the orchard or forest garden we might first plant a green manure crop to add the plant food, nitrogen, and fibrous carbon-rich organic matter to the soil so that it will decompose and be taken up by the roots of our fruit and nut trees and shrubs and improve water-retention in the soil; the green manure is chosen according to climate and season and characteristically consists of a nitrogen-fixing species (a legume) and a grain (such as millet or oats); the green manure will take some months to grow to the point at which it is ready to slash before the grain sets seed and be left on the soil surface as a mulch or forked into the soil — the soil may be forked to loosen so that water, air and nutrients penetrate easier, but not turn it unless you are using the Biointensive method; adding a layer of compost on the soil surface before forking allows us to incorporate it into the soil as we loosen it.
Install water conserving irrigation if needed	❀ **install fixed irrigation**—if we are installing permanent irrigation, such as drip irrigation, microspray or leaky hose, it will should be placed during this phase of garden construction
Mulch	❀ **mulch the garden** thickly (10 to 20cm of straw mulch, preferably a legume such as pea straw or lucerne hay) to conserve water, build up organic matter and reduce soil temperature extremes.
Plant out	❀ **plant out our seeds** or seedlings, then water them in ❀ **monitor** the plants to assess their growth and to watch for pest and disease infestation.

PLANNING AND CONSTRUCTING OUR GARDEN

STAGES	GARDEN ACTIONS
Maintain the garden	

- now we enter the **maintenance phase** of gardening during which we care for the plants:
  - keep them as free as posible from insect pests and plant diseases
  - harvest, save the seeds and replant according to what will grow in season
  - add compost and mulch at a frequency dependent on the richness of our soils
  - provide the plants with water, particularly during the hot summer period.

THE SEQUENCE OF GARDEN DESIGN

Site Analysis	**IDENTIFY:** sun access | winds | drainage | soil type | topography | services | existing vegetation | structures
Needs analysis	**WHAT PEOPLE WANT TO GROW**: vegetables | herbs | fruit | nuts | flowers | native plants **OTHER GARDEN USES**: chooks | solar clothes drier etc
Design concept plan	**WHERE TO PLACE THINGS IN THE GARDEN**: garden beds | compost bins | propagation area | tool storage etc
Design final plan	**COMPONENTS**: size | scale | location
Construct	**SETTING UP**: paths | soil improvement | garden beds | mulch | plant out
Maintain	**MONITOR**: irrigate | add compost | mulch | pest and disease management | harvesting | seed saving

PERMACULTURE TASMANIA ...is a member-based, volunteer-managed association bringing together Tasmanians practicing permaculture in their homes and communities.

Permaculture ...is a platform of practical ideas and techniques through which individuals and communities can build resilience to the many global and local pressures we are facing. The challenges may be global. Permaculture's solutions are local.

PRODUCED for... Permaculture Tasmania DESIGN: Fiona Campbell TEXT & PHOTOS by... Russ Grayson

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