Scotland's

allotment

site design guide

2013

Scottish Allotments & Gardens Society

minister's foreword

I am delighted to endorse this Allotment Site Design Guide.

Since the publication of our National Food and Drink Policy in 2009, we have made clear our commitment to supporting the increasing number of people who want to grow their own food.

Allotments and community growing spaces are often at the very heart of our communities and we recognise the range of benefits that they can bring. We want to encourage all those involved to make the best possible use of the land available through good, practical use and design.

This guide will be another valuable addition to the growing body of advice we have helped to produce to make it easier for Local Authorities, landowners, groups and individuals to develop and cultivate their own grow your own initiatives.

I believe our vibrant communities are key to our country's future and widening participation in food growing is one of the ways we can work towards a healthier, wealthier and more environmentally sustainable Scotland.

Derek Mackay
Minister for Local Government and Planning

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introduction

The aim of this Guide is to provide detailed solutions to all aspects of good allotment site design. To ensure that an allotment site can be designed to bring pleasure to users, providers and the general public, and to enhance the environment.

Scotland's Allotment Site Design Guide is aimed at those who have the responsibility for designing and planning allotment sites and those who have the responsibility for the approval of planning permission. By providing a good practice guide the general public can have confidence that allotment sites are being designed to a set of standards endorsed by the Grow Your Working Group which was set up by the Scottish Government to take forward those aspects of food production associated with allotments, community gardens and orchards. The Guide will also be very useful to existing allotment sites to improve their appearance and the regeneration of derelict allotment sites. There are many options to any particular problem and it is the user's responsibility to choose the correct solution for their particular scenario. Communications with local residents and other interested parties is advised to maintain good relations. No two allotment sites will be exactly the same, but many features will be similar.

There is great pressure for new sites, with Local Authorities, public sector bodies, housing associations, development trusts and private groups all seeking advice on how to design and implement a well-designed allotment site. Some existing sites are well integrated into the local landscape with boundary hedges and trees, fruit trees, shrubs, coppices and shelter belts. However, many existing sites will benefit from advice on good designs for boundary and communal areas, planting schemes and appropriate construction materials.

What is an allotment?

The legal definition is enshrined in the various Acts*; it is a plot of land about 250 sq.m., within a community of other plots, tended by a plot holder singly or in partnership with others, holding the rental agreement with the landowner. An allotment site is the land worked by the community of plot holders. It is permanent and should have legal guarantees for its continued existence. It will be recognized within the Local Authority Green Space Audit.

Historically in Scotland there was a distinction between 'allotment' and 'allotment garden'*. An allotment was quite a large piece of land (at least an acre) and could be used to keep livestock. An allotment garden (plot) was originally defined in law as being not more than 40 poles (that is ¼ acre or about 1000 sqm).

*Allotments and allotment gardens as defined in the Allotments (Scotland) Acts 1890, 1922, and 1950. www.legislation.gov.uk/ukpga/Vict/55-56/54

Today 200 / 250 sqm is often regarded as a typical plot size, but in fact the size (and shape) will depend on what can fit into the site.

Modern allotment sites often have plots of different sizes, leased to community groups and may also have common areas for the amenity of all plot holders on the site.

How to use the Guide

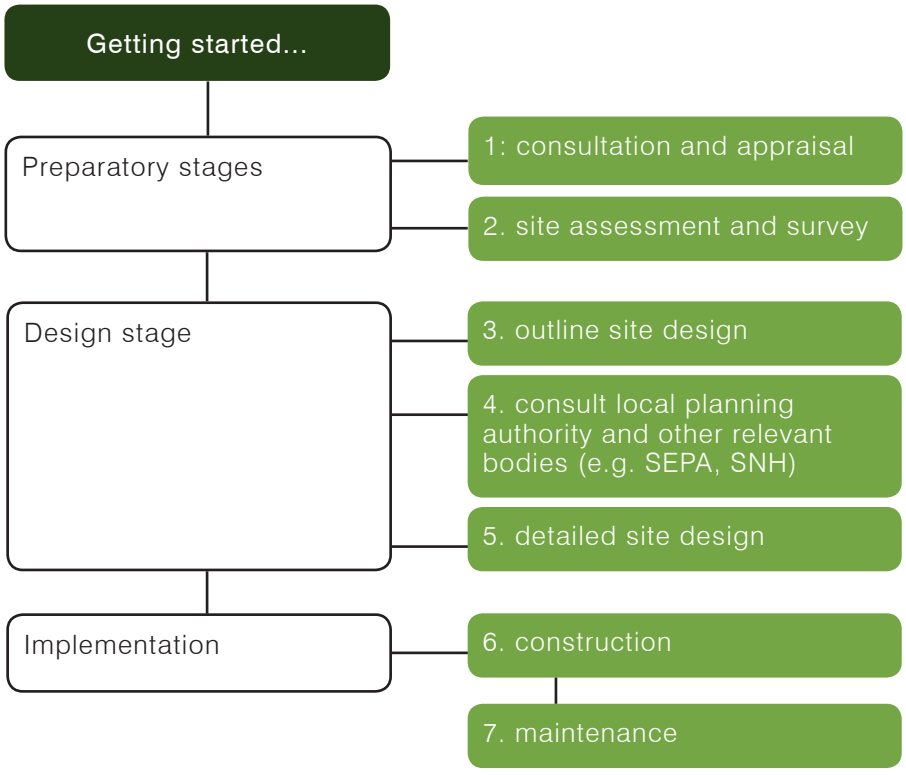
The guide is divided into five major parts detailing grouped aspects of allotment site design. Each part is further sub-divided into detailed examination of the group theme. Part 6 gives examples of good design on existing allotment sites, and part 7 contains the appendices referred to throughout the main text.

Responsibility

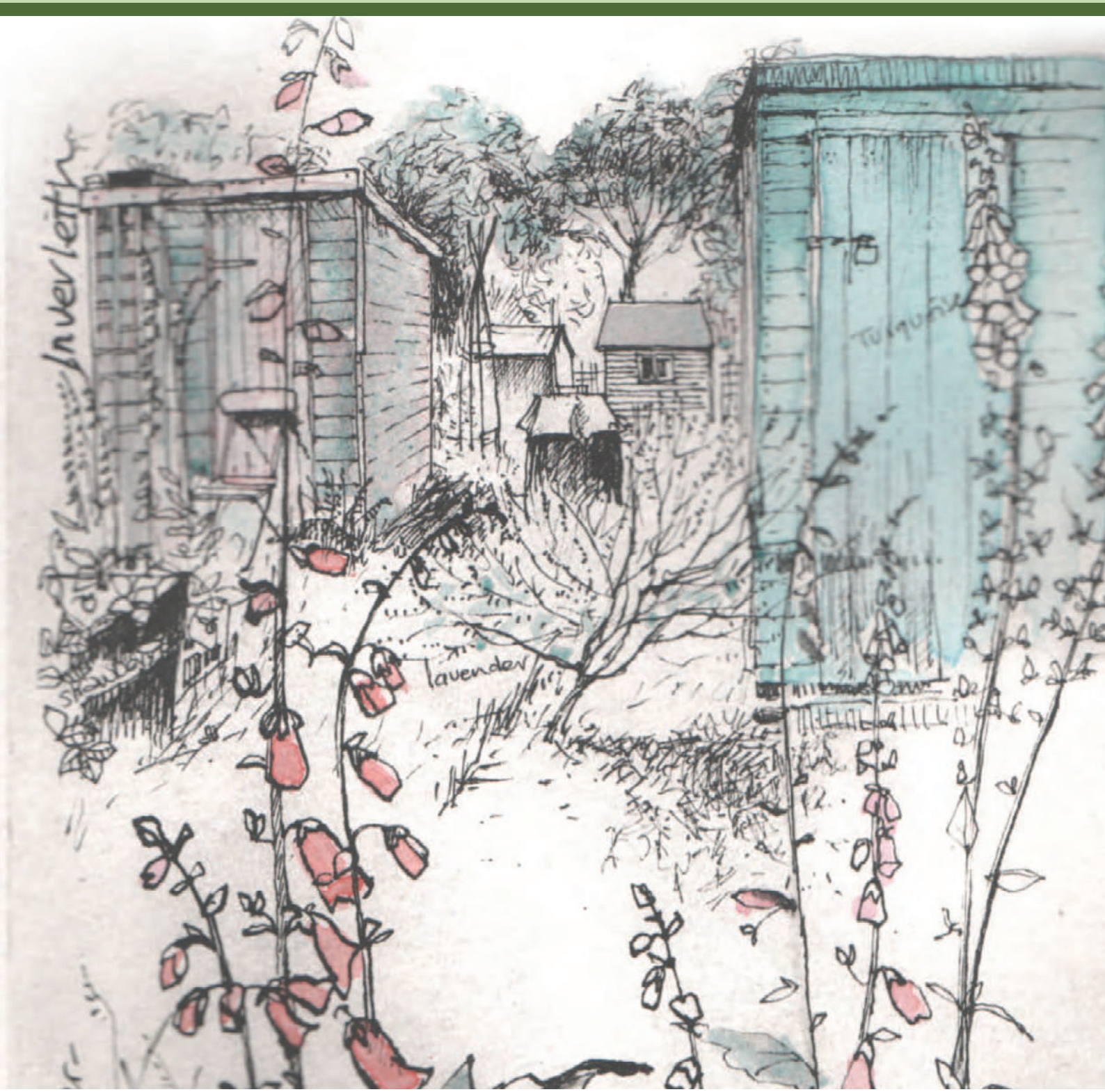
It is the user's responsibility to ensure that all legislation, health and safety requirements, and any local bye-laws are satisfied.

This guide has been compiled from the best practice at this time. If in doubt, professional guidance should be sought.

How to get started



initial surveys



1. initial land and environmental surveys

1.1 introduction

Allotment sites come in as many varieties as the landscape of Scotland: from the lush farmlands of the Borders to the treeless Northern Isles; from the wet West Coast to the cold Grampians of Aberdeenshire; from the tenement-surrounded sites in our major cities to sites on the edges of villages. There are allotment sites in all these places and many more.

No one approach suits all, but the one common denominator is the soil. The quality of the basic growing medium will determine the success or otherwise of the growing project.

A fertile, productive soil is the result of planned hard work by the plot holder, led by a thoughtful initial survey and considered design of the site.

The overall concept for the site, including common areas for composting, bonfires, fruit growing, community groups and facilities, should be discussed and agreed with the proposed users, local residents and land owners with reference to the visual impact of the whole site and the appropriate use of materials.

1.2 the ideal site

The ideal site will have a slight slope to the south with drainage and minimum soil depth of 2m together with a shelter belt of trees to the north and east. The previous use will have been for organic food production for at least seven years. The size will be 2.5 acres or 1 hectare which will provide approximately 45 standard size plots, with some extra land for community use and special groups. This size supports a community where all plot holders can communicate easily and form a coherent group. Access will be a short distance from a road accessible by car, but not close to a major road. The site will have housing nearby.

However, this unique combination of features will rarely exist in reality, and many sites will not be ideal, so a survey of the land must be done before any layout is decided. The survey should monitor drainage, spot heights and hollows, orientation/land shape, wind direction, slope direction, soil analysis, surrounding environment including overhead electricity/telephone cables, any underground utility services, and, if possible, current drainage provision, and current vegetation. The results of the survey and the evidence gathered will determine the overall site design, and play a major part in the success of the community that grows there.

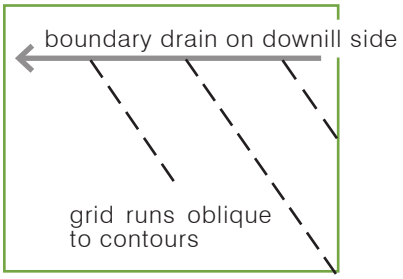
1.3 drainage

The initial survey will hopefully identify if any drainage system exists. Ideally a drainage expert should survey the site and advise. Clay pipe field drains have been used extensively in the past and may still be viable. If their presence is known care should be taken not to damage the network during the site construction. Drainage requirements of the main access road / path will need to be considered in the overall drainage scheme.

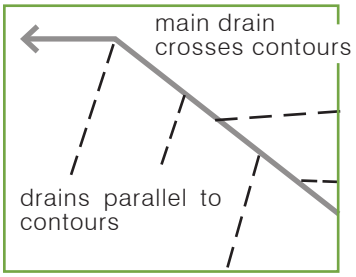
Flat, clay, unused, panned land can have drainage problems. The standard drainage test is to dig a square hole one spade deep, fill it with water and note the time to drain away. In a dry period this should not be longer than 1 hour. There is a problem if it takes any longer. On a site basis, a drainage system of pipes below the growing strata can be inserted on a herringbone or parallel grid both draining to the lowest point. For clay soils the herring bones should have a maximum spacing of 4m with up to 8m spacing for other soils. If land is available, the drains should empty into the site pond. Be careful that the water problem is not transferred to the neighbouring land. It may be advisable to consult SEPA* about the final run-off/outflow.

French drains work well but are labour-intensive. They can be impractical for a whole site but can be installed on individual plots. They are dug on a herringbone or parallel matrix, below the growing and digging level, draining to the lowest point, into the pond if available. The trench is lined with pervious material to allow water but not soil particles through, gravel is put onto the material which is then wrapped over the gravel particles, and the trench backfilled with top soil, over-filling to allow for sinkage. Side drains join at 45° with spacings as above for different soil types. Individual plots can have drainage ditches surrounding them, the soil from the ditches going onto the plot to raise the basic height, triple digging in the first instance, adding as much straw as possible into the bottom spit. Adding humus/compost into the bottom spit will improve drainage. Water is carried away through a perforated pipe. A drainage pit/soakaway can be incorporated on individual plots into which the French drains empty, and for a standard plot this needs to be dug at the lowest point, 2m x 2m x 2m deep. The bottom 1.5m is filled with gravel, a covering of a pervious membrane is placed on top of the gravel, and top soil backfilled with overfill to allow for sinkage.

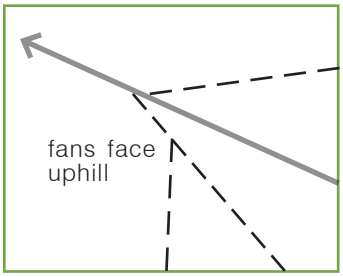
Design and construction of a drainage pond should be left with a specialist. Size and position will be based on the area being drained, the annual rainfall and existing soil conditions. The excavation will be at least 2m deep, to allow aquatic life to survive when the water freezes over. The pond may be lined with heavy duty impervious material and land drains fed in to it at the upstream side. Provision should be made for an overflow, being careful not to put excess water onto a neighbour's land. A submersible pump driven by solar panels and filter system can be incorporated to recycle water to provide a gravity-fed water system to the whole site.



Grid layout



Herringbone layout



Fan-shaped layout


French drain

*SEPA (Scottish Environmental Protection Agency) provide expert advice on all aspects of drainage / water management: www.sepa.org.uk/water/water_regulation/regimes/pollution_control/suds.aspx

1.4 orientation and land shape

To some extent the shape of the land will determine the shape of the plots. Plots should be positioned to maximise the effect of the sun and to minimise shadows. Positioning should also maximise the site's available growing space and keep paths to a minimum. If the site is basically flat, the layout of plots will be determined by access availability and any shadowing, together with the siting of any special needs plots, community plots and facilities. Flat sites should have the long side of the plot facing south and sloping sites have the long side up the slope. Access will be discussed in Part 2.


On flat sites the layout is driven by access, overshadowing from adjacent landscape, tree belts and buildings, e.g. Inverleith, Edinburgh.


Midmar photo by Ernie Watt

On hilly sites the layout of plots will be determined by the aspect, slope and localised level areas which might be most useful for communal facilities. Huts are located at the top of the slope, e.g. Walkerburn, Borders [L], Midmar, Edinburgh [R].


Steeply sloping sites can use landscape elements such as raised planters to create more level growing areas e.g. Dunblane [L], Kirklee, Glasgow [R].

1.5 wind breaks

Windbreaks can be living or artificial. Living windbreaks of planted trees and shrubs are most attractive and long-lasting but artificial screens give immediate protection. They can be used alone to provide shelter or in conjunction with living windbreaks while they become established. Solid fences are unsuitable for slowing wind but a fence with 50-60% porosity, such as woven hurdles of willow or hazel, will be effective. Woven or extruded plastic netting is suitable on the individual plot, but, for screens over 1.5m high, professional heavy-duty plastic strapping should be used. The visual impact of heavy duty plastic netting windbreaks has to be assessed in relation to the overall impression of the site and the effect on neighbours.

Trees - natural windbreaks. Pollock Park, Glasgow

Windbreaks should be carefully positioned to prevent shading, maximising the amount of sun the site receives. With careful selection, a windbreak can help:

- Reduce windspeed, prevent root rock of shallow-rooted plants, broken fences, shattered greenhouse glass and scattering of loose objects
- Create shelter, allowing a wider range of plants to be grown
- Provide shelter for pollinating insects, enabling fruit set in orchards
- Reduce moisture loss from soil and plant foliage
- Minimise soil erosion on light soils
- Reduce damage from salt-laden winds in coastal areas
- Provide protection from driving snow
- Screen unsightly views and increase privacy
- Provide a habitat for wildlife, especially when mixed species

Richard Craawford

Artificial windbreaks can include plastic sheeting, timber fencing, or netting. Inverness Allotments

To prevent excessive shading on the south and west side of the site, any windbreak planting should not be sited within 10m of the nearest plot. On the north and east sides, planting can approach within 3m of the nearest plot. If it is any closer, roots will cause a problem to the plots' productivity. To be effective, windbreaks must be semi-permeable, ideally filtering 50-60 per cent of the wind to reduce its strength. Solid barriers are unsuitable, leading to damaging eddies of wind on each side.

A windbreak will significantly reduce wind on its leeward side to a distance of ten times its height. Windbreaks should be wider than the area needing protection as wind can slip around the sides. In general, windbreaks should face the prevailing winds (which come from the south-west in Scotland) but in some situations the priority may be protection from damaging, cold, north and easterly winds. Where the wind speed is high and trees cannot survive, e.g. the Highlands, Northern Isles and Outer Hebrides, innovative ideas have to be used e.g. rows of tyres filled with soil have proved effective in Shetland.

The lie of the land (topography) affects wind direction and must be taken into account. Hilly sites may need shelter on several sides as wind can come over a hill and also produce gusts round the sides. Wind can also be funnelled along valleys, between lines of trees or tall buildings, creating what is known as a 'wind tunnel'.

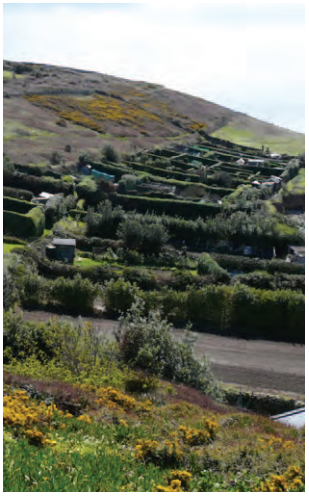
Artificial screens will require fixing to a sturdy supportive structure: Posts for screens less than 1.5m should be 9cm in diameter, spaced at twice the screen height and posts for screens over 1.5m should be 10-15cm in diameter, spaced at intervals equal to the height of the screen. Fit cladding to the windward side of the posts and ensure woven or plastic screens are pulled taut.

Living windbreaks require site preparation and thorough, careful planting. A maintenance plan for their future management, such as cutting and pruning, must be agreed at the outset. Deciduous shrubs and trees are best planted from autumn through till early spring; evergreens are best planted in spring.

- Buy small, young plants, which usually establish well
- Plant shrubs and trees fairly close together: 30-90cm between plants within the row is suitable
- In shelterbelts, large trees should be spaced 2-4m apart, with shrubs planted between the lines of trees to slow wind at the base of the belt. In deep shelterbelts, plant the tallest trees at the centre, with shorter trees or shrubs at the front and back
- Put tree guards in place to protect trunks from rabbit damage
- Keep new planting well mulched, watered and weed-free until established
- Rows of trees and hedges can be pruned annually to keep them dense

Deciduous plants, whether a rows of trees or clipped hedges, create permeable barriers suitable for slowing wind speed. Evergreen hedges can offer good year-round shelter. However, bear in mind that a dense line of evergreens may act like a solid barrier, causing problems with wind turbulence. In a shelterbelt, fast growing evergreens will provide initial shelter for deciduous trees, and when the broad leaf trees are established the evergreens can be removed.

A perimeter windbreak at an allotment site on Shetland: recycled tyres backfilled with soil. These can be planted to create a green wall



Shelter hedging around individual plots, St Mary's Allotments, Isles of Scilly

Windbreak design reference: Royal Horticultural Society
http://apps.rhs.org.uk/advicesearch/Profile.aspx?pid=624

1.6 slope and direction

A site slope above 1 in 120 can be considered level. No special consideration is needed for paths and plots on slopes between 1 in 120 and 1 in 40. Slopes greater than 1 in 40 will need special treatment to:

- Ensure safe paths
- Prevent excessive water run off
- Prevent soil loss
- Retain moisture in the upper levels

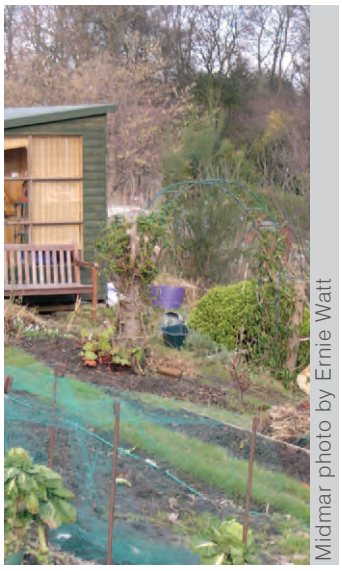
Gabion baskets are a good method for making steep sites more useful as growing spaces

The most common treatment of steeply sloping sites is terracing, creating level areas which follow the land contours. Depending on soil type and the steepness of the slope, soil embankments with a 1 in 2 batter (steep slope) can form the terraces. Steeper slopes will need gabions (wire cages filled with stones), which can be labour-intensive to install but are not too expensive and the arrangement will last many years. Worldwide, there are examples of hillside terracing which has lasted for hundreds of years when properly maintained. Terracing does reduce the surface area under cultivation, but the benefits on steep slopes outweigh the loss of land.

Steep, step-less paths are to be avoided as they will be slippery when wet and heavy rain may wash the top surface away. Steps create an access problem for wheeled equipment and some garden users. Where possible, design paths to follow the contours, with hair pins at the ends of the terrace, to avoid access problems. Between these accessible routes, stepped paths could be added to provide minor access routes.

A slope facing from south-east to south-west is ideal, a slope facing west is acceptable, a slope facing to the north and east will mean reduced sunlight on the soil surface, lower soil temperatures, slower seed germination, and earlier frosts. In this case shading has to be carefully monitored, and drainage needs to be good to assist with drying the soil.

Plots can be set out on slopes with the long side up the slope. The plot should always be dug up the hill to counteract soil slippage. Small scale terracing can be accommodated on a plot by plot basis but consideration has to be given to adjacent plots.



Midmar photo by Ernie Watt

Steep site at Midmar, Edinburgh: plots laid out with long side up the slope

1.7 soil analysis

An initial soil analysis is essential and may be a condition of the lease. The analysis should be carried out by an accredited organisation. If possible the previous use of the site over the last 100 years should be determined. This can be done from a desktop survey of the area. If there is any suspicion that the soil is contaminated, e.g. on a brownfield site, further analysis is required. It can be very informative to know the previous industrial use of the land (including railway sidings etc.) and therefore the possible residues left.

Soil contamination consists of either liquid or solid particles mixed with soil. Contamination results when hazardous substances are spilled or buried in the soil. It can also occur when pollutants settle on the soil, such as chemicals or waste from an industrial smokestack. Plants grown in contaminated soil take up the hazardous substances through their roots. Humans or animals that ingest these plants may become ill. People and animals can also inhale soil contaminants through dust that is present in the air or absorb these hazardous chemicals through their skin.

The result of the survey will determine whether or not remedial action is required, or if the levels of contamination are acceptable. Care should be taken that isolated contamination 'hot spots' do not represent the totality of the survey, and effectively write the land off as a potential allotment site. It is almost impossible to get a completely neutral analysis, e.g. bonfires of old window frames will leave lead; poorly managed intensive farming can leave excessive nitrates and trace elements.

An expert should be involved to determine the best solution. There is a potential for the developer of the allotment to become legally responsible as a polluter if working on a contaminated site creates a pathway for contaminants as a result. A selection of approaches to cleaning up contaminated soil are listed on the following page:

Soil challenges on a new site. Oakwell, Linlithgow

Kirsty Leonard

Establishing the correct soil depths and levels. Oakwell, Linlithgow

Heritage allotments map, showing allotments near railway sidings

Community Land Advisory Service
www.communitylandadvice.org.uk

Macaulay Scientific Consulting Ltd., James Hutton Institute
www.macaulaysoils.com

approaches to the remediation of contaminated land:

in situ bioremediation

Planting some types of flora will take up contaminants, and improve soil quality, but this is a long term procedure and not of much use to an allotment site except for specific areas, and the flora have to be disposed of.

In situ containment:

Containment of soil in place is usually done by placing a large pervious membrane over the contaminated soil to prevent direct contact and back filling first with uncontaminated sub soil and then 1m of top soil. Rain can still seep into the soil and spread the contamination, so ground water could be affected on adjacent land and in water courses. See Part 4.6 on raised bed construction.

in situ treatment

In situ treatment approaches can include: flushing contaminants out of the soil using water, chemical solvents, or air; destroying the contaminants by incineration; encouraging natural organisms in the soil to break them down; or adding material to the soil to encapsulate the contaminants and prevent them from spreading.

extraction and disposal

Excavation and disposal at controlled landfills, deep ploughing the sub soil to improve drainage, and then back filling with uncontaminated top soil to a minimum depth of 1m.

extraction treatment and replacement

Extraction treatment and replacement is generally too expensive to be contemplated for allotment sites. A soil survey will also give an indication of the crops that can be grown and future composting / liming regimes. Some idea of the fertility of the soil can be gauged from the type and virility of plants already growing there.

references
www.sepa.org.uk/land/contaminated_land.aspx
www.gov.uk/local-environmental-quality

1.8 surrounding environment and existing vegetation

The existing flora and built environment will determine shadow and wind effect. If there are tall buildings to the south, the site should be designed so that their shadow will fall on the access area and any non-growing facilities. Plots should be placed at the north and east of the site to minimise shadow. Buildings to the north and east will act as reflectors of the sun's rays and a heat sink. Plots should be as close as possible to the buildings and will also get some protection from the cold north and east winds. Trees will give the same shadow effect and protection, see wind breaks (Part 1.5 above).

Electric and telephone overhead cables in the proximity of the site should be noted and care taken when planting shelter belts. Cables passing over the site must be treated with respect and all plot holders advised as the service company will require access for maintenance. Underground services should have been recorded and their position logged on relevant maps, contact local utility providers. The depth of the service will determine the cultivation limit and any initial deep ploughing. Most underground services across open fields are usually laid at a datum of at least 2m below ground level dependant on service.

The vegetation may comprise self-seeded shrubs and trees. Any vegetation should be identified and a decision taken on its removal. Consider whether its removal is beneficial to the overall ethos and design of the site. In most cases the weeds and shrubs can be cleared by hand and either shredded, composted or burnt, using the resultant ash on the land.

Weed trees are best removed by specialists who can shred or chip them providing wood chip for paths. The tree roots and stumps should be ground away, otherwise valuable growing space is lost.

Some native weeds such as mare's tail, ground elder, convolvulus and creeping thistle are difficult, but not impossible, to eradicate. Diligent digging and/or treatment with glysophate will remove them in time. Non-native invasive weeds are treated in a similar manner, but it is worth noting that some species are covered by invasive plant legislation*. You are not obliged to remove or treat invasive plants, but:

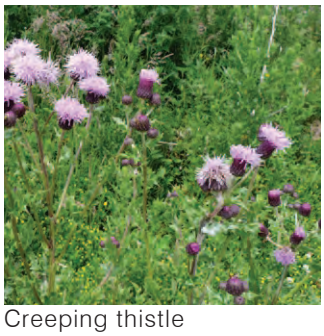
- You must not allow invasive plants to spread onto adjacent land - the owner of that land could take legal action against you.
- You must not plant or encourage the spread of invasive plants outside your property. This can include moving contaminated soil from one place to another or incorrectly handling and transporting contaminated material and plant cuttings.

Some of the most difficult non-native invasive species are detailed in appendix 3.


Dock


Mare's tail

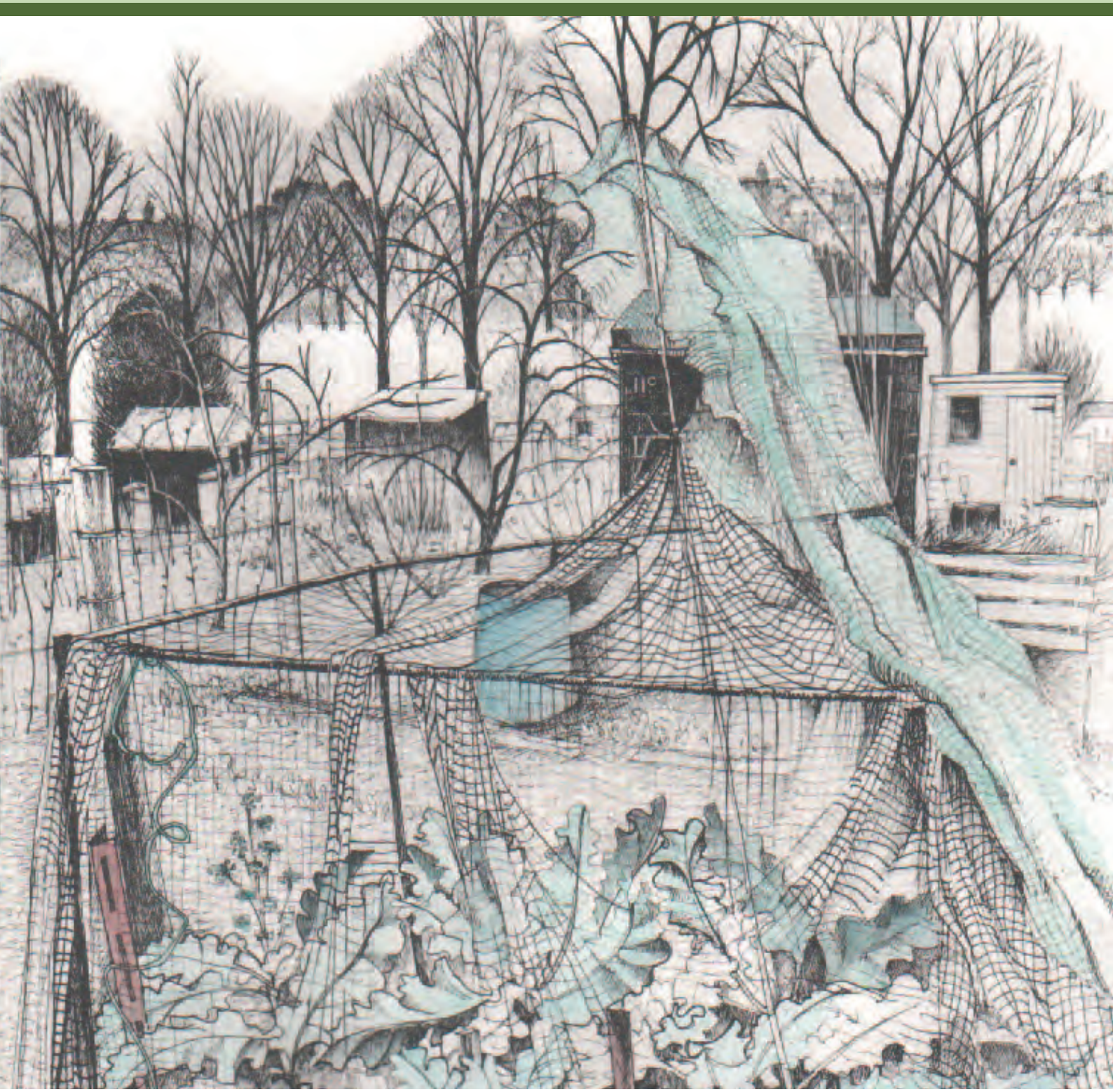

Convolvulus


Creeping thistle


Ground elder

* The Scottish Government's Code of Practice on Non-Native Species came into effect on 2nd July 2012: www.scotland.gov.uk/Topics/Environment/Wildlife-Habitats/InvasiveSpecies/legislation/CodeofPracticeonNonNativeSpecies

general layout

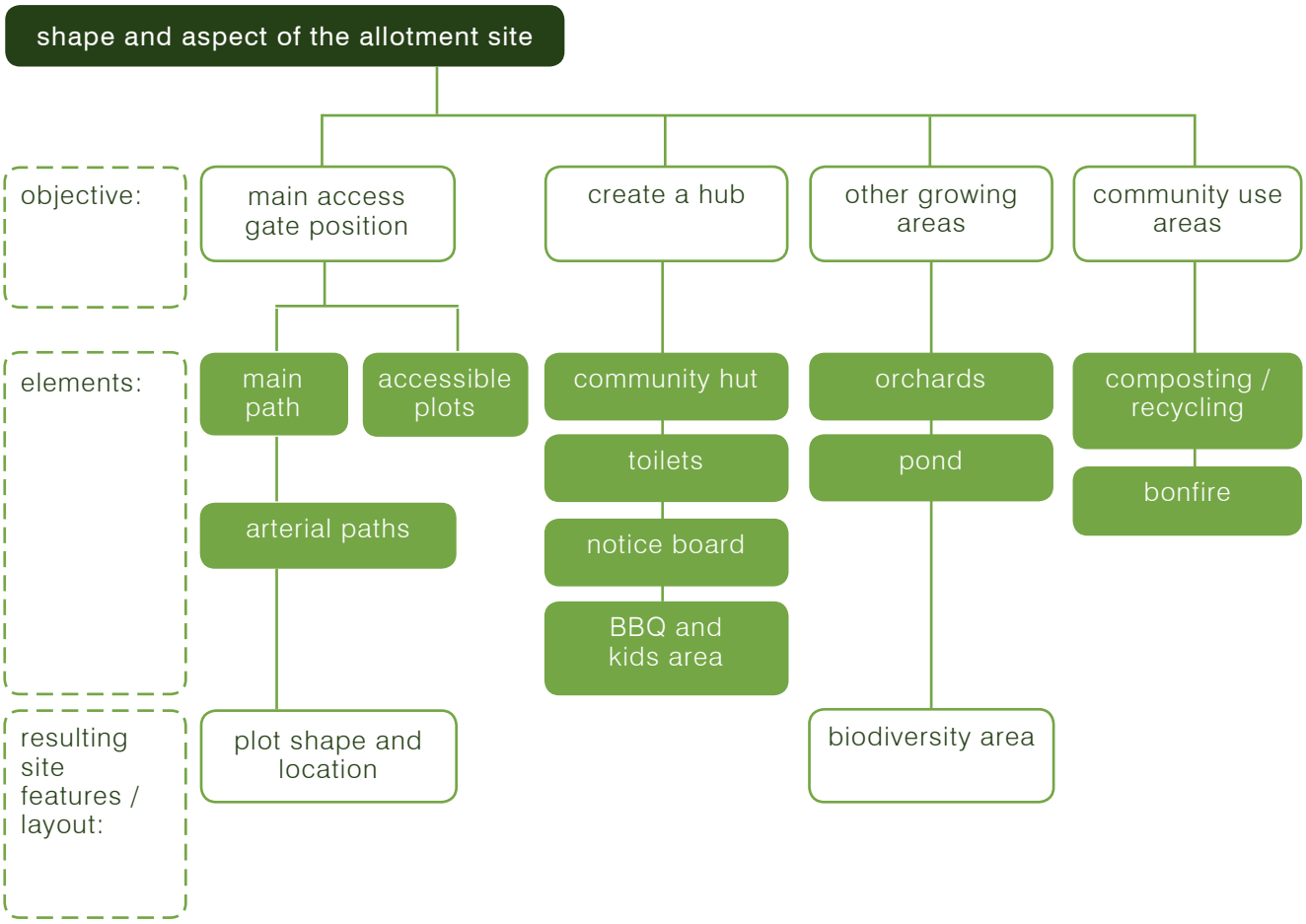


© Pamela Grace: Brussels and Broccoli. Hand-coloured solar–plate etching

2. general layout of the site

2.1 introduction

This Part will deal with the general layout of a site. The detail of the various aspects covered are found elsewhere in the guide. When developing the overall site layout the flow path below will aid decision making.



2.2 external aspects

The visual aspect of the site should be maximised to be pleasing to the eye and blend into the surrounding landscape and environment. Careful selection of hedging and integrated fencing can enhance appearance and provide a haven for nature and wildlife. Car parking needs to be carefully considered, and whether or not it is needed at all. Limited car parking outside the site may be desirable, and if possible set at 1 parking place per 10 plots. Note that all plots will never be worked at the same time, and although many plot holders will walk, cycle or use public transport the number of car parking spaces required must be considered and will vary from site to site.

Access to site (see also Part 3.2): Where possible the main access should not be off a major road as this may be dangerous. The local authority planning department will advise on this. The gates should be lockable and in two sections for ease of opening. Ideally the access will be off a side road with sufficient road room to enable the largest vehicle likely to want access to the site to be able to manoeuvre into the site without hindrance. However if the access is off a major road, consideration should be given to allow an easy entrance and exit which is wide enough to take a lorry bringing in compost or building materials etc. and if possible being able to turn the vehicle round.

Allotments sited in the agricultural context. Mossbank, Shetland

Allotments overlooked by the surrounding houses. Yetholm, Borders

The townscape setting led to the decision to use fencing at Oatlands, Glasgow

A boundary hedge planted to obscure the fenceline. Inverleith, Edinburgh

2.3 inside the site

Community facilities may be adjacent to the access area or located in the middle of the site when all will be within reasonable distance. Community facilities at one end of the site tend to be ignored by those plot holders at the opposite end. If toilets are to be installed they should be near the main access. Arterial paths leading away from the access need only be 1m wide, enough for a wheelbarrow. Any plots for plot holders requiring accessible gardening should be located as close to the main access as possible.

Access routes: From the main access area a single main path, up to 2m wide, should lead through the focus of the site. Vehicles should not be driven further than the main access. Arterial paths up to 1m wide off the main path will give access to individual plots. A small path surrounding each plot can be beneficial to define and reinforce the plot extremities.

Layout of plots: The main objective of plot layout within the site should be to maximise the available growing area. Rectangular shapes maximise land availability and are easily laid out.

Community area: The hub of the site is the community area so its location should be carefully considered. Any community facilities such as community hut, toilets, childrens' area, BBQ area and notice board should be located there. Any buildings or space should be aesthetically pleasing, but designed to be low maintenance as plotholders will focus their attention on gardening their plot. If the community area is located at the centre of the site it will become the focus for the plot holders. If it is located at the main access all plot holders will pass it on their way to and from their plot. Locating the community area at the far end of the site will provide some privacy but discourage some plot holders from using the facilities because of the distance.

Communal growing: Land too small for a plot, or the wrong shape, or with soil or drainage problems that are difficult to solve can be used as a community orchard or become the site of a community polytunnel. For this to function well, a management procedure must be in place. Espaliered fruit trees alongside the main path can provide a division marker. The low point of the site can be used as a pond (see Part 1.3 Drainage) and assist in the establishment of an active area for the encouragement of biodiversity. Other planting can support beneficial insects, birds and mammals.

Bonfire area:
If bonfires are allowed, this area needs to be carefully sited with regard to prevailing wind and neighbours, proximity of combustible buildings, and overhead structures such as pylons and tree branches. There should be a structured management procedure to its use including a policy on which materials can be burnt to ensure safety in use and to avoid noxious fumes.

Communal compost area: If allowed this should be located either near the manure/leaf compost areas or near the bonfire area. (See Part 5 communal composting).

Biodiversity: It is beneficial to both the growers and the local wildlife to include an area which will be managed for biodiversity when planning the overall layout of an allotment site. This could be as formal or as incidental as desired, and could include for example:

- An overgrown corner of brambles or thorn species which offer nesting sites to bird life
- Hazel coppice area, which can be very valuable to bird life, and also a wide range of insect species
- A small pond to support amphibious animals, which are very useful to gardeners as many forage on slugs and snails
- A plot or half-size plot could be set aside as a site's communal biodiversity 'corner'.
- Good practice on plots usually involves crop rotation principles but some areas could be perennial to include flowers, herbs, fruit bushes, or espalier trees which provide regular food and habitat for local wildlife.
- Generally organic methods are advocated for the health of the land and the wildlife supported by the garden. An allotment committee may decide to write into their lease agreements that only organic methods are used, which in turn will improve the perception of the allotment or community garden and could be helpful if seeking to secure grants for funding.

Adjacent woodland offers habitat and connects the gardens into the wider green space network. Bridgend Farm, Edinburgh

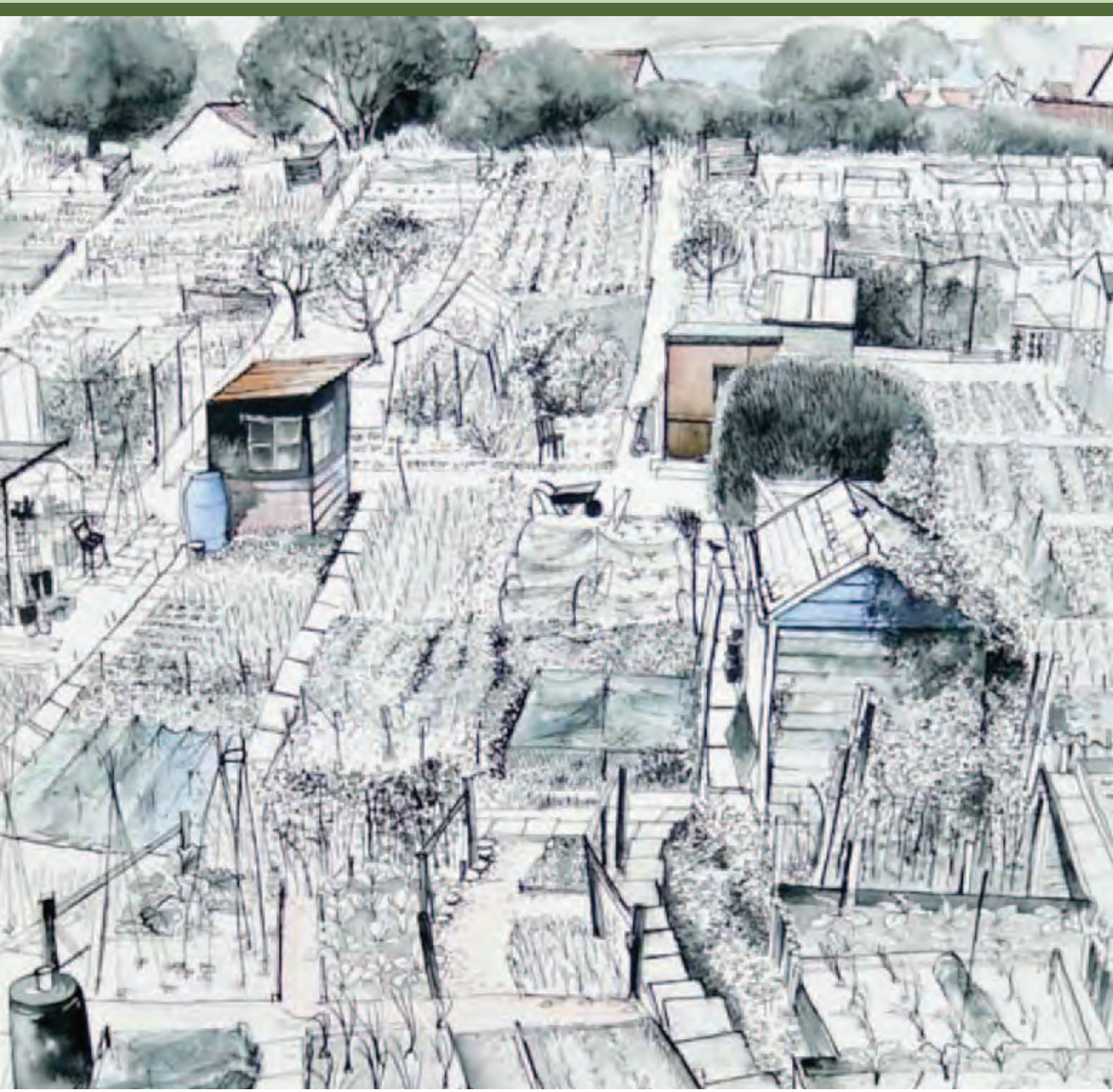
Although inefficient of space for growing, internal hedgerows create valuable wildlife corridors. Westthorn, Glasgow

One of the smaller plots left as a 'biodiversity plot'. The plotholders are collectively digging a pond, creating log piles, and they leave space for a few native trees. Mansewood, Glasgow

Example of a plot with fruit trees where careful management enables trees and food growing to co-exist. Julian Avenue, Glasgow

A plot designed to the benefit of biodiversity and habitat. It incorporates a bug 'hotel', nest boxes, log pile, green roof, and flowering plants. Inverleith, Edinburgh

infrastructure



© Pamela Grace: Lions Allotment II, Berwick-upon-Tweed. Watercolour and Ink

3. infrastructure

3.1 introduction

Infrastructure is the set of interconnected structural elements that provide framework supporting an entire structure of development. In the context of allotments, it refers to the basic organisational and structural elements needed for the operation of a site, no matter how large or small in scale.

All allotment sites will include elements of landscape infrastructure, whether for the definition of boundaries or an access network of paths or tracks. The design of the allotment site's infrastructure is critical to its accessibility to the full range of user groups. It ensures the site's edges are designed to protect the plotholders' interests whilst not inviting vandalism or making adjacent communities or individuals feel unnecessarily excluded. The design of the allotment's infrastructure ensures that adequate services, facilities and structural elements are provided.

Effective, well designed and planned infrastructure is central to the success of any allotment site. It contributes to the functionality of the allotment site as a whole, as well as that of the individual plots.

While infrastructure is commonly seen as the 'nuts and bolts', its design and execution strongly impacts the visual quality and appearance of the allotment site. The infrastructure of boundaries and paths also offers the most valuable opportunities for green networks and connections with the wider woodlands, hedgerows and water courses, providing important corridors for biodiversity. When designing the infrastructure of an allotment it is therefore best practice to be mindful of the aesthetic quality, the practical requirements, and the biodiversity it offers.

Planners and allotment holders are strongly encouraged to consider an allotment's infrastructure holistically, planning the elements described in this section of the guide together rather than in isolation. This will help to define a language for the site, tying it together visually and ensuring efficient functionality

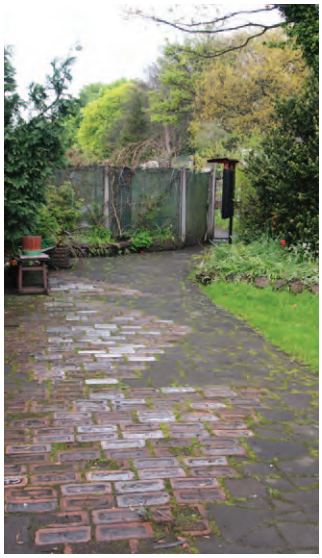
3.2 access area

The surface of the access area should be a load bearing medium with good drainage. (See Part 3.4 Paths for details) There is typically no need to provide car parking inside the site, as this will take valuable growing space.

The access area within the site should be big enough to offload a delivery of loose compost and if that material is not moved there should still be room left for plot holders to bring a car into the access area to off load equipment. Some local authorities have arrangements with allotment sites for leaf sweepings to be composted in purpose built silos which are located near the main access.

Ideally the location of the main access will be at the middle of the longest side; however the actual location will need to be thought out with other factors, any cost implications, ease of construction, ease of vehicular access. Within the access area there should be the site notice board in a prominent place. Some sites will have a policy that whatever comes onto the site has been carried through the gate by a plot holder, therefore anything that leaves the site should also be carried out by the plot holder. Other sites will have a rubbish skip uplift as part of their rental agreement. If a rubbish skip is allowed, it should be located in the access area. It should only be used for non-compostables, plastics, glass etc. If recycling is envisaged then it should be located by the main access bearing in mind the aesthetics of recycling storage.

On a large site a second subsidiary pedestrian access gate can be provided, if possible at the opposite side to the main gate. If bonfires are not allowed then green cages for compostable shreddable material should be provided. An area for such a green cage should be incorporated into the design near the main access gate.



3.3 gates

The aim should be to provide the allotment holders with a sense of security, in particular vulnerable allotment users when working alone in evenings, and to deter vandals. Designs which provide a secure gate without 'fortifying' the allotment site are best.

Site security: some of the best sites have no lockable gate, and security is afforded by overlooking adjacent land uses / residential areas.

It is recommended that the design of the gate is in keeping with the type of fencing used: e.g. if a timber panel fence, use a timber gate, if wire mesh fence a metal gate would be more appropriate. Mortice locks are more durable and easier to manage as a committee than a padlock on the gate. Remember, a locking gate is not always necessary.

Julian Avenue, Glasgow

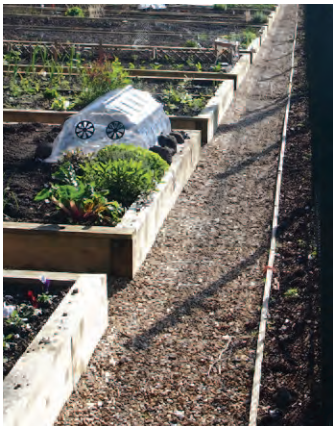
Inverness Allotments

3.4 paths

There is a wealth of published good practice guidance in path construction*, and using this will result in paths which best meet the needs of the plot holders, make optimal use of natural resources, are durable and easy to maintain, and have minimal impact on the environment. Achieving this requires a decision-making process which will produce a unique solution determined by the opportunities, conditions and constraints presented by the circumstances of an allotment site. This section leads you through the key decision-making elements of path construction to help you implement paths which are appropriate to each individual situation and location. The following key elements are described:

- Consultation and appraisal
- Site assessment and survey
- Path design
- Construction
- Maintenance

Grass paths with Type 1 hardstanding at entrance. Inverleith, Edinburgh



Loose gravel paths laid out in a grid network. India Place, Edinburgh

Consultation and appraisal

The plot holders should be consulted at all stages as their plots will be affected by the routes and users. On an allotment site there will be three basic types of paths.

1. The main access route from the gate through the site which should be reasonably load bearing and wear resistant. It will take the most use.
2. Lateral access routes to the plots, wide enough to take wheelbarrows.
3. Paths within and around the plot, to give access without taking too much growing space.

The scope of this section refers to the main access route. The principles will also apply to lateral and plot paths which will be dealt with at the end.

Site assessment and survey

Having determined the main site layout (see Part 2), and the main access route will now need a design. The lateral and plot access paths can be considered on a more piecemeal basis, however the arterial path should be planned from the outset.

If the site is on a slope then attention needs to be given to drainage, sub-strata, surface material, surface scouring, slipping hazards, and side wall collapse. Take photographs of the site and lay out ropes to indicate the main access route. Decide how far you need to provide wheelchair access if required.

Paths For All
www.pathsforall.org.uk

Path design

The decisions that you make at the design and planning stage will have the biggest impact on the cost of paths. As a general rule, if insufficient funds are available to construct the path design you believe is required, then it is better to cut down on the length of path, rather than produce a path of a lower standard. In the case of a path network, it is better to prioritise routes and spend available funding on important paths, perhaps completing the network at a later stage.

Keeping water off and away from a path is the single most important factor to maximise longevity and usability. Poor drainage is the most common cause of path failure. An efficient and reliable drainage system is easily achieved with careful detailing which comes from surveying how the water flow system of the allotment site is working. The overall drainage plan of the site must include main path drainage.

Rain or snow will fall on a path. This water may stand on, or flow along, the path surface, resulting in scouring and potholes. To remove this water a path surface should always have either a cross-fall or a camber. It is essential that hard or soft path edges do not impede water flowing off a path surface. Clearly, the path edges must not be higher than the path surface. Maximum recommended cross-fall is 1:50 for inclusive access. If using a camber, the middle of the camber should be 50mm above the path edge. Do not use timber edging as it will hold back surface water, especially after the path surface has worn down below the top of the edging boards. (For paths around the plot, timber edging is acceptable, indeed encouraged, as the topsoil will build up in time and spill onto the path).

Long sloping paths will allow surface water to flow quickly, causing scouring. Careful use of bends and level areas tied in with a cross-fall to the appropriate side will prevent surface water from flowing too quickly.

The path base (often referred to as sub-base) is the foundation for the path surface. It is made up of a layer of graded stone or aggregate comprising various stone sizes right down to dust. The bigger stones provide most of the base strength. The smaller sizes fill in the gaps to 'bind' the base together and prevent lateral movement. The deeper a path base, the stronger it will be. Specifying the base depth requires two factors to be considered:

1. Path users – the types, frequency and loads they will impose;

2. Formation strength – the load bearing capacity of the ground on which the path is being laid.

A wheelchair accessible path. Ferry Road, Edinburgh

Internal path layout and construction. Lady Road, Edinburgh

Stuart McKenzie

Grass paths. Inverleith, Edinburgh

Base stone should be thoroughly compacted to maximise its strength and binding properties. Type1 stone/gravel, rubble, road planings, shale waste, or quarry materials can be used for the path base prior to dust or bitmac surfacing.

Providing enough base depth to place the final path surface above (about 50-100mm) the level of the surrounding ground will ensure surface water drains away effectively, and keeps the main access path usable in all weather.

The surface is the most important part of the path from the plotholders point of view. It is the only part of the path with which they will make contact. The surface is therefore critical to the usability and appearance of the path. When choosing a path surface, durability, smoothness and appearance should be considered. The types of surface available are:

- Natural surfaces e.g. grass: In some situations, a path may not require a formal surface. This will be determined during the consultation phase, and should be seriously considered. Mowing a strip of grass regularly will help to define the path and improve the strength and wearing quality of the grass. The addition of drainage may further improve the surface.
- Unbound surfaces (whindust, aggregate, sand and gravel): These do not use an additional binder such as bitumen or epoxy, but rely purely on the friction between the different sized stone particles for strength and durability. Generally, the aggregate used is very fine, 3 or 6mm to dust (often referred to as whindust). The lack of a binder means these surfaces are very susceptible to being washed out by water, so careful surface drainage is required.
- Sealed surfaces (bitmac / tar spray and chip): A top layer of aggregate or gravel bound together by bitumen. A sealed surface will be much more durable than an unbound surface as the binder will prevent material being washed or worn away. Sealed surfaces will therefore be more suitable for slopes and all year round use. It should be noted, however, that use of a sealed surface should not mean that drainage provision can be reduced as flooding will still damage even a macadam surface. It is also essential to protect a sealed surface from weed growth either by using a suitable geotextile or using a suitable residual weed killer.
- Unit surfaces (blocks and setts): Tend to be used to designate entrances to paths and to act as transition zones between the main access point and main path. There is the additional cost of kerbs, which are required to prevent lateral spread. Using recycled concrete slabs, recycled bricks and setts around a plot is to be encouraged.


whindust (buff)


plastic reinforcement


type 1


whindust (grey)


wood chip


type 1 with blinding (dust)

Construction

1. Excavate topsoil and turf to expose the subsoil. The ground should be even and free of all obstructions, tree roots, tree stumps and other vegetation. The area for the path ('formation') should be rectangular in section with vertical sides. Maximum depth for tray excavation will be dependent on the soil structure.

2. Backfill the formation with sand and gravel to create a free draining layer to a depth of 100mm - 150mm. If the soil is particularly poor draining, e.g. with high clay content, increase the depth of the drainage layer to 150-200mm.

3. Lay a geotextile sheet to prevent weeds from growing through.

4. Lay the base material (see box opposite) and compact using a vibrating roller or a vibrating 'whacker' plate. The base stone must be laid dry. The finished base should be free of ruts, dips, potholes and roller marks. Depending on the type of surface material to be used the base will finish 0 to 25mm above the surrounding land to ensure drainage.

5. Lay the surface material, compacting using either a roller or a whacker plate. If using a sealed surface, bitumen or asphalt treat the base stone with weed killer.

Site-wide path layout and construction. Comrie

Edna Monteith

Low maintenance concrete slab paths. Ferry Road, Edinburgh

Maintenance

Strim or mow grass surfaces regularly to increase durability. Monitor surface conditions to determine if upgrading to a constructed surface is necessary.

To maintain natural surfaces the rain ruts and potholes should be filled, leaves cleared to prevent mud formation, and weeds removed.

On unbound surfaces, re-dusting should be done when a significant amount of base stone becomes exposed and loose. Surfaces on slopes less than 1:20 should last around 7 to 10 years. Slopes between 1:20 to 1:10 should last for 3 to 5 years.

Sealed surfaces will eventually wear as frost, vehicles and water break up the surface. Tar-spray and chip surfaces are simply re-surfaced with a new layer laid on top of the old. Bitmac and asphalt surfaces can be ground up, re-mixed with bitumen and re-laid in one process. Expect 15-20 years from a bitmac surface, 20 plus years from an asphalt surface and 10-15 years from a tar spray and chip surface. Clear leaves and treat weeds as necessary.

The different types of base materials are:

Type 1 – Department of Transport specified graded aggregate suitable for path base / general fill.

Scalpings – Similar to Type 1, but not produced to a specified standard. Much cheaper than Type 1 and if selected carefully, can be almost as good. Look out for high clay content or wet material.

Recycled builders' rubble – Not produced to any standard specification so check quality.

Road planings – Ground up bitmac produced in road re-surfacing works. If rolled hard in hot weather, the bitumen binder can re-bind the material to form a hard surface requiring no further treatment.

Blaes / oil shale / ash – available in some areas and due to its variable size can provide a well bound base material. Quality is variable. As with planings, care must be taken when using near to watercourses as blaes can be highly toxic. Seek advice from SEPA.

Sands and Gravels – naturally occurring graded stone that can be used as a sub-base or as a complete path construction. Used to provide the bulk of a path base which can then be overlaid by a layer of dust, or a sealed surface can be laid.

Lateral and plot paths

Because the use of these paths is much less heavy than the main access path, detailed design and construction is not necessary. However the principles used in designing the main paths described above can be applied. Drainage to prevent slipping and puddling is important.

If the paths are below the level of the plots, they will collect water run-off from the plot. If possible incorporate the site drainage system into the lateral and plot paths system. A French drain can be incorporated under the path (see Part 1.3 drainage for plot soak-away notes).

Grass is the traditional surface, but unless well maintained weeds will intrude into the plot. The top soil can be excavated onto the plot, a geotextile sheet laid and wood chips laid for a low maintenance path. Re-cycled paving, tightly butted, provide an all weather low maintenance surface. A crazy paving slab path is a good use of recycled materials, but allows weeds to grow requiring maintenance. Re-cycled external frost resistant house bricks laid on their side on a free draining base stone,gives an attractive all weather surface. Using carpet for a path surface is not recommended. It is ugly, dyes may leech into the soil, the "surface" can move posing a hazard, the underside of the carpet is a haven for pests such as slugs and New Zealand flatworms and weeds will grow through.

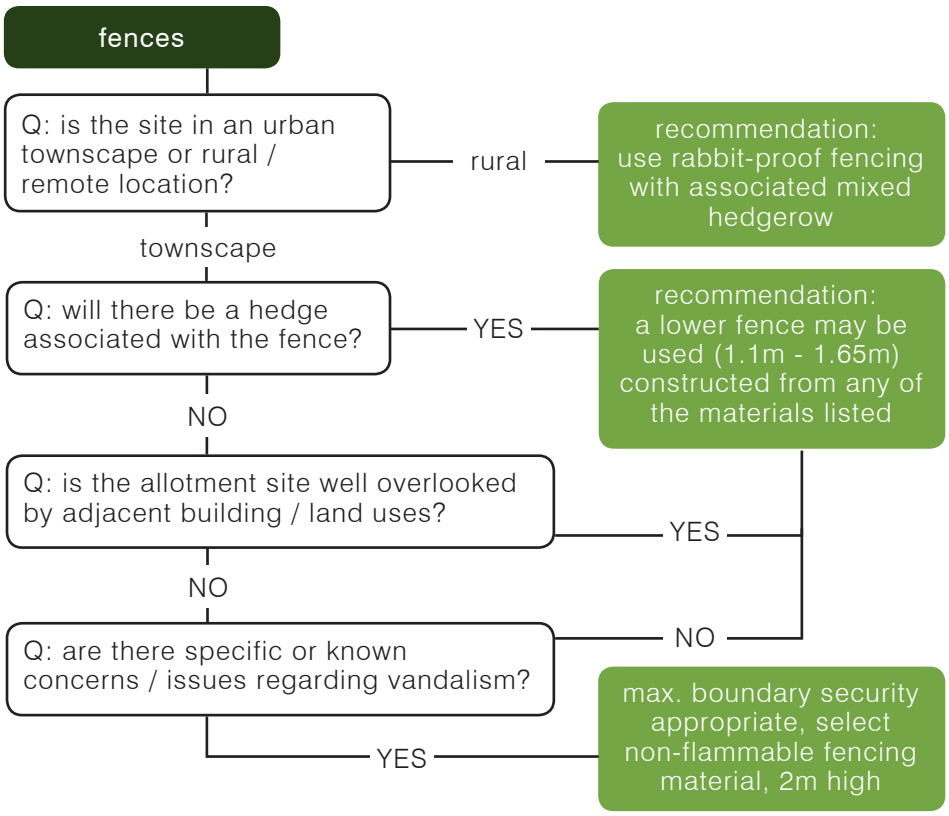
Maintenance is mainly weed control or grass cutting. Wood chips should be hoed regularly to remove wind borne seedlings.

3.5 fences

The fenceline represents the interface between the general public / private land and the allotment site. It requires careful consideration and design: it functions to provide definition of the allotment site and protect the site from potential vandalism, but the design should avoid a 'fortification' effect which can result in increased vandalism incidences.

The ARI FactSheet 'Safe Sites' available on line provides detailed guidance on tackling vandalism and the appropriate design of allotment site boundaries. Generally, it is recommended that the assumption is to opt for the lowest fence practicable while balancing security and aesthetic objectives i.e. high fences give allotments a poor public image. The visual appearance of a fenceline can be greatly enhanced by planting a hedge in association with it. There is a very wide range of fencing solutions available which can be used at allotment sites, the main considerations in selection will be the adjacent land uses, risk of vandalism, and aftercare requirements / maintenance arrangements. Timber fencing requires regular maintenance to preserve it. Rabbit-proof fencing should be inspected frequently to check its integrity.

It should also be noted that the various boundaries do not necessarily require the same treatment: there may only be one forward facing boundary which requires full height fencing whilst the other boundaries are formed by private back gardens for instance. Advance design and planning for this opportunity can reduce costs and make local residents feel part of the fabric of the allotment.

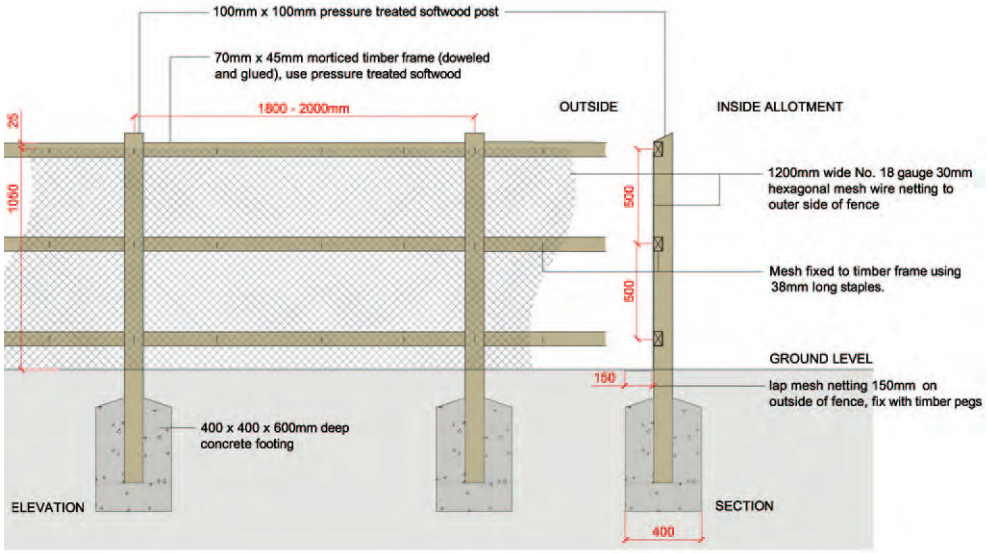


2m high dark green powder coated metal mesh panel fencing. Hedge on outside obscures fencing and integrates site with adjacent parkland. South Western, Glasgow.

On low metal mesh fences (this example 1.5m), the top should be rolled for safety. Black powder coated mesh good for townscape setting.

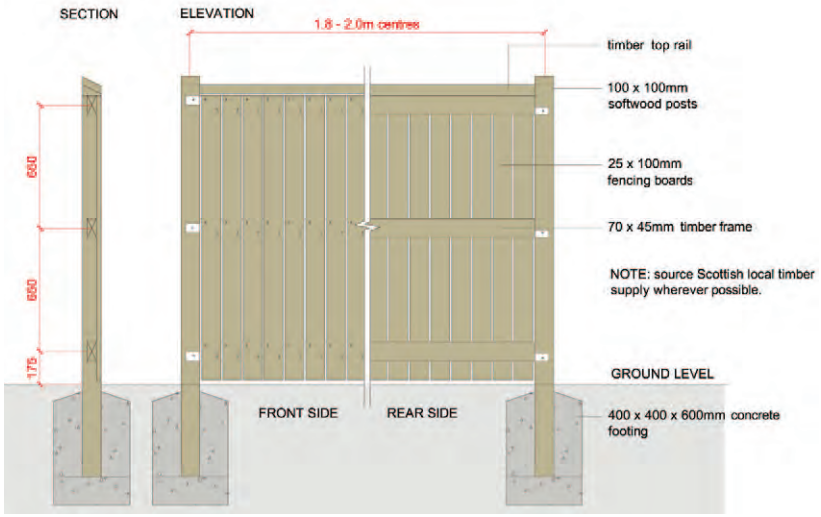
Timber close-panel fencing painted black. 1.5m high. India Place, Edinburgh

The looser structure of the timber panels allows more light through and reduces the amount of shading over the land for growing. High Carntyne, Glasgow



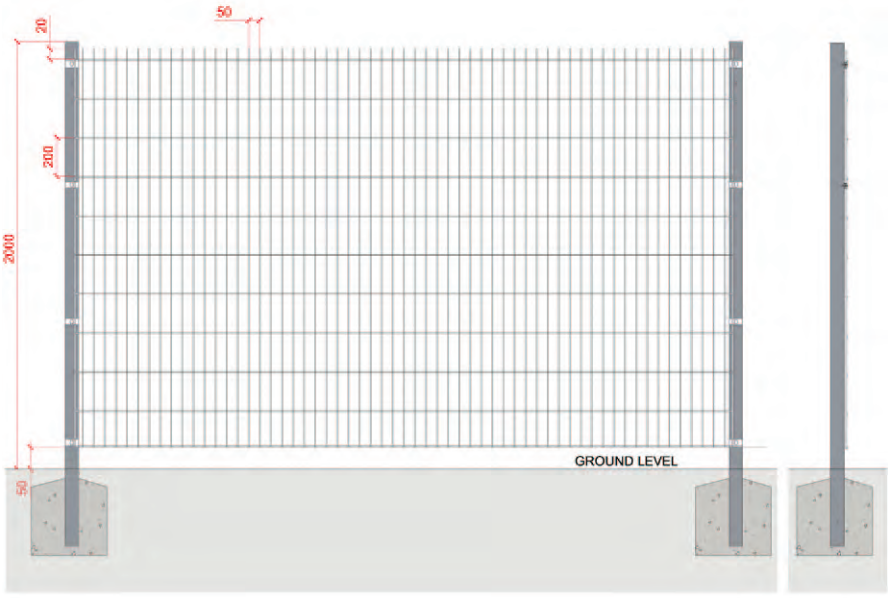
1. rabbit-proof fence

Height minimum 0.9m. If rabbit-proof fence is used with a hedge, it should be planted on the allotment side to allow for the lapped mesh on the outside edge. Pros: low risk of damage by pests. Cons: expensive, easily vandalised.



2. timber panel fence

1.4 - 1.65m high. It is recommended that timber panel fencing does not exceed 1.65m high, as it is visually over-powering if above head height. Pros: provides shelter and wind break. Cons: expensive, requires regular maintenance, casts shade over growing space, visually intrusive, can be easily damaged in high winds.



3. vandal-resistant fence

Welded mesh fences range from 0.8 - 2.0m high. The 2m height is considered a maximum where adjacent to a public highway, to avoid need for planning permission. May be painted with anti-climb paint to deter vandalism. Pros: allows light to ground, reduced risk of wind damage. Con: not attractive.

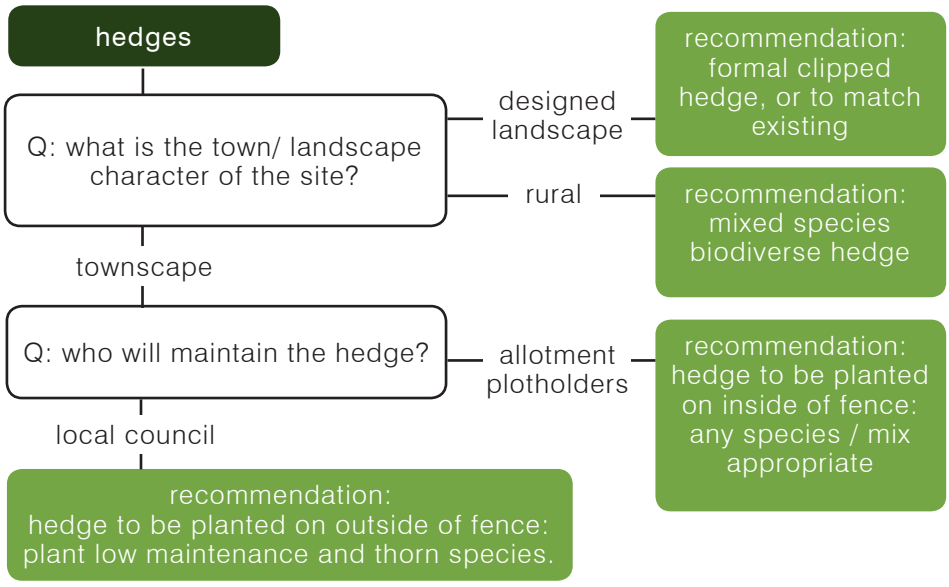
Animal-proof fencing www.forestry.gov.uk/pdf/fctg002.pdf/$file/fctg002.pdf
Secured by Design www.securedbydesign.com/pdfs/SBD-principles.pdf

3.6 hedges

Hedges are primarily used around the perimeter of an allotment site, rather than to divide individual plots to avoid shading of the adjacent land for growing. As a perimeter boundary, hedges offer several benefits which a fence cannot provide. Hedges create very effective windbreaks, as wind energy is dissipated, and once established hedges are difficult to scale and therefore deter vandalism and intruders effectively without the hard visual effect of fencing. Bare root hedging is very cheap to buy and install. There are many forms of hedging which may be appropriate and design choices are guided by setting, adjacent land uses, and environmental conditions. Hedges may be as informal as brambles trained over wire / chainlink fencing, or formal clipped single-species instant-hedging.

A best practice option to balance security with biodiversity value is to use a mixed species-rich hedge. These are defined as hedges which include 5 or more native woody species in a 30 metre length. Hedges which have a rich variety of herbaceous plants at their base, are also very valuable for nature and wildlife. Appropriate species to include are listed opposite. When designing a hedge of mixed species, consider including evergreens such as holly and yew, and the aesthetics and sheltering benefits of a mixed coniferous / deciduous hedge. All hedges require maintenance, and the differing types will require more or less maintenance. Leaf litter is very valuable to wildlife, and as long as it does not pose a fire hazard it should be left to rot down.

Where a hedge is planted in association with a fence, consider which side it is planted on. Hedges planted on the outside of the allotment site are commonly maintained by the local authority; hedges to the inside maintained by the plot holders / allotment committee. The decision as to which side is most appropriate will be a balance between maintenance arrangements and protection of hedge from vandalism. Agreement on maintenance of boundary hedges should be reached if adjacent land is owned by private land owners.



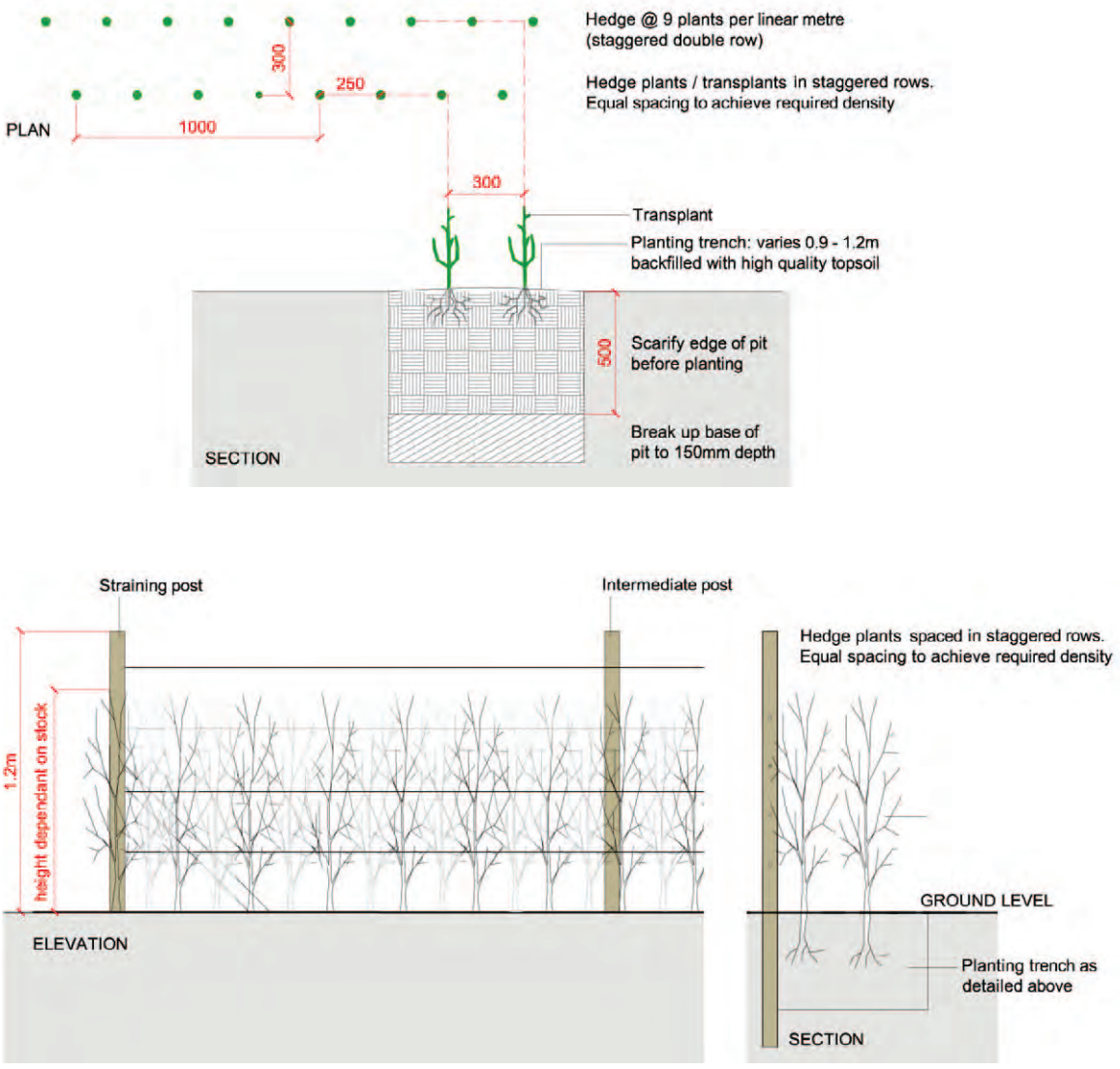
Instant hedging can be bought from nurseries. Costly, but a well formed hedge boundary can be achieved. This may be particularly beneficial where the visual impact of the allotment is an issue.

Espalier fruit trees can also form 'hedge' however would not create an effective or suitable perimeter boundary. Lady Road, Edinburgh.

Single species thorn (Berberis) hedgerow planted to the outside of the fence. Maintained by the local council. Inverleith, Edinburgh

Species for a 'biodiversity' hedge:

common name	latin name	flowering season	fruiting season
Hazel	*Corylus avellana*	late winter / spring	early autumn
Yew	*Taxus baccata*	early spring	autumn
Bird cherry	*Prunus avium*	spring	mid summer
Crab apple	*Malus sylvestris*	spring	mid summer
Bramble	*Rubus fruticosus*	spring	late summer
Blackthorn	*Prunus spinosa*	mid spring	summer
Hawthorn	*Crataegus monogyna*	late spring	late summer
Guelder rose	*Viburnum opulus*	spring / summer	late summer
Holly	*Ilex aquifolium*	spring / summer	late autumn
Dog rose	*Rosa canina*	spring / summer	mid autumn
Alder buckthorn	*Rhamnus frangula*	early summer	mid autumn
Wild privet	*Ligustrum vulgare*	early summer	autumn
Honeysuckle	*Lonicera periclymenum*	mid /late summer	autumn



Double staggered hedge planting detail, with post-and-wire fence. Whether the hedge is formal or naturalistic in style will depend on the laying / maintenance regime.

3.7 water supply

Traditionally, allotment landlords were expected to provide a mains water supply to an allotment site, and to install a network of standpipes / taps around the site. Many existing allotment sites will still provide mains water with a piped system servicing the plots, however there is increasing concern about the long term viability of such water supply approaches.

With greater awareness of the value of our water resource, it is becoming imperative that rainwater is collected (harvested) on site in every way possible, and used for the site's water demands.

It is possible to collect water off any hard surface, and there is a wide range of water collection infrastructure available. Rain water harvesting products may be either off-the-peg or created from recycled materials. There are many online resources and toolkits describing how to implement such measures.**

A metered water supply could also be provided to the allotment site, perhaps if there are no structures such as sheds or greenhouses planned and, as such, rainwater collection is unfeasible. A metered supply could be used in conjunction with rainwater harvesting, balancing supply and demand to reduce costs whilst avoiding completely dry spells.

Option 1: Water butts Individual allotment holders are strongly encouraged to integrate a large water butt in association with any structures on their plot, such as sheds or greenhouses. Rain water collected in the gutter is intercepted at the downpipe, and collected in a suitable vessel. These can have taps to facilitate watering, and an overflow pipe. Water butts are cheap and easy for the individual to install (see Part 4.3 on huts).

Option 2: Underground storage tanks An expensive option and requires an electric supply to pump water up (or a hand pump may be used). This option is only viable where there are larger structures such as communal huts. This saves space on site and can be located under a structure if necessary. Capacity and design should be to an engineer's specification.

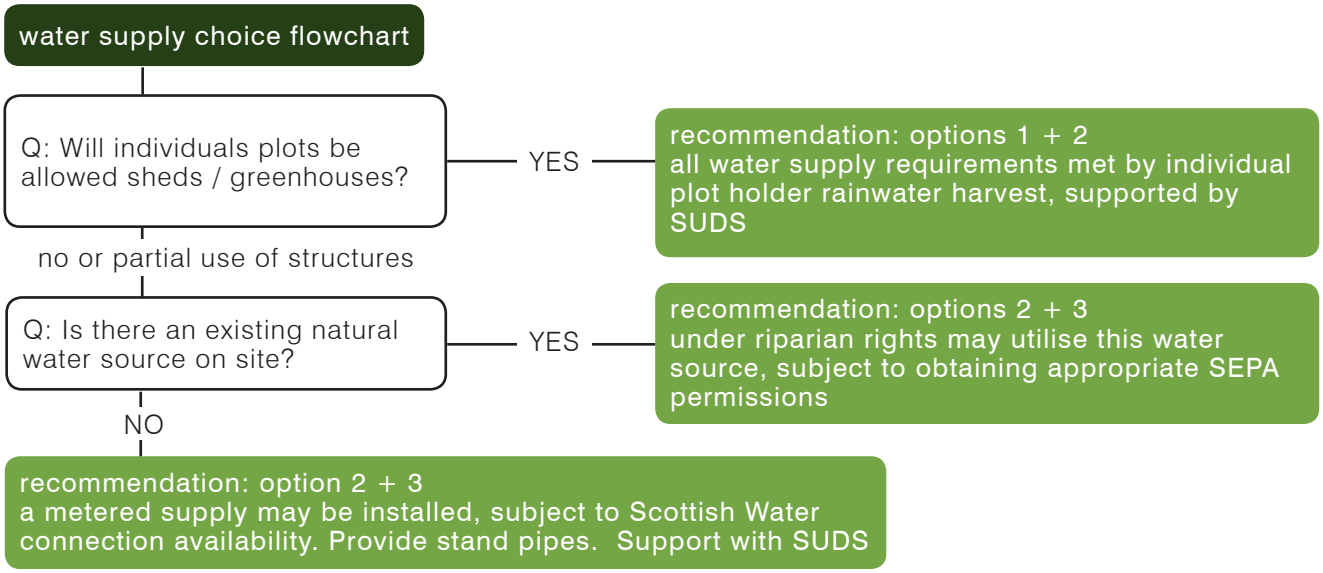
Option 3: Open water features Some sites may incorporate car parking areas, hard standing for lay down, or sealed surface paths at the entrance gates. Where there are areas of sealed surface, the rain water run-off can be collected or channelled into swales or ponds based on SUDS (sustainable urban drainage systems) design. Open water bodies help re-charge the ground water levels and provide valuable habitats for local wildlife and nature. Any new area of hard standing, however large, should consider how rainwater is being intercepted and used as a site resource.

A DIY water butt collects the water from a plastic gutter. The single pitch of the hut minimises infrastructure. Mansewood, Glasgow

This proprietary water butt system connects to the gutters. Works on double pitch roofs, 200L butt shown. Bridgend Farm, Edinburgh

Communal stand pipe. Oakwell, Linlithgow

*SEPA advice: www.sepa.org.uk/water/water_regulation/regimes/pollution_control.aspx
*Sustainable drainage: www.susdrain.org/



3.8 electricity

An electricity supply is not required to individual plots or around the allotment at large, but can be beneficial on allotment sites which provide communal facilities such as toilets and community huts. Electricity can be useful if wider community groups outwith the plotholder group are being encouraged to use the site (e.g. school children, local interest groups, or where community growing plots are being provided).

On allotment sites, electricity is generally only required for lighting, kettles, and occasional use for charging power tools. As a best practice recommendation, electricity should not be provided beyond the communal facilities.

The use of generators to provide power for an allotment or community growing site, or for individual plotholder use, is not recommended due to noise pollution and disturbance to people in buildings and streets nearby.

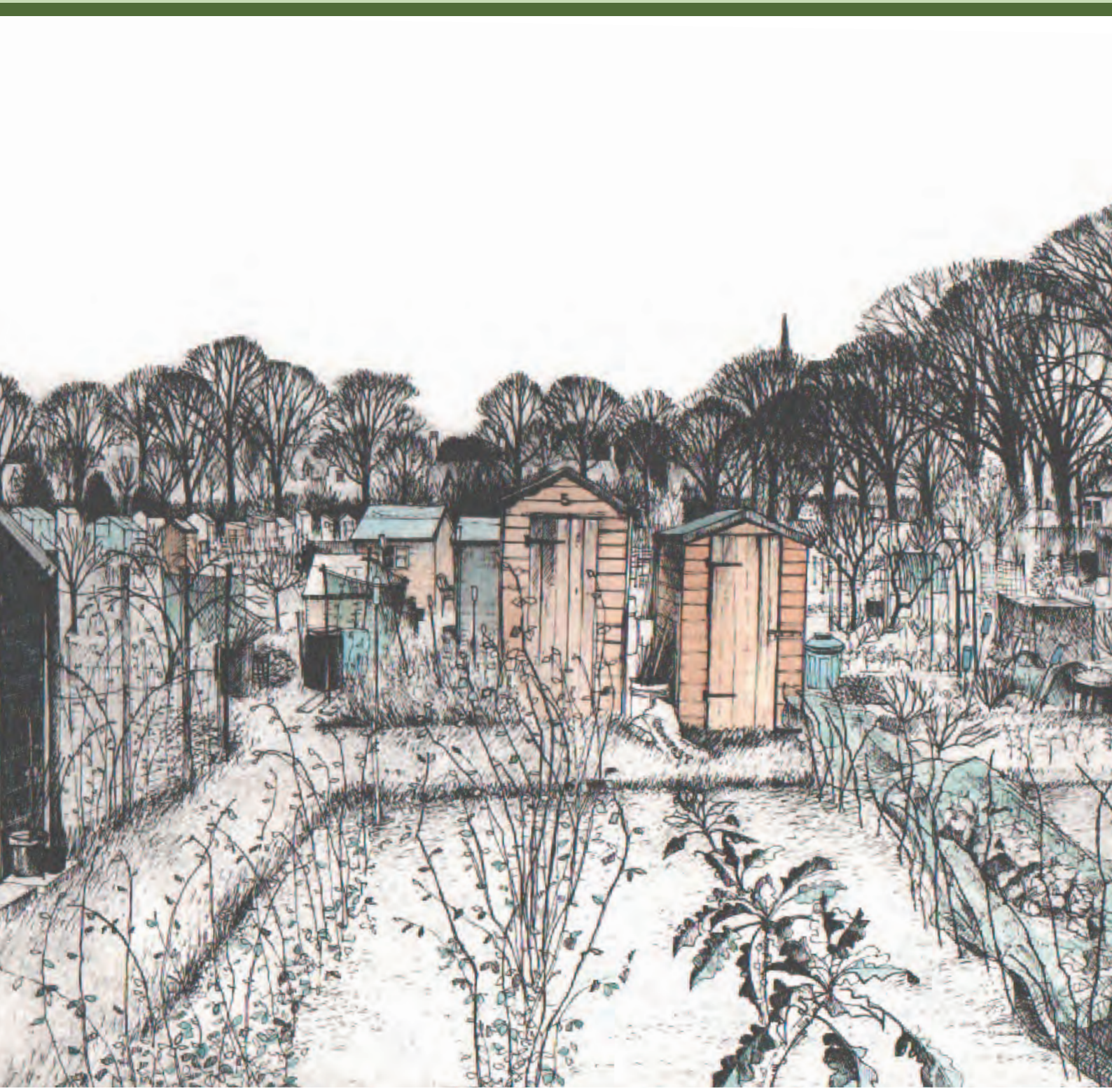
Electricity from renewable micro-generation sources is highly recommended. Allotments are greenspaces, and it is best practice to design and plan an allotment site in a carbon neutral manner. If electricity is required, the two main micro-generation sources are wind and solar energy. A case study with notes on advantages and disadvantages is provided in appendix 6.

Communal hut has two solar panels to provide a source of electricity for shared facilities. Inverleith, Edinburgh

The battery from the solar panels. Inverleith, Edinburgh

www.energysavingtrust.org.uk/Generate-your-own-energy

plots



© Pamela Grace: Winter at Inverleith. Hand-coloured solar–plate etching

4. plots

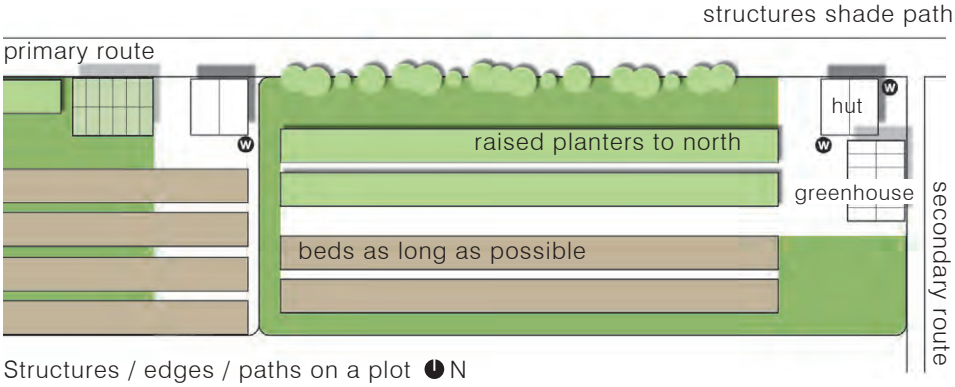
4.1 introduction

The most important part of the plot is the soil. A well-tended soil will repay in healthy, quality crops. The hard work that goes into maintaining the soil is well worth the effort. The detailed design of the individual plot will be the plotholder's responsibility, subject to site rules for example to protect visual amenity and to reduce the effect of any structure or planting scheme on neighbouring plots.

Whether raised beds or open plan, the growing area should be maximised and internal paths kept to a minimum, whilst allowing access. New allotment plots can be stony, weed-ridden, poorly drained and the soil in poor condition. There is no magic wand other than hard work.

Huts and greenhouses should be sited to minimise shadow onto the plots alongside, and placed to allow easy access from the surrounding path. Where huts are not allowed, tools will probably be stored in a central lock-up. Care should be taken to avoid introducing permanent structures that could inconvenience future plotholders. The size of the plot will determine whether a hut and/or greenhouse will take up too much growing space.

Raised beds should be as long as possible with paths minimised to enable maximum growing area; generally, the smaller the plot the more the growing area should be maximised. Grass paths are a source of weeds if not kept well mown. For safe access the paths must be well maintained.



Structures / edges / paths on a plot

It is essential that good management procedures are in place if livestock such as bees or fowl are allowed. Poor management of livestock leads to vermin and hive failure.

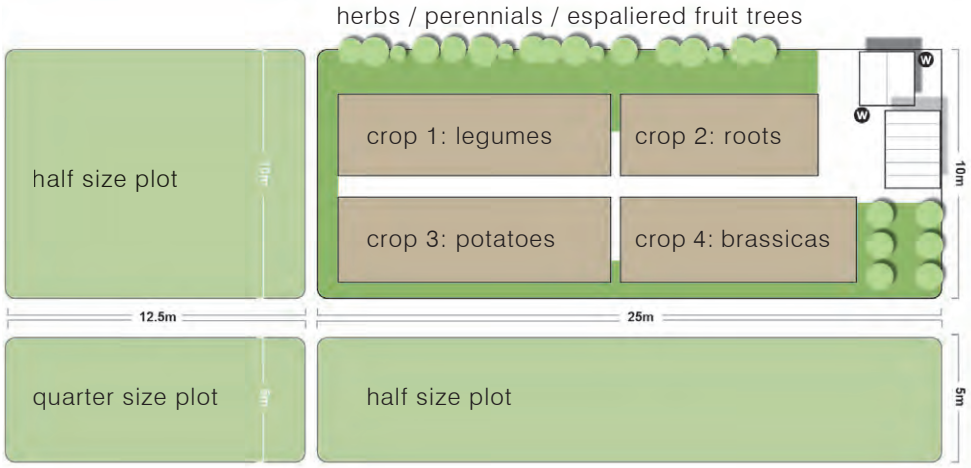
The demand for plots which are designed to inclusive access standards, e.g. for disabled plot holders, should be ascertained at the outset.

4.2 plots detail

The original size of plots was 300sq.yds (10 sq. poles in imperial measure). Today a full size plot is usually about 250sq.m. The normal shape is rectangular 25m x 10m. Curved shapes are to be avoided as the edges are difficult to maintain, and a rectangular shape maximises the land available.

If edging is required it can be maintained by using treated timber, proprietary trimming, recycled treated timber or bricks. The timber is nailed to stakes sunk into the ground; the edging timber is against the path.

A plot may include the following: 4 areas for a 4 year crop rotation plan; additional areas for perennials, fruit, hut and sitting out; greenhouse (if required); and storage for wheelbarrow and other spare materials. Annual flowers and herbs that attract pollinators can be planted around the edges. Other layouts are possible remembering the basic principles of crop rotation and care of the soil.



Sub-dividing the plot N

Crop rotation is essential for healthy soil and crops. An example of a 4 year cycle is roots, legumes, brassicas and potatoes, which fits in with a lime, compost, lime, compost regime to maintain a sweet ph. neutral soil. Crop rotation prevents the build-up of pathogens and pests caused by continually growing the same crop on the same land, especially, club root in brassicas, eelworm in potatoes, root rot in legumes and onion rot.

On half- and quarter-sized plots, huts and greenhouses take up a greater proportion of the growing area and their use must be carefully considered. Management and planning of crops needs to be more efficient in a smaller plot, to prevent the build-up of pathogens and pests.

Paths within the plot should be minimised to maximise the available growing area.

The boundaries can be defined by soft fruit (brambles, tayberries etc.) on wires, and espaliered fruit trees. Fencing around individual plots is to be avoided at all costs.

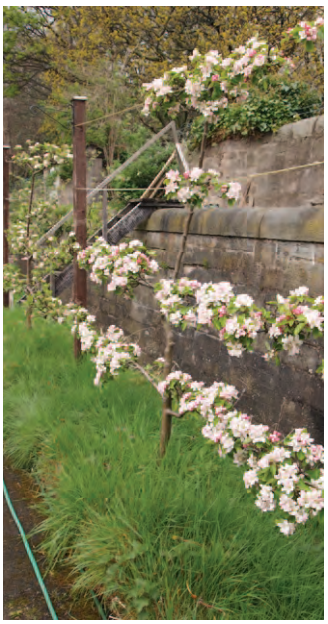
Open plan sites are more attractive, and avoiding fences reduces shading of the land for growing. Fences require maintenance to keep them looking good and different types of fencing lead to an untidy looking site (see solutions for wind exposure below). It is recommended that rabbit-proof fencing, if required, is installed at the perimeter of the whole site.

Plot boundaries

Across the world, allotment plot boundaries vary widely. In particular, northern European examples tend to have high, dense boundaries to individual plots, however it should be noted that the year round use of allotment sites is quite different.

In Scotland, high plot perimeters offer some advantages such as shelter from wind, however they also isolate plot holders from each other and the culture of sharing ideas, resources and advice is lost.

Generally, internal hedgerows are not promoted on allotment sites in the UK due to the land they remove from food cultivation.



Espaliered fruit tree edges. Lady Road, Edinburgh

Some allotments have very high plot hedges but this is wasteful of growing space. Westthorn, Glasgow

4.3 huts

Most plotholders buy their huts. Huts can be made out of sheet metal on a timber or metal frame, plastic on a timber or metal frame, or all-timber construction. There are advantages and disadvantages with each. With regular maintenance a hut will last at least the lifetime of the plot holder.

Metal huts are flame proof but can rust and need regular maintenance. A concrete base can be corrosive if the metal is not galvanised and side panels are light and can get damaged. As the huts are light, wind damage can be a problem and they should be attached to a concrete base with rawlplugs or similar. Maintenance: check for rusting and repair and repaint as required.

Plastic huts need little maintenance and are rot proof. As they are light they need to be fastened down. Modern UV resistant plastics mean they are long lasting. Maintenance: plastic huts need minimal attention: check for joint leaks and repair.

A timber hut is the traditional type. They vary from very minimal strength construction to high quality bespoke. Timber is a renewable, sustainable material, and the resulting hut is generally more aesthetic. Maintenance: timber huts will require regular painting with preservative both inside and out. Roofing felt will deteriorate in time and will need replacing at some time in the life of the hut.

If required the huts on a new site could be of a similar design, same neutral colour (usually natural, black, green or brown) and positioned in the same relative spot on each plot to enhance the general appearance. Any shadow must not fall on the neighbouring plots. Ideally huts are positioned on the south boundary of each plot towards the west end and located at the edge of the plot, not in the middle, as paths are needed to get to the hut taking up growing space.

Huts of the same style, size and made of the same materials. Walkerburn allotments

Huts aligned in relative position to each other makes for a more uniform and aesthetic site. Bridgend Farm, Edinburgh

Advantages and disadvantages of the materials available:

material	advantages	disadvantages	maintenance
metal	flame proof easy to construct from kit	can rust light panels can get damaged susceptible to wind damage	repaint to avoid rust
plastic	no maintenance	light panels can get damaged susceptible to wind damage	no maintenance required, but check for leaks at joints
timber	options in style and size traditional, aesthetic renewable material	requires regular maintenance roof felt liable to leakages	check for leaks, replace felt as required paint exterior regularly

The door opens outward to maximise space. Care has to be taken to provide strong hinges and door jambs as wind can blow the door open and buckle the hinges. Fasteners to hold the door open are not necessary as a large brick can do the job. A simple closing method will suffice. A heavy hasp and padlock is an attractive challenge to any thief. The contents of a hut are usually of little value. Valuable equipment such as strimmers and rotavators, should be kept in a high security metal container (see Part 6.6 on community huts). A hut should be big enough to store all the tools and equipment, and have space left to sit in when it is raining. A 2m x 3m is ideal. Any smaller and it becomes cramped, and any bigger it is an eyesore and may attract a requirement for planning permission application.

For timber construction the side and gable end sections are held together via the main corner timbers by coach bolts. The walls can be tongue and grooved, or shiplapped or another kind of weather boarding. Lack of a rigid frame will allow sway in high winds and eventual collapse. All side frames must be fastened to the base floor. The roof of a timber construction hut should be tongue and grooved and of sufficient thickness to take the clout nails holding the roofing felt.

There should be a water collection system from the roof draining into at least one 200 litre water butt. Two butts in line will provide enough pure rain water for most purposes. Green roofs are to be considered carefully as they can be too heavy for lightweight construction and the long term sealing arrangements are expensive (see detail on living roofs below).

The ground must be prepared, compacted and made level, with a base of concrete, paving slabs, bricks, or washed gravel. The floor should not rest on the earth, but on treated timber battens or bricks. An air space under the hut is beneficial to reduce rot with wooden sheds. The space under the hut may shelter vermin and other pests. A surrounding of fine wire mesh will minimise the risk or the floor can rest on washed gravel on a weed-proof and waterproof membrane so there is no space for vermin. Metal and plastic huts can be placed directly on the base and fastened down. In strong wind areas wooden huts will need wire or rope ties over the roof to stakes on either side of the hut with anti-fray protection at sharp corners.

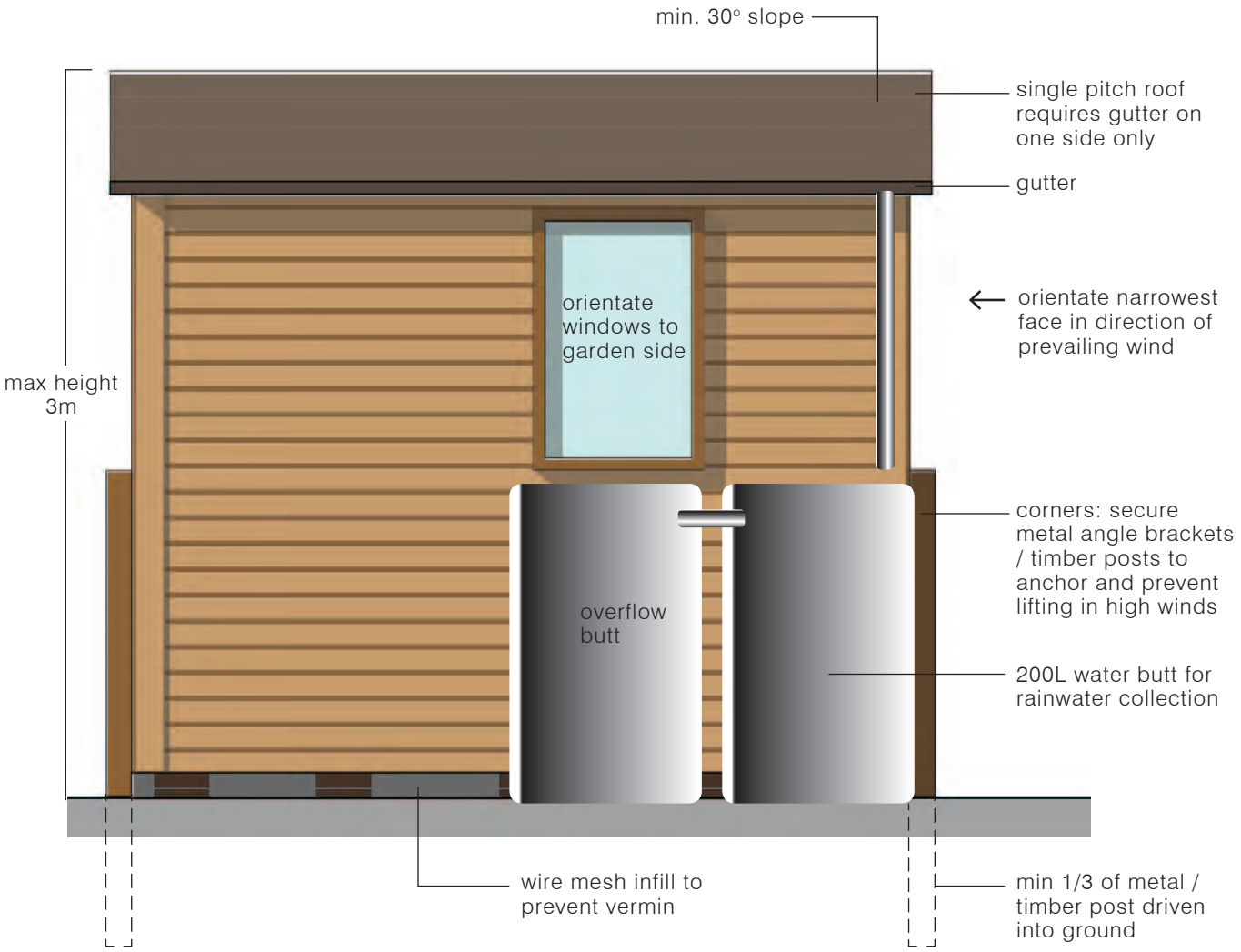
The interior may be shelved to store consumables, small tools, etc. Good well fitted shelving can enhance the stiffness of the hut. Tools should held in racks against the wall. The floor should be kept as uncluttered as possible. Remember that mice and rats can hide in the smallest space, hibernate and eat stored produce.

A metal hut. Lady Road, Edinburgh


Huts located next to the path with rain water collection provision. Fife Growing Project

Timber huts are available in many styles. Inverleith, Edinburgh

Green roof construction guidelines:
http://livingroofs.org



Typical hut components and notes on design and layout considerations.

Living roofs

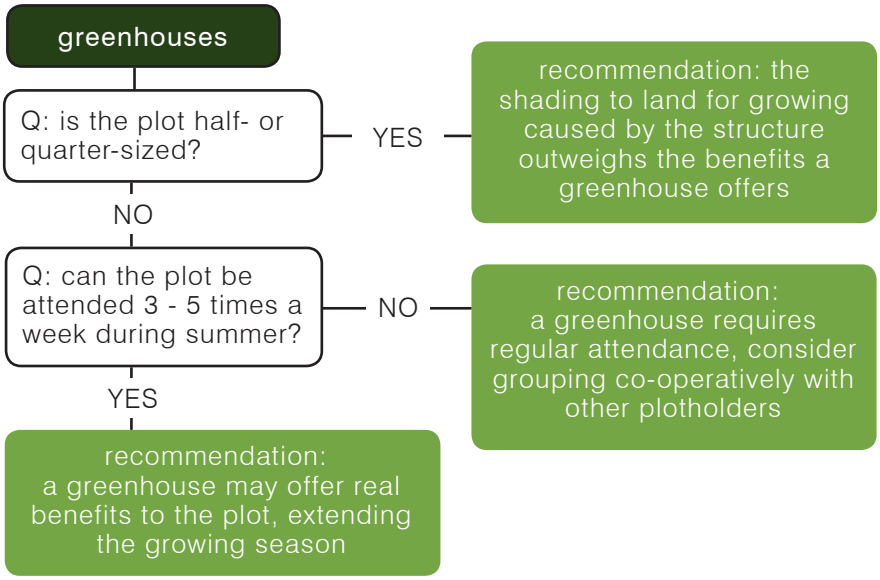
A sedum green roof on a hut provides thermal insulation and nectar for pollinators. Sedum is a low growing plant requiring little maintenance. The roof should be flat or gently sloping. Steeper slopes will require supports to stop soil slippage. The roof should be thoroughly waterproofed and supports checked to be adequate to take the additional weight. This is important because a standard hut will not be strong enough to support the weight. The roof is covered with the growing medium and small sedum plants and a retaining strip fitted at the edges.

A more sophisticated green roof can have a root resistant layer over the roof's waterproofing. This is covered by a drainage board designed to provide high tensile strength for both water retention capacity and substrate loading. A geotextile sheeting is placed to allow water to pass through to the drainage board below. The growing medium is placed on top and the sedum planted.

Green roof on a hut. Inverleith, Edinburgh

4.4 greenhouses

To gain all the benefits from a greenhouse a management regime needs to be established involving almost daily attendance in summer for watering and ventilation, and regular attendance in winter. Automatic watering and ventilation can reduce the need for daily attendance. Even the hardiest plant can wilt within 24 hours without water in a very hot environment. In winter temporary insulation can be fitted to the glazing to preserve heat. Heaters can be used but again these will need regular servicing and an energy source which requires considerable extra infrastructure or the installation of a micro-scale renewable energy source.



High Carntyne, Glasgow.

Greenhouses should be sited so they do not overshadow neighbouring plots, ideally in the same relative position on each plot and on the south edge near to the hut. A greenhouse can be made with different types of covering materials, such as glass or plastic. The walls can be wood for the first metre. A 2m x 3m size is adequate for most needs.

There are two basic types, stand alone or lean-to glasshouses. In allotments, the glasshouse is typically built directly onto the earth and the plants are grown in the native soil. Alternatively, they can be built on a solid base of concrete or slabs and the growing medium is provided in gro-bags, large pots etc, which are replaced annually with fresh growing medium. Glasshouses constructed directly on the native soil are cheaper, but can have problems of disease and pests in the soil. Traditionally 4mm horticultural glass is used but as this can be broken easily many polycarbonate or toughened glass products are available as good alternatives. The lean-to model need a wall or hut to supporting it.

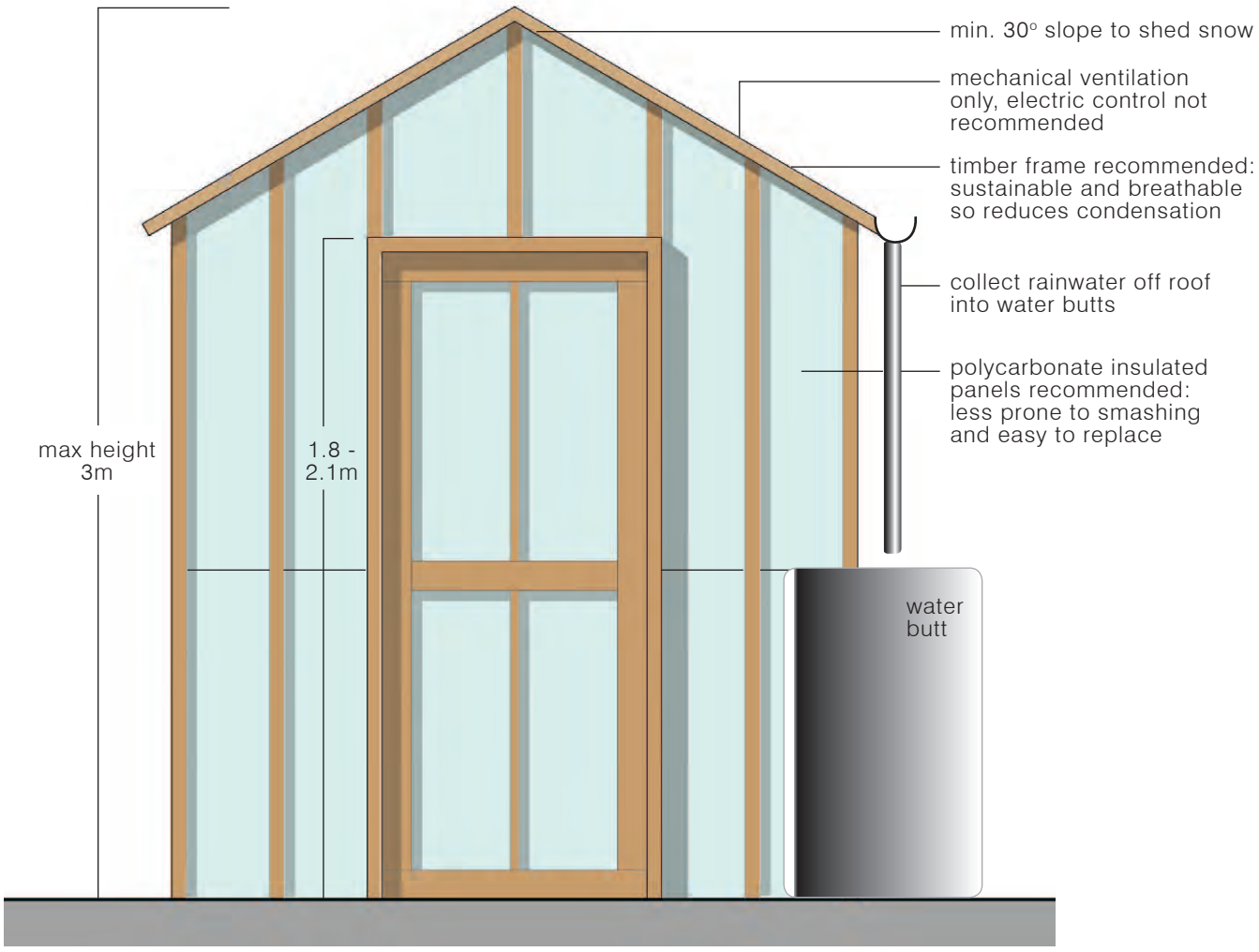
Alternative using recycled plastic bottles. Sanday primary school, Orkney.

Both types can have either a wooden or steel frame, which should be as strong as the design for a hut. Regardless of the glazing material used, it must be fastened securely to the frame. If a section of glazing breaks the whole structure can be destroyed in a wind.

How a greenhouse works:

The inside of a greenhouse heats up because incoming solar radiation from the sun is absorbed by plants, soil, and other things inside the building. Air warmed by the heat from interior surfaces is retained in the building by the roof and wall. In addition, the warmed structures and plants inside the greenhouse re-radiate some of their thermal energy, so some of this energy is also trapped inside the glasshouse. Thus, the glass used for a greenhouse works as a barrier to air flow, and its effect is to trap energy within the greenhouse.

The air that is warmed near the ground is prevented from rising and flowing away. Although heat loss due to thermal conduction through the glass and other building materials occurs, net temperature increases inside the greenhouse.



Typical greenhouse components and notes on design and layout considerations.

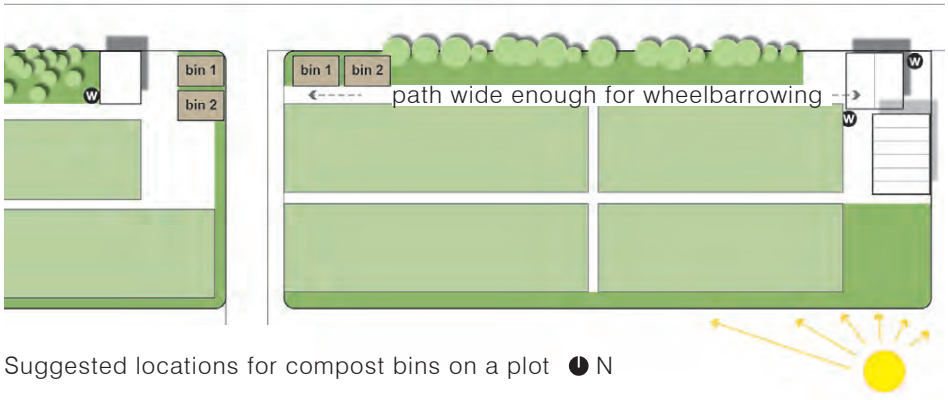
4.5 compost bins

Well rotted compost adds humus and nutrients to the plot soil. It is the classical way of recycling all the waste vegetation and non-invasive weeds. If managed properly on a standard size plot it will provide a significant amount of the compost requirement. If managed in conjunction with green manures (plant species grown on fallow beds to be turned into the soil), the plot will be sustainable in compost. At least two bins will be needed, used in rotation to ensure well rotted compost, as the temperature does not get high enough for a long period to allow the compost ingredients to rot quickly. To control the water content and prevent animals making their homes in the bin all compost bins should be covered.

The fundamental in composting is ensure **a 50/50 mix of both green and brown materials. Zero Waste Scotland has a "how to" guide.***

Ideally compost bins should be sited in a reasonably sunny spot on bare soil. A place should be chosen where it is easy to add ingredients to the bin and get the compost out.

If the plot is on a slope put the bins at the top of the slope. It is easier to carry small loads up and then barrow full loads of compost down. A sunny spot will aid compost temperature, but do not position too close to the hut and sitting area.



Suggested locations for compost bins on a plot

The reason the bin should be sited on soil is that it makes it very easy for beneficial microbes and insects to gain access to the rotting material. It also allows for better aeration and drainage, both important to successful composting. The soil under the bins should be well dug to assist drainage. The bins should be along-side each other so that the rotting compost can be turned from one bin to the next to assist mixing and aeration, leaving the last turned load to finish rotting down.

Each bin should be about 1sqm and at least 1m high. A bin full of tightly packed fresh waste, turned into each bin as the preceding bin gets full, will rot to 50% at least of its original volume. A smaller bin will not generate the heat required to rot the waste material. A larger (width and length) bin will not get the depth of fresh material to allow the process to work.

The two principal compost bin types: wooden slat construction and off-the-shelf plastic bins

* www.zerowastescotland.org.uk
www.wrap.org.uk/category/materials-and-products/compost

Types of compost bin

compost bin design	advantages	disadvantages
4x timber stakes with wrap-around netting	The quickest and simplest to build. Line with cardboard to prevent mess	Light-weight materials such as chicken wire and cardboard may be easily damaged
a square with removable timber slats	No maintenance, the height can be adjusted by adding or removing the wooden slats. Timbers provide stability and good air circulation	Require storage for spare timber slats, timber slats may begin to rot, although plastic alternatives are available
off-the-shelf plastic bin	No construction required	Essential to ensure that aeration is provided by turning and stirring
rotating plastic drum	No construction required. Produces compost very quickly compared with other options	More expensive

Wormeries

These are an excellent way of using up vegetable scraps from the kitchen. The worm casts produced can be used as a powerful fertilizer for the allotment.

Recycling

Materials for construction of compost heaps, wormeries, and other plot equipment can make good use of spare timber and other surplus construction materials. It is a good idea to stockpile such materials communally for plotholder's use, an example of which can be seen at Mansewood Allotments in Glasgow.

Stockpiled spare materials. Mansewood, Glasgow

4.6 raised beds

In recent years the popularity of deep bed growing for fruits and vegetables has increased but many people decide to start growing this way without an understanding of the benefits and drawbacks as well as a lack of understanding of how to construct a deep growing bed. Working a raised bed on a contaminated site could result in the creation of a contamination pathway as mentioned in Part 1.7, and the allotment worker could be held legally responsible. There is also a risk of consuming contaminated produce. Below is a table which looks at the advantages and disadvantages of raised bed growing:

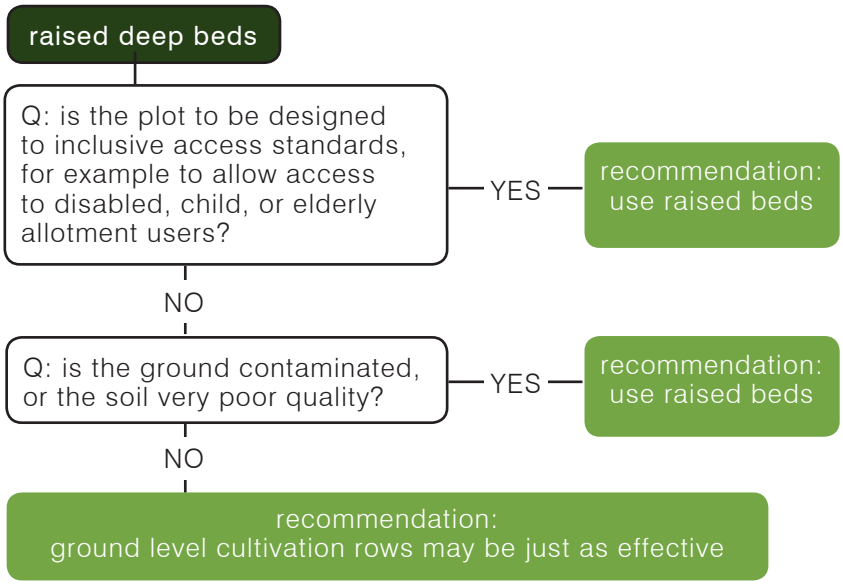
issue	advantages	disadvantages
food yield	yield per square metre is higher with deep bed systems	space taken up by paths means less growing space
construction	raised beds are easy to maintain once built, and should last for many years	building deep beds correctly is hard work and can be costly in terms of materials
weeds	due to closer plant spacings in deep beds, weeds are suppressed. Psychologically many people find that deep beds are easier to keep in order as beds can be selected and cleared one at a time rather than coping with a whole plot.	deep beds still require weeding, and this has to be done by hand which takes longer than hoeing a conventional row.
vegetable varieties	container growing cultivars are available	not all vegetables are ideal for deep beds and for some vegetables it may be necessary to select varieties that are suitable for closer spacing
growing season	deep beds can be ideal for purpose-made large cloches and fleece supports, extending the growing season	structures and materials for such infrastructure can be costly and will require added maintenance inputs
soil quality	raised beds generally enable you to create high quality areas of deep topsoil if your soil is poor, unworkable, or contaminated	raised beds are a lot of work and effort if you have good quality soil to start with

Raised beds offer a great way to grow on heavy clay soil. They are not ideal for crops like potatoes, Jerusalem artichokes and sweetcorn nor do they offer any significant advantage for growing broad or runner beans. They are brilliant for root crops like carrots and parsnips because they offer deep fine soil. They also work well for a salad bed, turnips and beetroot.

raised beds...
became popular in the 1970s when the technique was to dig over a bed to a deep, fine tilth which was mounded between paths. The rounded shape increased the surface area to grow on and this, coupled with higher density planting, increased yield. Unfortunately heavy rain would wash the bed onto the paths and so converts to deep bed growing soon added walled sides to their deep bed.

Raised beds for school use. Ravenscraig, Kirkcaldy Fife

Julian, Glasgow



How to construct raised deep beds

The main aim of deep beds is that they are never trodden on and the soil compacted so it is important that the centre of the bed can be reached from either side. The best width will be around 1.2m. If the bed is too long, then getting to the other side will involve a long walk and the temptation is to step over the bed, so about 6m long is considered the maximum length. The height should be a minimum of 60cm. The main path will need to be between 60cm and 75cm wide to allow easy access with a wheelbarrow with the secondary paths around 45cm wide to allow walking and kneeling. Plan out where the beds are going and use string to mark out.

Materials and construction

Having marked out and checked the layout, a cutting list for the wood for the sides is produced. One good source of timber can be second-hand scaffolding planks. Do not use wood that is too thin, because it will rot and be too flimsy to take the side load (225 x 38mm boards recommended). Fix planks to stout internal corner and secondary posts (e.g. 75 x 75mm). Try to make the length of the side boards abut at the secondary posts to ensure strength. Fasten the boards to the posts with non-rusting screws. Timber touching the ground is prone to rot so should be painted with a preservative. The corner and secondary posts can be sunk a few inches into the ground to improve stability. The posts should finish above the side boards to stop hosepipes from dragging across the plants.

Soil preparation

It is important to double dig the bed to break the soil up, remove perennial weed roots, and incorporate a lot of organic matter like compost or manure before putting the wooden frame into position. Half fill with top soil and allow to settle for a few days, before bringing the soil level up to about 25mm below the top of the boards. The raised bed is now ready to plant.

Paths between the raised beds

Once the beds are in place complete the paths between them. Level, route out, and compact if loose. Use a porous weed-suppressant fabric material cut to size and lay over the paths and then cover with bark or wood chippings. Concrete slabs can be used, check the sizing accurately when you position the beds. Other materials which can be used are gravel and paving bricks (see Part 3.4, paths).

4.7 bee-keeping

The benefits of well-kept bees on an allotment extend to all the plot holders on site. Wild honeybees and other pollinators are currently declining in numbers, due to many factors. Where bees are kept the pollination of crops improves, particularly of fruit, where higher yields of better-formed fruit should result. Honeybees prefer to work one type of flower at a time on a foraging trip and may visit between 100 and 1000 flowers on a single trip. The bees themselves benefit from the diversity of plants and the extended season of availability that allotments in urban environments offer. Limited numbers of well managed hives should be advantageous from every viewpoint.

The key to success is that the hives should be well-managed so as to avoid affecting the pleasure and safety of other plot holders. Bees working flowers do not normally sting but nevertheless other plot holders may occasionally be stung. The bees are likely to be held responsible for all stings and bites received on the site! For most people a bee-sting is a sharp, short-lived pain. One person in a thousand may have a severe, generalized reaction and suffer anaphylactic shock.

The majority of people are fascinated by the life of a hive and many will be actively interested in watching its progress if kept informed by the beekeeper. To this end of making beekeeping pleasurable for all, there needs to be management policy in place to ensure good beekeeping practices.

Honey bees are valuable as pollinators on allotments.

Management Policy for bees on plots*

There should be no automatic right to keep bees on any allotment site or plot. Some sites will not be suitable due to the proximity of footpaths or houses. Other sites may be too insecure, leaving hives open to vandalism.

Where conditions are suitable there should still be a limitation on the number of hives. Two hives would be a reasonable number on one plot and the total number would need to be governed by the size of the site. Six hives should be considered the maximum even on the largest sites. Initially, it would be best to allow only a single beekeeper on any one site in order to gauge the reactions of fellow plot holders over a period of time.

Only beekeepers with reasonable experience should be given permission to keep bees on an allotment. An applicant should hold a "Basic Beemaster Certificate." This is a qualification awarded by the Scottish Beekeepers Association (SBA) to beekeepers who have passed a foundation examination on the theory and practice of beekeeping. An allotment is not a suitable place for a new beekeeper to start with a first hive and it would be wise for them to be members of their local association where they would have access to an experienced mentor.

Beekeepers MUST be members of the Scottish Beekeepers Association as membership provides £2,000,000 Public Liability Insurance. This cover extends to allotments provided that hives are properly sited away from public footpaths and houses. (Note that membership of the British Beekeepers Association, which is English-based, does not give insurance cover to Scottish members).

All plot holders adjacent to the proposed apiary site must be in agreement. Dissenters should not be over-ruled by a majority vote as the wishes and needs of gardeners should be paramount. On smaller sites it would probably be necessary for all the plot holders to agree. There would also need to be some protection for an established beekeeper. An adjacent plot that becomes vacant should not be let to someone opposed to bees.

Manipulations of hives should not be carried out when other plot holders are working nearby. Time must also be allowed for bees to settle after manipulations.

There must be provisions in place to deal with any situations arising during a beekeeper's absence. Reliable contact numbers should be available, somewhere on the site, in case of problems. Cover must be arranged if the beekeeper is away.

Plot holders who are experiencing problems from bees should bring these to the attention of the Landlord or Allotments Officer, who will be able to call upon advice from an SBA member. Very aggressive bees should never be permitted on a plot.

City of Edinburgh Council's Allotment Strategy: Cultivating Communities
www.scribd.com/doc/82402930/Allotment-Strategy, Appendix 5, p.45.

4.8 livestock

There is no law forbidding the keeping of animals on allotments. In the past pigs or goats or other animals were kept, as well as pigeons. Permission from the landlord is required, and local site rules may govern their keeping (leases can refer to “fowl”). Hens are notorious for attracting rats so conditions must be clean and safe so as not to cause a nuisance. Current allotment sizes of approx. 250 sq. m. means that only hens are acceptable on an allotment.

Daily attendance is necessary to let the hens out of their hen house in the morning, feed and water them, and lock them up at night. Hens must be maintained in good health. The following problems are to be strenuously avoided: mucky pens, hens escaping and scratching everywhere, and vermin infestations.

Hens can be part of the production cycle of the plot, converting waste or surplus produce into feathers, meat, eggs and fertilizer. Hens, because of their companionable ways and friendly clucking can become firm favourites. Therefore go mainly for egg production, selecting an appropriate breed at the outset and do not get too many. Some breeds are developed for meat, some for laying whilst others are more all-round in their performance.

There is no automatic right to keep cockerels especially if anyone objects and they must be kept properly. Cockerels are only necessary for breeding from the hens, which may be desirable in conserving a rare breed. Permission is needed for cockerels or, alternatively, fertile eggs for incubation can be bought.

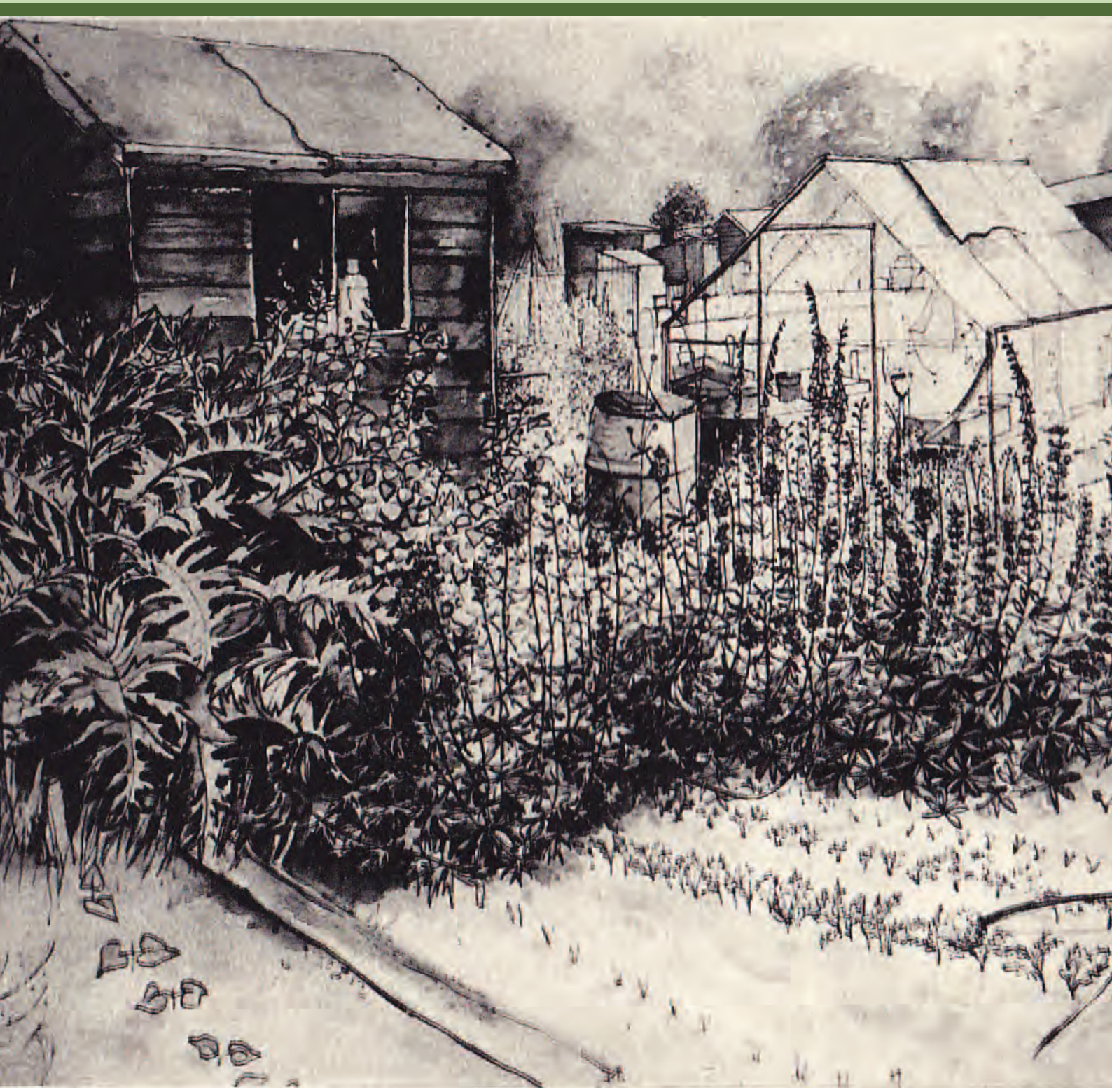
The runs and henhouses fencing should be made of strong wire netting at least 1.8m high. Use small mesh netting (10mm or smaller) so that the hens cannot poke their heads out and be bitten. Their main predators are dogs, foxes and badgers. The run should be spacious and sheltered from the wind. If the wire fencing is buried 15 cm or more, and the bottom bent out and buried at right angles for at least 30 cm. foxes and rodents may be deterred from tunnelling in. Some people use a battery-powered electric mesh fence but note that foxes will hunt both day and night. The wooden hen coop where they will roost from sunset needs to be strong and securely closed at night, and should accommodate nesting boxes for egg-laying. One side or more of the run can be camouflaged with climbing plants on the netting. Part of the run can be roofed so the hens are fed under shelter.

Typically, the house is about 1 sq.m. and fitted with nest boxes and solid perches (not too narrow). Small arks are available which can be moved about, but larger houses need a bigger run. There are also good ready-built hen coops and runs from arks to eglu cubes which can be bought from from local suppliers or online.

Hens as part of the productive garden: this example is from a flat pack kit, featuring next boxes off the hen house, which is raised off the ground. An attached run provides outside space when not free-ranging.

www.backyardchickens.com

community areas



© Pamela Grace: Flowers on the Allotment. Solar-plate etching

5. community areas

5.1 introduction

Well-managed communal areas can enhance sustainability and add to plotholders' enjoyment of their site. They can provide opportunities to socialise with other plotholders creating an inclusive community. There can be areas for specific user groups, specific purposes and additional shared facilities. However, all of them require a robust management strategy for their successful upkeep.

5.2 communal plots

First-time gardeners may like to gain experience and confidence by working on an area in a group before taking on their own allotment. On-going responsibility for this facility needs to be established if it is to flourish and fulfil its objectives with one or more experienced plotholders providing direction and support. On the Bridgend Farm Allotments, Edinburgh, a demonstration bed has been set aside and is cultivated by members of the Royal Caledonian Horticultural Society.

Beds for individual school groups can be provided as required. The general size and height of raised beds (if used) should reflect the age and number of users. Arrangements need to be made for the management of school plots during school holidays.

Plots for young children can be really small, say 1sq.m. Children should be able to reach across the plot without standing on it. Low raised beds are ideal as they make it less likely that children will walk over them. Recycled sandpits can be adapted by adding drainage holes.

The Royal Caledonian Horticultural Society have a showcase plot, where new allotmenteers can learn how to tend a plot. Bridgend Farm, Edinburgh

Allotments for all:
http://ari.farmgarden.org.uk/documents/Other_ARI_factsheets/allotmentsforall2010.pdf

5.3 therapeutic and adaptive gardening

Trellis is the Scottish Horticultural Charity specialising in therapeutic gardening. Their briefing on adaptive gardening covers a wide range of how to make gardening accessible to everyone who wants to. It is recommended as essential reading before embarking on the installation on any specific facilities. For example, rectangular raised beds are not the only or best option suitable for wheelchair users. Some gardeners find difficulty in harvesting tall plants grown in raised beds and would prefer to use adapted tools in conventional ground-level beds. The key to success is to be flexible, keeping options open. It is a waste of money to provide specialised facilities unless users are forthcoming and therefore it is better to await and assess future demand.

In general terms, this area should be sited near the entrance to the site, be surrounded by non-slip paths wide enough for wheelchair users and accessible to toilet facilities (if any). Raised beds built from timber, in situ, work out cheaper than commercially made ones. However, all beds need filling with some kind of growing medium which can be expensive.

5.4 children's areas

Ideally, children will accompany adults on their plots. However, children's play areas can be incorporated in a site. They can have outdoor and indoor areas. Westhorn Allotments, Glasgow have a "playbusters plot" with a fun hut. There can be seating and tables. The Cottage Project in Kirkcaldy has an adult-sized "story-telling seat" surrounded by child-height log stools. General layout of the site will dictate the location of this area, but proximity to toilets and hand-washing facilities, if available, is desirable.

A plot designated for local children's groups. Westthorn, Glasgow

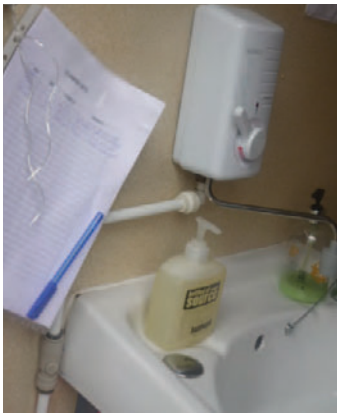
Therapeutic and adaptive gardening:
www.trellisscotland.org.uk/files/briefings/Adaptive%20gardening%20briefing.pdf

5.5 toilets

Toilet facilities vary widely from site to site and what can be provided will depend on local circumstances. The choices will be restricted by the availability or otherwise of a mains water supply and drains. In all cases, a suitable accessible building will be required.

If the site has no mains water or isn't in close proximity to a sewer, the choice of toilet facilities will be a chemical toilet(s) or composting toilet. If there is a mains water supply but no possibility of connection to the sewer, consideration should be given to a flushing toilet draining to a septic tank, providing a suitable outfall can be managed. The septic tank will need periodic emptying. The Scottish Environment Protection Agency must be consulted in all cases where an outfall is required.

Where there is a water supply and mains drain, a flushing toilet is an option.



Hand basin installed in a re-furbished sea shipping container.

The choices are summarised below together with some of their advantages and disadvantages. In all cases, their success depends on choosing models appropriate to the site and making workable arrangements for both regular maintenance and long term sustainability. Where an allotment site serves the immediate neighbouring community, it may not be necessary to provide any toilet facilities. The Allotments Regeneration Initiative has a detailed helpful fact sheet on affordable toilets. ARI factsheets are now located on the SAGS website.

Composting toilet. South Western, Glasgow

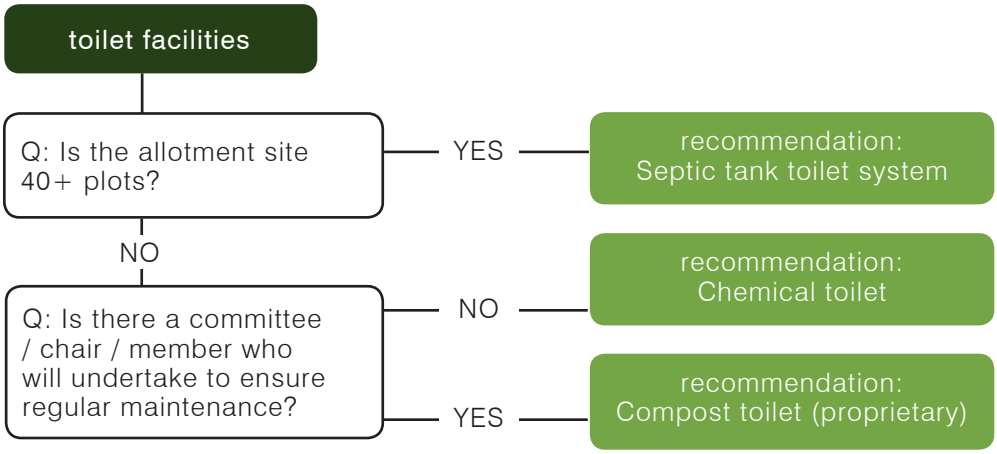
Traditional flushing toilet

Requires mains water supply and drainage which can be to main sewer or by septic tank. Unless there is some frost protection, the system will need to be closed down and drained off in the winter to avoid burst pipes. Second-hand steel containers already equipped with toilet facilities can be bought and plumbed in to a mains drain. Water heater for wash hand basin and lighting can be provided by solar panels. An example is Glamis Road Allotments, Kirkcaldy, Fife.

Compost toilets

There are many examples of these. It is important to make a realistic estimate of their likely use and purchase one or more units of the appropriate capacity. The site must delegate someone to arrange responsibility for regular maintenance and cleaning. Experience shows that a rota system does not always work. In addition, arrangements have to be made to remove and dispose of "compost" as necessary. Site committees sometimes have difficulty in getting plotholders to help with this. Some storage facilities are needed for bulking material (usually sawdust or hemp). Examples can be seen at Kirklee Allotments, Glasgow, and Midmar, Inverleith and Saughton Allotments, Edinburgh. In the absence of handwashing facilties, alcohol handwipes can be provided.

Toilets for allotments:
http://www.sags.org.uk/docs/ARIdocuments/Toilets/affordabletoilets2010.pdf



Chemical toilets

A complete unit can be hired and a fee paid for its regular servicing (an example may be seen at Inverness Allotments), or a purchased portable unit as used by caravanners can be installed in a suitably adapted hut. Some storage facilities will be needed for necessary chemicals and special toilet paper. An example of the portable unit can be seen in use at Arbroath Allotments.

Composting toilets general guidance:

1. Composting toilets have the advantage that they require no connection to infrastructure.
2. Water for hand washing may be harvested off the roof.
3. Urine diversion recommended, to reduce smell and keep the stored matter drier and easier to contain.
4. Double barrel system recommended to allow material to be left for 12 months before being removed.
5. Compost material is not recommended to be used directly on food growing plots.
6. Composting toilets require site specific design and detailing. Design will alter depending on the water table level, gradients, number of anticipated users, and the availability of infrastructure.

5.6 community huts

The need for a community hut will vary from site to site and its size will depend on its proposed use. For example, the shed may be used for storage of bulky items of equipment such as wheelbarrows. At certain times of the year it may be used for bulk deliveries of seeds, compost and seed potatoes. The community hut may be used for committee meetings or social functions, in which case, windows providing daylight, and/or solar powered lighting will be needed together with sufficient room for tables and chairs. Responsibility for regular maintenance of communal facilities must be arranged.


Lady Road, Edinburgh

On sites which do not permit individual plot sheds, the community hut may also be used as storage for individual plotholders' tools and equipment in which case, individual secure lockers might be provided as at Dumbryden School Allotments, Edinburgh. At Dean Gallery Allotments, Edinburgh, plotholders store their tools in an old brick built building.


Dean Gallery, Edinburgh

Wooden community buildings can be chosen to blend in with local surroundings and can be visually pleasing. Rainwater can be harvested from the roof. Attractive examples can be seen at Buckhaven, Fife, Yetholm in the Scottish Borders and Lady Road Allotments, Edinburgh. The principal disadvantage of wooden community huts is that they are not fireproof, vandal or vermin proof. They will require a regular maintenance regime including treating with timber preservative.


Yetholm, Borders

Inverleith Allotments use a converted shipping container to which windows and solar panels have been added. The solar panels provide enough power for lighting but not power tools (see Part 3.8 electricity on plots).


Converted shipping container. Inverleith, Edinburgh

Case Study

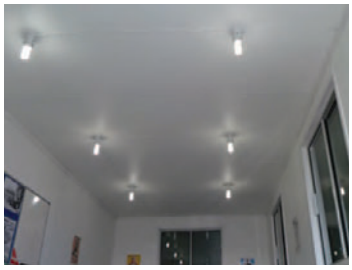
Converting a shipping container: Inverleith Allotments, Edinburgh
by plotholder, Stuart McKenzie

I applied for a local grant to convert a shipping container into a meeting/education facility. The container was taken away and three windows added together with an insulated lining. Once back I added solar lighting inside with a kit.
www.lake-renewable-energy.com

This supplier does have another kit which has strip lights but they are not quite as bright. They are good in confined spaces as they lie flush with the ceiling rather than having bulbs screwing into fitments. You also need a battery to hold the charge and power the lights.

The kit has everything you need but I found we needed more wire (remember it's 12v – Tower 2 core flat flex – white – 2192Y), more clips to fasten the wire to the ceiling and some self adhesive plastic trunking which sticks to the wall you put the wire runs in and snap a plastic top on to make it all neat and tidy.

Work out where you want the lights and how you want to run them – the kit comes with two light switches so we have one circuit with 4 bulbs over where a meeting table would be – and another set of two on the other circuit to light the rest of the space. We have the control box right under the light switches. Quite simple wiring – the power comes off the panel on the roof through the control box to the battery. Then a separate circuit from battery to light switches to bulbs.



Originally we fixed the solar panel to a railway sleeper flat on the container roof which worked fine but it spent a lot of the next winter covered in ice. We then made a couple of angle iron triangular mounts to fasten it to the roof and boxed it in to stop the wind ripping it off.

Finally, you need a box to put the battery in, measure your battery and get down to your local wine merchant, where they have beautiful boxes for a half dozen bottles of port that fit perfectly. Alternately you may have a cupboard to hide it in.

The system has worked really well for 2 years now. Occasionally someone leaves the lights on and you immediately think about the 'bill' but then realize it's all for free and the battery is recharged in a couple of days.

Finally we put a security light on the roof which illuminates the outside at night. This is a solar panel and a wire to the light which comes on when someone approaches. It is very easy to fit.

If the community hut is going to be used to store bulk deliveries of heavy items, it should be as near as possible to the site entrance to minimise the distance these items have to be moved when delivered to the allotments. Some allotment sites have a "site shop" trading seeds and other horticultural supplies. Depending on the scale of the enterprise, a separate secure and vermin-proof trading hut may be required.

Case Study

Midmar Allotments, Edinburgh

In 2004, Brian Sandell, Chair of Midmar allotments initiated, managed and completed the following project.

In 2006 a Scandinavian Svenskabin Solid Log Building was erected on the communal plot in Midmar Allotments, Edinburgh for use as a centre at all times of the year and for all weathers.

The cabin is 5m by 4m internally with a 1m deep veranda along one side. The design was altered to give double glazed windows all round, a double door and windows in the door. The wood is 1 ½ inch Scandinavian pine, tongue and grooved. The floor is insulated, and there is insulation in the roof under a layer of felting, which is covered with tiles. The site preparation and erection was done by a local firm.

The plotholders treated the wood with two coats of preservative, which will last for a minimum of 5 years. They installed solar lighting for the cabin with a roof solar panel that charges a Deep Cycle Battery that provides lighting to six 40 watt fluorescent strip lights for 7 to 8 hours. Also on the building there is a flood security light, provided by its own solar panel. This serves as a light for the BBQ and also as an anti-intruder device. The composting toilet also has a 40 watt fluorescent strip light powered by its own south facing solar panel. The door is illuminated by a PIR self-activated light, again with its own solar panel. A solar panel to provide hot water for the cabin blew off the roof in the very strong winds of the new year 2012 and hot water is now provided by Calor gas.

The inside of the cabin has seats round one wall, table, chairs, gas stove and sink. It accommodates 15 people easily and up to 30 at a pinch. Interestingly since the insurance is too high, the cabin is not insured and kept open at all times. There has been little vandalism and only minor misuse.

5.7 other communal areas

A communal area with seating is particularly appreciated by many plotholders and adds to the creation of a strong allotment community. It should be sited in a central area so that it is accessible to all. Families who are spending the day on their plot can have a picnic there. Musselburgh Allotments has a permanent brick-built barbecue area for communal or individual use at any time. Yetholm Allotments have an attractive grassed area and Glamis Road Allotments, Buckhaven have a seating area available to neighbouring residents as well as plotholders. Some sites organise workshops for newcomers which can either be held inside, if wet, or in the communal area. An open air shelter is very useful in case of a shower (see also Part 2.3).

Communal covered work space. Bridgend Farm, Edinburgh

Communal drying facilities behind water tanks. Yetholm, Borders

Shared outdoor spaces. Yetholm, Borders

5.8 communal polytunnels / Keder tunnels

A polytunnel can greatly extend the growing season on an allotment particularly in the north of Scotland. It can even be used to grow crops right through the winter. The size of polytunnel will depend on the number of plotholders wanting to use it. Objections are sometimes raised by surrounding residents about the appearance of polytunnels so consideration should be given to minimise their visual impact.

Polytunnels are very vulnerable to strong winds and need to be carefully sited in a sheltered spot on the site. The frame must be securely anchored and the polythene stretched tightly over the frame.

A much more robust structure such as a Keder tunnel* will be needed in windy and/or exposed areas than in more sheltered spots. Keder tunnels are stronger and more durable than polytunnels and use bubble plastic over a stronger framework than polytunnels. They can withstand wind and snow. It should be sited to get maximum sun light.

The erection of a polytunnel is usually within the capabilities of a team of plotholders.

Users of the communal polytunnel / greenhouse / Keder tunnel will need to decide on its management. For example, during the summer the door will need to be kept open during the day time and/or sides opened and in hot weather frequent watering will be needed. In winter, doors and vents will need to be opened and shut according to the weather and this may vary from day to day. Agreement should be reached on any use of pesticides and insecticides within the shared area.

Communal polytunnel. Hamiltonhill, Glasgow

Polytunnel. Royal Botanic Garden, Edinburgh

Keder tunnel. Redhall Walled Garden, Edinburgh

*Keder tunnels www.kedergreenhouse.co.uk

Case Study

Erecting a polytunnel: Maggie and Ewan Laws, Aberdeenshire

When selecting a polytunnel consider the prevailing wind and weather conditions. A windy site needs more support that in a sheltered spot. We bought our polytunnel over the internet from a good site which had good paper instructions and a series of how-to-do-it videos on YouTube; we read and watched these and spent a lot of time preparing for the construction.

The exposed nature of the site led to two decisions: to go for larger diameter tubing for the frame (36mm rather than 24mm), and to bolt the anchor plates to solid foundations rather than just hammering them in. We also considered the orientation of the tunnel and the type of covering. We were keen to maximise the sun's energy so we oriented the tunnel east-west and went for a clear plastic cover. We were erecting the polytunnel at the same time as we were building a woodshed, so had the benefit of a mini-digger and concrete mixer.

A four-sided trench in the shape of the polytunnel footprint was dug to a depth of about 18 inches and. 150mm-wide building blocks (300mm high x 500mm long) were concreted in place. 70mm x 40mm treated timber was screwed along the top of the blocks once the concrete had dried. This was the stage where particular care was taken to achieve an accurate footprint. The anchor plates were next, bolted through the timber and into the building blocks with "thunderbolts" which screw themselves into concrete.

The hoops were constructed and inserted into the anchor plates. The diagonal braces and horizontal reinforcement bars on the end hoops were added. Wooden door frames were added and then the final task: affixing the polythene sheet.

Wanting to avoid a short, spectacular but ultimately expensive kite-flying session, we waited for a calm afternoon and had four people available. The plastic went over the hoops, was clipped in to the aluminium edging on one side, adjusted to be quite taut, and then clipped in to the aluminium edging on the opposite side. The edging, which was secured to the base of each hoop with "U" clips was then trodden down the last couple of centimetres and then the "U" clips tightened to hold it in place with nice, taut polythene now stretched neatly over the hoops. The final steps were to fold the polythene round the ends, fasten it to the wooden door frames and then cut away the excess bits.

We spent the first winter worrying about snow load and winds but the tunnel has now survived for three seasons. Our weather station says that highest wind-speed we've had since was just over 101 kmh-1 on 2nd June 2011.

Tools included: mini digger, tape measure, concrete mixer, wheelbarrow, spade, spirit level, trowels, hammer, spanner, cold chisel (for cutting building blocks), saw for the timber edging, battery-powered screw driver / drill, socket wrench, step ladder for putting up the hoops, and a sharp knife.

5.9 security containers

Costly communal equipment such as rotovators, mowers, strimmers and shredders should be kept in a secure metal container such as a shipping container, which can easily be bought secondhand. These come in a range of sizes and can be fitted with additional locks which make them very secure.

The appearance of a metal shipping container can be greatly improved by painting it an appropriate colour to blend in with its surroundings. For example, at Musselburgh Allotments, the shipping container is painted matt dark green and situated close to an evergreen hedge making it inconspicuous. It should be noted that basic shipping containers do not have any insulation making them hot in summer and freezing in winter which may make them unsuitable for storing certain items.

Shipping container site hut. Musselburgh, Edinburgh,

Security container hut. Germiston, Glasgow

5.10 noticeboards

A weatherproof notice board(s) should be sited in a conspicuous position near the site entrance(s). The best ones are free-standing, mounted on legs with glass/Perspex fronted door. A metal back board means that magnets can be used to secure notices, doing away with the need for drawing pins.

Display board inside the community hut. Yetholm, Borders

5.11 bonfires

Most plant material should end up as compost or leaf mould. Exceptions are woody prunings, some pernicious weeds and diseased matter which should be burned. Some sites elect a “firemaster” and periodically have a communal bonfire (see also information in Part 2.3). Local site rules apply but if there are none the following guidance applies.

- All material to be burned should be dry or it will cause the fire to smoke
- The bonfire heap should be examined before lighting to ensure that no animals are hibernating in it
- A fire burns best when there is a light wind
- Attention should be paid to wind direction to minimise any nuisance to neighbouring plotholders and nearby houses
- No fire should be left unattended.

Magnetic noticeboard. Oakwell, Linlithgow

5.12 communal compost / leaf mould / recycling

On some sites, an area can be set aside for communal composting where plotholders deliver their waste plant material for composting. The compost area should be carefully sited to ensure that the area does not appear unattractive but as conveniently placed as possible for ease of use for the maximum number of plotholders. It needs careful management by a team of plotholders to ensure that it is well-organised to produce good compost.

A number of different bays or bins can be made from pallets or other appropriate recycled material. Different bays are rotated with different materials, such as soft plant material and non-invasive weeds, grass cuttings, soft woody material and hedge trimmings. The bins will need to be carefully labelled to ensure that plotholders understand the processes and leave their waste in the correct bin. When the bins are full, the compost is left to mature, and finally, it is made available to plotholders.

An area of hard-standing where woody prunings, such as raspberry canes, can be shredded or chipped is useful, particularly on sites where bonfires are not permitted. The resultant material can be used on site paths.

A communal shredder.
Yetholm, Borders

Stuart McKenzie

Communal composting area.
Inverleith, Edinburgh

Case Study

Community composting, New Victoria Gardens, Glasgow

New Victoria Gardens Site has developed a successful community composting scheme which has been in operation for a year. It is proving to be a successful way of community composting, involving both local plot-holders and a local shop to mutual benefit.

There are 21 compost bays for community use made from pallets, average size 1.3m W by 1.25m D and 0.9m H. Different bays are rotated with hedge prunings, grass cuttings etc. which plot holders leave in bags near the bays. The bays are labelled according to the materials which can be left in them, viz. hedge trimming, soft woody material, grass cuttings, soft plant material, weeds, hard wood material and shrubs. Users are asked to chop material into a manageable size.

In addition, vegetable waste from a local shop is collected when it is needed and mixed with the plotholders' compostable refuse, cardboard and shredded white paper.

Full bins are clearly marked DO NOT DISTURB and left to mature. The resulting compost is put into builders' bags for plot-holders to use. Four members of the association are responsible for organising the compost area. They sort through the bags and remove any pernicious weeds such as mare's tail, ground elder and bindweed.

Any community composting needs careful oversight by the committee to ensure it fulfils its purpose and is always tidy.

Leaf mould

An additional area can be set aside for leaves which will rot down into leaf mould which is an excellent soil conditioner. The fresh leaves should be stored separately from compost in wire mesh containers, which can be made from chicken wire or they can be stacked in a mound. Fresh leaves are very bulky so the containers should be sufficiently large, at least 2 sq.m. Some sites accept leaves collected from local parks. The heap will rot down within a year or two and the leaf mould can be used by plotholders during the summer so that an area is clear by the time of the next leaf fall.

Leaf mould made in a chicken wire cage

Recycling area

An area can be marked out where plotholders can leave materials which may be of use to other members of the site, for example sound wood. As with the compost area, above, this facility needs careful management to avoid it becoming an eyesore and a tip.

Sharing recycled materials. Mansewood, Glasgow

Case Study

Recycling at Mansewood, Glasgow: by plotholder Jan MacDonald

Recycling can provide useful material for plot-holders to use, e.g. rubble and stones can be used for making hard core for drains and bases for sheds. Pallets can be made into compost bins, paving stones into paths. Plot holders can make repairs with bits of wood that have been painted, varnished, or treated with wood preservative. Recycled doors and windows can be used to make glass houses and cold frames. Plastic bins make rain water butts. Plastic pots and seed trays are always in demand.

These materials are useful and storing them enables plot-holders to use their ingenuity, save money and show how re-cycled material can be put to good use. However a recycling area needs very careful management to avoid it becoming a tip. At Mansewood these materials are divided into piles in an area that is concealed from view. Anything that is not used is periodically emptied into a skip. With a capable member of the committee responsible for upkeep, such areas can be of great benefit but if not managed well they can become a blight.

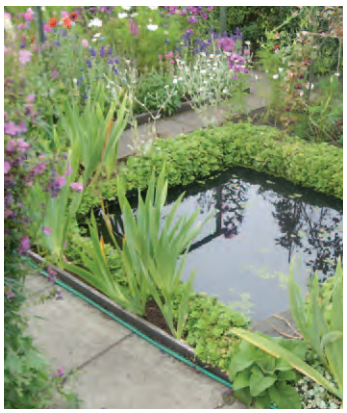
5.13 communal planting and habitats

Having a pond or ponds on site is an excellent way to enhance biodiversity in allotments. Since amphibians are voracious predators on pests such as slugs, ponds which allow amphibian populations to develop are good for gardeners. New Victoria Gardens, Glasgow has 10 ponds on individual plots. Ponds are also good for a variety of other animals. Froglife* have a number of useful Advice Sheets on creating wetland habitats for wildlife.

Digging a communal pond. Nairn allotments, Nairnshire.

Care in choosing pond and bog plants is essential to prevent problems at a later stage! Native plants are preferable to encourage wildlife. Many of these such as yellow flag iris, bog bean, marsh marigold and purple loosestrife are very attractive. Certain pond plants commonly used in garden ponds are introductions to the UK. These plants do not make good residents in a pond because they are fast growing and can swamp other aquatic and marsh plants that are more desirable for wildlife. Additionally, if non-native invasive species escape into the wild, they cause far-reaching problems which are very difficult to eradicate. More information on suitable plants and on plants to avoid can be found in the Pond Alert! series of leaflets produced by Plantlife Scotland.*

Blanket weed can be a problem initially, for which patience and a rake are required. The worst can be raked out. As the pond becomes established and the water snail population increases the algae usually disappear. Ideally avoid runoff from fertilised soil. Top up the pond with rainwater to prevent adding extra chemicals such as chlorine to the pond. A submerged bale of barley straw will also help control blanket weed. Even a small amount of straw inside a pair of old tights and weighed down with a stone so that it sinks can solve the problem.



Ponds for wildlife don't necessarily need to be big. Smaller ones can still benefit amphibians as places to cool off in summer, plus many other animals can use them as a pit-stop. An allotment site could have one bigger pond in an area unsuitable for plots, or individual plots could have their own ponds. These can be dug into the ground or, with safety in mind, they can sit as a raised pond. Recycled household items such as an old bath, butler sink, half a barrel or an old plastic paddling pool can make a small pond. Animals will need to get in and out of the pond (particularly frogs) so ensure at all times that there are objects built up around the sides, inside and out, such as pebbles, log-piles and planters.

Advice on pond construction can be found on the Froglife website.*

*Froglife advice sheets: www.froglife.org
*Plantlife Scotland: www.plantlife.org.uk/scotland

5.14 hedges and windbreaks

(Appendix 1 gives suggested suitable hedging plants to encourage biodiversity)

A thick hedge around an allotment site is valuable as it can deter unwelcome intruders while providing food for insects, birds, mammals and humans. It is an effective windbreak, a shelter belt and a superb wildlife habitat. A hedge can also act as a green corridor which allows wildlife to move from place to place in relative safety (see also Part 3.6).

A good hedge should be planted in a double row 15cms wide with 25cms between plants. Hawthorn is a valuable hedging plant as it is known to attract over 200 species of insect which in turn are important food sources for birds, bats and mammals. A mix of hawthorn and blackthorn as the main hedging plants is ideal and they can be interspersed with other species to give a variety of flowers and berries over an extended period of time. It takes about four years for a hedge to grow to become an effective hedge and it should be pruned hard in the first two years to ensure that there is a good thick growth at the base. After that if different parts of the hedge are trimmed every other year there will, each year, be flowers and berries. Faster growing plants like roses and brambles can be used to fill gaps. Small trees such as crab apple, rowan, bird cherry or hazel would increase the diversity of the plant species and provide additional food for the wildlife.

If a particularly strong barrier is required, the hedge can be layered - that is the branches are cut almost through and interwoven. Planting of the thornier species can help make an impenetrable hedge. A thick hedge around an allotment site is valuable as it can deter unwelcome intruders while providing food for insects, birds, mammals and humans. It is an effective windbreak, a shelter belt, and a superb wildlife habitat. A hedge can also act as a green corridor which allows wildlife to move from place to place in relative safety

When choosing trees for windbreaks, attention should be paid to size, roots, water uptake and shading. See Part 1.5 for detail on windbreaks. Advice should be sought for specific sites. A list of deciduous trees for windbreaks/shelter belts is in Appendix 2 to be read in conjunction with advice on hedging plants in Appendix 1.

5.15 coppicing

Coppicing on the allotment site or individual plot is a great way to become self-sufficient in bean poles and pea sticks. Hazel tolerates frost, shade and exposure thriving in a wide range of soils so is suitable for a coppice to provide bean poles and pea sticks in an odd corner of an allotment site.

Ideal spacing is 1x1m between plants and so 11 plants can be grown in the area of a garden shed (8ft by 10ft).

Plant bare rooted trees from the beginning of November to the end of March using the notch planting method. A handful of compost at the base of the tree does no harm.

Average rotation is 5 years with 10 beanpoles per plant rising to 30+ in old stools. Pea sticks have an average 3 year rotation. Three years after planting the dominant main shoot and any strong shoots can be cut for pea sticks to encourage addition sucker shoots. Once the stool is established it should be cut to ground level during the winter dormant period between the end of September and mid-March.

A number of allotment sites around the central belt of Scotland were visited to gather evidence of best practice which would assist the devleopment of new allotment sites in Scotland. Findings, observations, layout principles and notes are gathered in this Part for reference. This is provided to assist future allotment developers, whether planners or potential plotholders, in the design and planning of their own site.

You are encouraged to identify a site which is similar in context, condition or character to the site you are working with, for approaches and inspiration.

case studies

© Pamela Grace: January on the Allotment

6.1 Inverleith, Edinburgh

Location: parkland, residential neighbourhoods. Visible due to its townscape setting and adjacent land uses.

Scale: large. This site provides a significant number of allotments. It is compactly laid out and efficient in its structure. 163 (Approx.) plots.

Communal facilities: communal hut is a converted shipping container which has had windows, insulation, and solar panels for lighting. Compost toilet, communal tools / mowers.

Internal infrastructure: all grass paths, maintained by plotholders. Sheds and structures in a grid, lining up throughout site.

Boundaries: 2m high welded mesh panel fence, with hedge planted to outside (primarily *Berberis thunbergii*, some mixed native species).

Advantages:

Grassy paths are attractive, permeable, low cost.

High quality communal hut, with excellent facilities.

Low vandalism due to high, quality fencing.

Due to this site's central location no parking is required, plotholders use metered parking for occasional car trips.

Disadvantages:

grassy paths are an extra maintenance item for plotholders.

No communal space or play facilities (no demand?).

Hedge to outside relies on council input for maintenance.

Increased demand for half (split) plots increases number of sheds.

BEST PRACTICE OBSERVATIONS:

Bins + waste: this allotment committee is aiming to have no waste collection requirement. All green waste will be composted, and other materials recycled either on-site or by the individual.

BIODIVERSITY NOTE:

Exemplary plots: there are a number of plots which include excellent plot-based biodiversity features such as green roofs, ponds, and wood piles.

ALLOTMENT LAYOUT PLAN:

A sketch plan of the allotment layout, structure and main features is provided for information and comparative purposes only. It should be used to take inspiration and best practice lessons. Note plot layout structure, rules governing its arrangement, and the components of the allotment site.

If this site and its context resembles a site being reviewed or explored for the delivery of allotments, a site visit is recommended.

^ north; not to scale

Inverleith Park, Edinburgh, East Fettes Avenue, EH3 5NY

NT 23950 75220

6.2 Double Dykes, Musselburgh

Location: countryside / town edge. Near residential neighbourhoods. Adjacent footpaths, agricultural fields, and local park.

Scale: mid-scale, with a more recent extension and community area.

Communal facilities: communal hut (a basic converted shipping container), shared outdoor space where children play. BBQ. No toilet.

Internal infrastructure: one central spine road which is surfaced with unbound material. Parking provided outside gates, also possible within allotment site. All sheds located in standardised location: to rear of plot against the site boundary.

Boundaries: 2m high welded mesh panel fence, with hedge planted on allotment side (mixed species for biodiversity value, with some hedgerow trees). Hedge maintained by adjacent plot holder.

Advantages:

Very clear and legible layout structure: simple boundaries, maximum space efficiency, and good circulation and water connections.

Mixed hedgerow is very valuable for wildlife and biodiversity.

Simple structure facilitates division of maintenance responsibilities.

Disadvantages:

Some vandalism - primarily by golf balls, and therefore no glasshouses allowed.

BEST PRACTICE OBSERVATIONS:

Toilets: A toilet cannot be managed by a committee!

Layout: All built structures (sheds) pushed to back of plot, away from central spine footway. Organised, and aesthetically attractive.

BIODIVERSITY NOTE:

Mixed species hedgerow: mixed species hedgerows have be en used and successfully integrated at Musselburgh. The species for this hedgerow were selected in partnership with the local authority biodiversity officer.

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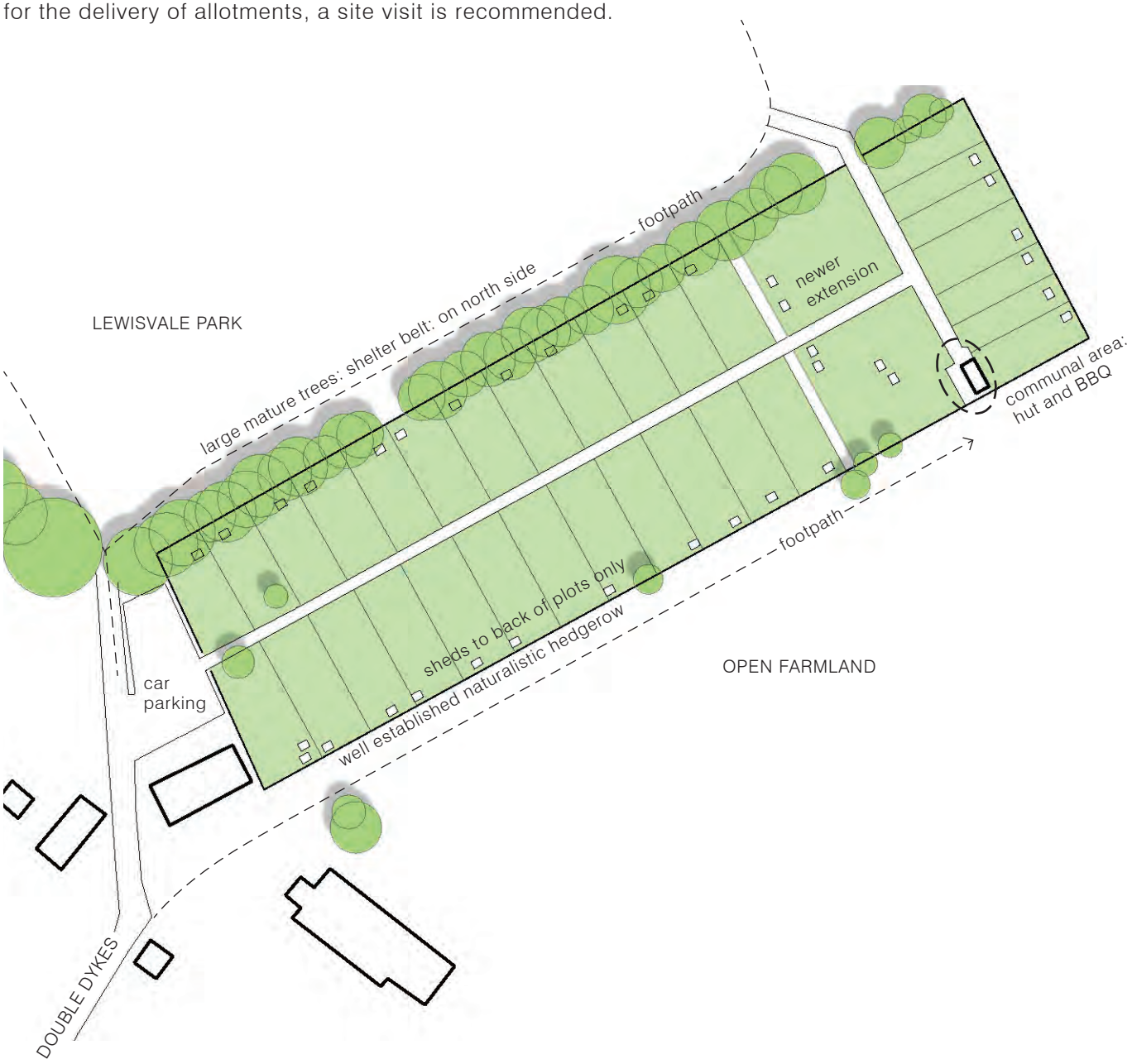

^ north; not to scale

Musselburgh allotments, Double Dykes, EH21 7TD

NT 35007 71968

6.3 Lady Road, Edinburgh

Location: townscape gap site, but visually unconnected from residential neighbourhoods. Adjacent railway, burn, and cemetery.

Scale: mid-size. It's unusual shape results in a complex layout.

Communal facilities: communal tool store and supplies located at the entrance, communal timber shed at apex of site. Bonfire, managed and controlled by elected firemaster. No toilet.

Internal infrastructure: wide range of materials used, form, layout difficult to read. A variety of full and half plots. Sheds and structures located in optimal aspect location and not structured by rule.

Boundaries: vary. Stone wall on cemetery edge, metal fence at railway side. Trees and scrub hedgerow species provides shelter belt.

Advantages:

Garden space and relatively low fence / walls at entrance disguises allotment land use and therefore reduces vandalism.

Plotholders free to decide optimal orientation / location for structures: no prescribed positioning of shed and glasshouse structures.

Wildlife area at corner of site offers site security as well as biodiversity.

The bonfire is communal providing control of timing and fire frequency; the fire is included as part of a site-wide waste management structure.

Disadvantages:

Lack of cohesion of materials makes for both successful and less appropriate paths, structures and boundaries.

Flooding issues with no structured, unified solution or approach.

BEST PRACTICE OBSERVATIONS:

Bonfires: having an area for one communal bonfire reduces the number of fires throughout the year and controls their size. See best practice recommendations on waste management hierarchy.

Entrance: there should be a small space at the allotment entrance for materials delivery and lay-down, and to disguise the allotment land use to some extent.

BIODIVERSITY NOTE:

Boundaries: the inclusion of a 'wild patch' at difficult corners or areas vulnerable to vandalism can be highly beneficial to biodiversity while offering site security. Beneficial species include *Rosa canina*, *Rosa regusa*, sea buckthron, brambles, nettles, etc.

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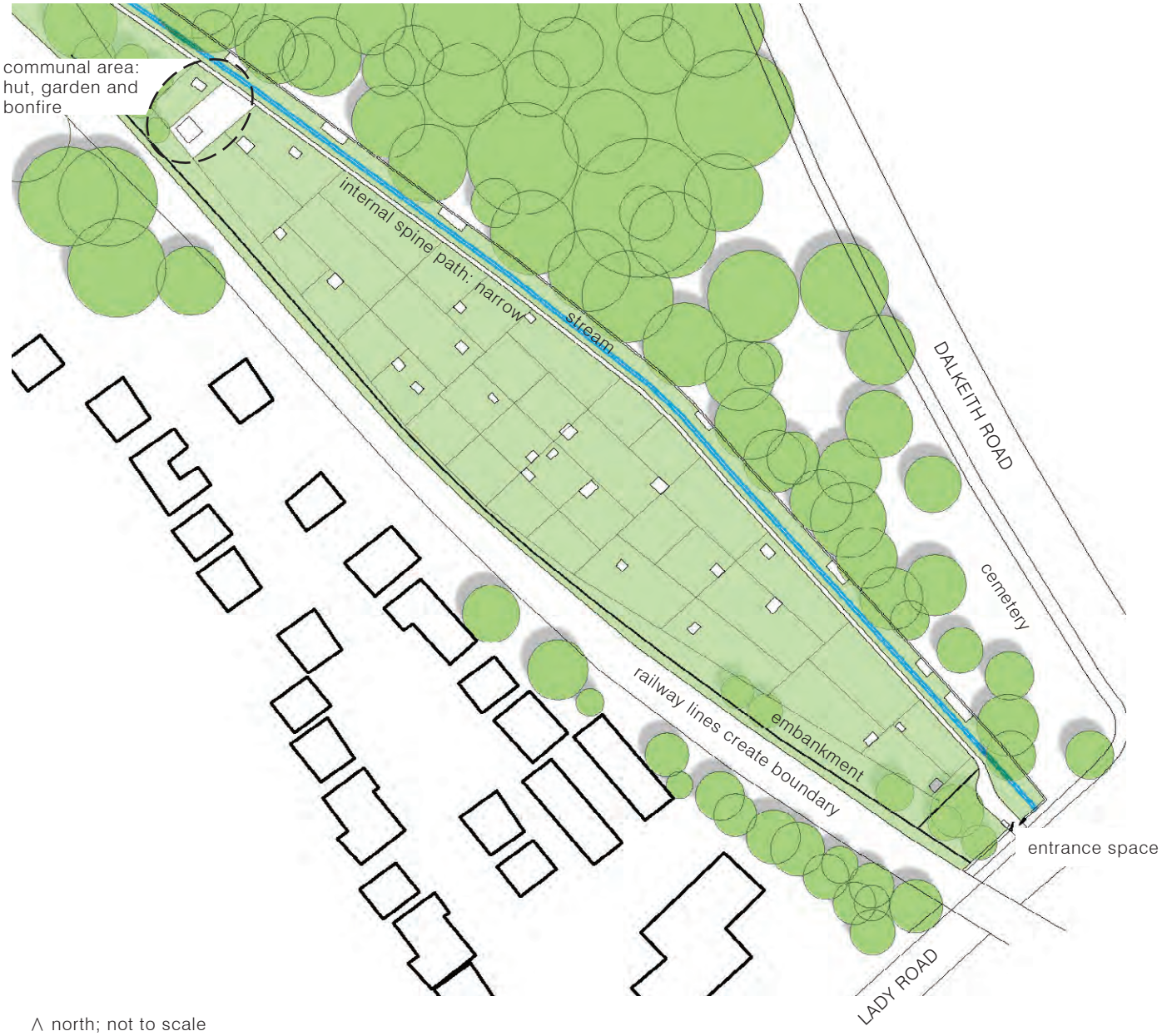

∧ north; not to scale

Lady Road, nr. Dalkeith Road, Edinburgh, EH16 5DT

NT 27395 71374

6.4 Bridgend Farm, Edinburgh

Location: adjacent to local nature reserve, greenfield character. Many of the site users are brought in groups from other city-wide locations.

Scale: large. Individual plotholders and community group users.

Communal facilities: many communal features including a community room, toilet with mains water, demonstration area (barn), demonstration plots, and community plots.

Internal infrastructure: near the entrance is a network of sealed surface roads and footways, for deliveries and inclusive access. Water stand pipes throughout. Rainwater harvested from barn roof.

Boundaries: 2m high welded mesh fencing panels, with mixed shrub hedgerow to outside of allotment site. Trees around all boundaries. Double gates for large deliveries.

Advantages:

A good hierarchy of path surfaces, reflecting intensity of use.

Wide ranging and well used community facilities.

Standard shed design, which have now been personalised: aesthetic.

Most structures (including plotholder's huts) collect rainwater.

Disadvantages:

The level of community involvement makes some individual plotholders feel removed from the work and management of the overall site.

There are lot of expensive paving materials, and extensive sealed surfaces which increases the volume of rainwater run-off.

BEST PRACTICE OBSERVATIONS:

Sheds: incorporation of rainwater collection infrastructure on almost all sheds. Simple to install and imperative for sustainability.

BIODIVERSITY NOTE:

Adjacent land uses: in designing the layout of an allotment site, it is important to consider the adjacent land uses which may offer opportunity to create valuable greenspace corridors. At Bridgend Farm there is an adjacent local nature reserve and the allotment boundaries, windbreaks and structure woodland are used to create connections offering benefits to nature and pollinators.

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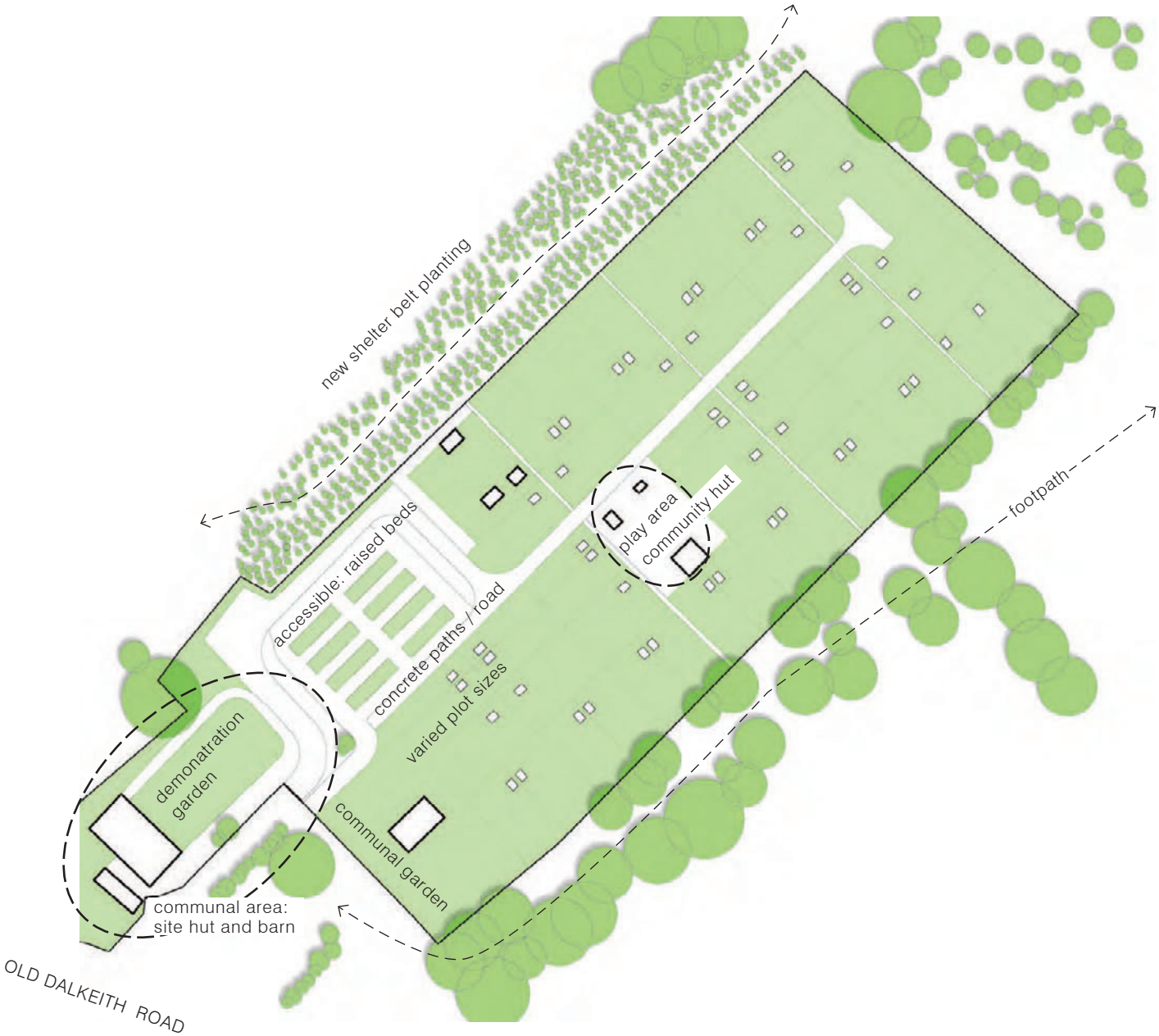

^ north; not to scale

Bridgend Farm, Old Dalkeith Road, EH16 4TE

NT 28042 71039

6.5 India Place, Edinburgh

Location: townscape setting.

Scale: small.

Communal facilities: still under development, planned to include a community hut and compost heap. No toilets, sheds, bins, but some limited site furniture e.g. seating and community plots.

Internal infrastructure: highly structured layout; each plot is a raised bed. The repetition of the same plot edge treatment unifies and structures the site. Plots are smaller than standard size, however the huts are incorporated in the old coal cellars freeing growing space.

Boundaries: boundaries are either a 1.4m high black painted timber fence or metal mesh fencing painted green with triple planted hedgerow planted to outside of allotment.

Advantages:

Aesthetic due to careful structuring and organisation of the plots.

Maximises existing features to make this site work.

Very attractive treatment of the boundaries, no evidence of vandalism.

Disadvantages:

Raised beds and imported topsoil becomes very expensive.

Difficult to repeat converted huts elsewhere, a one-off opportunity.

Inclusive accessibility restricted due to loose gravel path material.

BEST PRACTICE OBSERVATIONS:

Site opportunities: good example of incorporating existing site features (the coal sheds) in the design in order to provide storage space. When designing new sites, take stock of existing opportunities and materials.

BIODIVERSITY NOTE:

Mixed hedgerow: this site includes a mixed hedgerow along the footpath, with a good range of species including those beneficial for wildlife, evergreen species to provide year round shelter, and fruiting species for harvesting.

ALLOTMENT LAYOUT PLAN:

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^ north; not to scale

India Place, Stockbridge, EH3 6TS

NT 23950 75220

6.6 South Western, Glasgow

Location: parkland within a designed landscape park.

Scale: large.

Communal facilities: communal cabin and composting toilet. No play space / community plots, but wide paths allowing informal play.

Internal infrastructure: organic plot layout responding to shape of site, topography and boundary conditions. Some high plot edges, shelter belts. No sealed surfaces; a self-binding hoggin road / path provides a circuit around the site.

Boundaries: 2m high welded mesh panel fence, with hawthorn hedge planted to outside of allotments (but maintained by committee).

Advantages:

Strong character from the surrounding landscape: the site allows the language of woodlands and hedgerows to influence its design.

Excellent and well maintained composting toilet (NatSol).

No sealed surface paths / roadways, cost effective and low impact.

An independent allotment: self-managed by allotment association.

Disadvantages:

Some plot boundaries are very high casting shadow and affecting the aesthetics: introduce maximum boundary hedge / fence height.

BEST PRACTICE OBSERVATIONS:

Huts: issues with wind exposure causing damage to huts. Orientate the smallest surface area of a shed into the wind, create windbreaks, and use angle irons or wooden stakes to anchor structures. When installing greenhouses, design to withstand additional loading caused by wind and snow.

BIODIVERSITY NOTE:

Woodland: this site benefits hugely from its associated woodland shelter belt: it offers protection to the growing space and a 'biodiversity sink'. Useful predators which help reduce vermin find habitat here, such as hawks and foxes.

ALLOTMENT LAYOUT PLAN:

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^ north; not to scale

South Western, Dumbreck Road, Glasgow G41 4SN

NS 55492 62815

6.7 Mansewood, Glasgow

Location: residential / urban parkland.

Scale: mid-sized, with recent extension doubling site capacity.

Communal facilities: several huts and portakabin (two connected with bridging roof), BBQ, communal material recycling, power for charging electric tools, communal tool store, solar panels, application for wind turbine. No toilet.

Internal infrastructure: area at entrance sealed surface paths, becoming whin-dust self binding paths. Paths generally follow contours and avoid too many internal footpaths.

Boundaries: 2.4m high welded mesh panel fence, with mixed (primarily hawthorn) hedgerow planted on inside of fence.

Advantages:

Excellent community facilities, managed by very competent allotment committee and officer.

Very good re-use of materials, and recycling of donated goods.

Layout maximises the site's aspect and orientates plots accordingly.

Disadvantages:

Steeper slopes of new extension less successful handled, with cross fall over path reducing accessibility and resulting in run-off erosion.

BEST PRACTICE OBSERVATIONS:

Material recycling: all surplus and donated materials are collected and stored on site and available to plotholders. When a bulk material is received, the common stockpile creates a language of materiality which effectively ties the site together visually.

BIODIVERSITY NOTE:

A wild plot: one plot which is difficult to cultivate due to level changes and a number of existing mature trees has been left as a wildlife plot, it offers a space for a wide range of flora and fauna which in turn pollinate flowers and provide natural pest control. A pond has been dug, there is a wood pile, and a number of trees.

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^ north; not to scale

Mansewood, Barrmill Road, Glasgow, G43 1BY

NS 55560 60150

6.8 Oatlands Leisure Gardens, Glasgow

Location: residential community.

Scale: small.

Communal facilities: communal cabin and toilets. No play space / community plots, but wide paths which allow informal play.

Internal infrastructure: highly structured site, using timber fencing to divide individual plots. 3m wide sealed surface spine road. Each plot supplied with standardised shed design.

Boundaries: very strongly defined internal boundaries. Outer boundary green painted metal welded mesh panel fence (2.4m high).

Advantages:

Formal and structured arrangement complements townscape setting.

Simple grid structure layout, where plot boundaries are very clear.

Disadvantages:

Site huts not fit for purpose: too large, too close together to enable rainwater collection and poor design resulted in roofs blowing off.

Extensive use of expensive sealed surface pavement materials.

BEST PRACTICE OBSERVATIONS:

Context character: The surrounding townscape character informs this formal layout and results in a more urban feel. This could become a positive distinction of an allotment's design, where parkland and townscape allotments have a different design treatment.

BIODIVERSITY NOTE:

There is little effort made to actively support local biodiversity through the design of this site, however allotments will always provide some contribution to the green network of urban areas. The site's value for biodiversity will be determined by the practices used in weed and pest control and the inclusion of pollinator species within the planting provision of the plots.

Oatlands Leisure Gardens, Polmadie Road, Glasgow, G5 0HD NS 59920 62980

6.9 Shettleston, Glasgow

Location: residential / urban townscape.

Scale: mid-sized, a combination of allotment and community growing.

Communal facilities: communal hut, gardens, plots, and tools.

Internal infrastructure: constructed on a concrete base, with all growing space accommodated above ground in raised beds. Self binding gravel paths throughout, no evidence of rainwater collection.

Boundaries: vary. Existing brick walls in most places, high steel security fencing faces street sides. Tops painted with anti-climb paint and further height added by barbed wire coils.

Advantages:

Very good use of an urban gap site, suggests an appropriate method for dealing with difficult sealed or contaminated sites.

High quality, robust and attractive building materials used.

Disadvantages:

Expensive and virgin materials used, less sustainable and expensive.

Raised planters prioritise form over function: uneconomic scale and proportion for any meaningful Grow Your Own food production.

Raised bed-cum-glasshouse are difficult for the majority of growers to use as plan depth prevents users reaching the centre.

Additional security measures added to the boundary treatments are unsightly and poorly integrated.

BEST PRACTICE OBSERVATIONS:

RAISED BEDS: The raised beds used here are very well built, robust and well laid out for circulation, albeit too small and sub-divided. The use of raised beds offers a safe method of using gap sites where the existing soil quality is unknown, however imported topsoil will be a major expense for many start-up organisations.

Shettleston Growing Project, Eckford Street, Glasgow, G32 7AR | www.shettlestongrowing.org.uk

6.10 Westthorn, Glasgow

Location: parkland, near residential communities.

Scale: large.

Communal facilities: communal cabin and composting toilets. Playbusters plot, with volunteer staff.

Internal infrastructure: individual plotholders have installed a lot of high plot boundary treatments: hedges, fences, sheet metal etc.

Boundaries: boundaries of the allotment site difficult to perceive due to high plot boundaries. Surrounded by mature trees, very enclosed and inward looking, 2.4m high metal security gate at entrance.

Advantages:

The Playbusters growing site combines growing with play and learning the people make this site special to more than only the plotholders.

Tall trees around perimeter create a quiet and reflective atmosphere.

Disadvantages:

Inward looking site, disengaged with its wider landscape context.

High plot perimeters isolate plot holders from each other: the culture of sharing ideas, resources and advice not reflected at this site.

BEST PRACTICE OBSERVATIONS:

Community input: Playbusters and similar social enterprises taking a plot in an allotment is hugely valuable in encouraging younger generations to take part and appreciate growing spaces.

BIODIVERSITY NOTE:

Internal boundaries: Westthorn has an extensive network of hedges. While these are largely single species (Privet, *Ligustrum ovalifolium*) they offer valuable habitat networks and refuges for garden birds. Generally, internal hedgerows are not promoted on allotment sites in the UK due to the land they remove from food cultivation. The hedges here could be improved for their biodiversity value by introducing an understorey of herbacious plants at their base.

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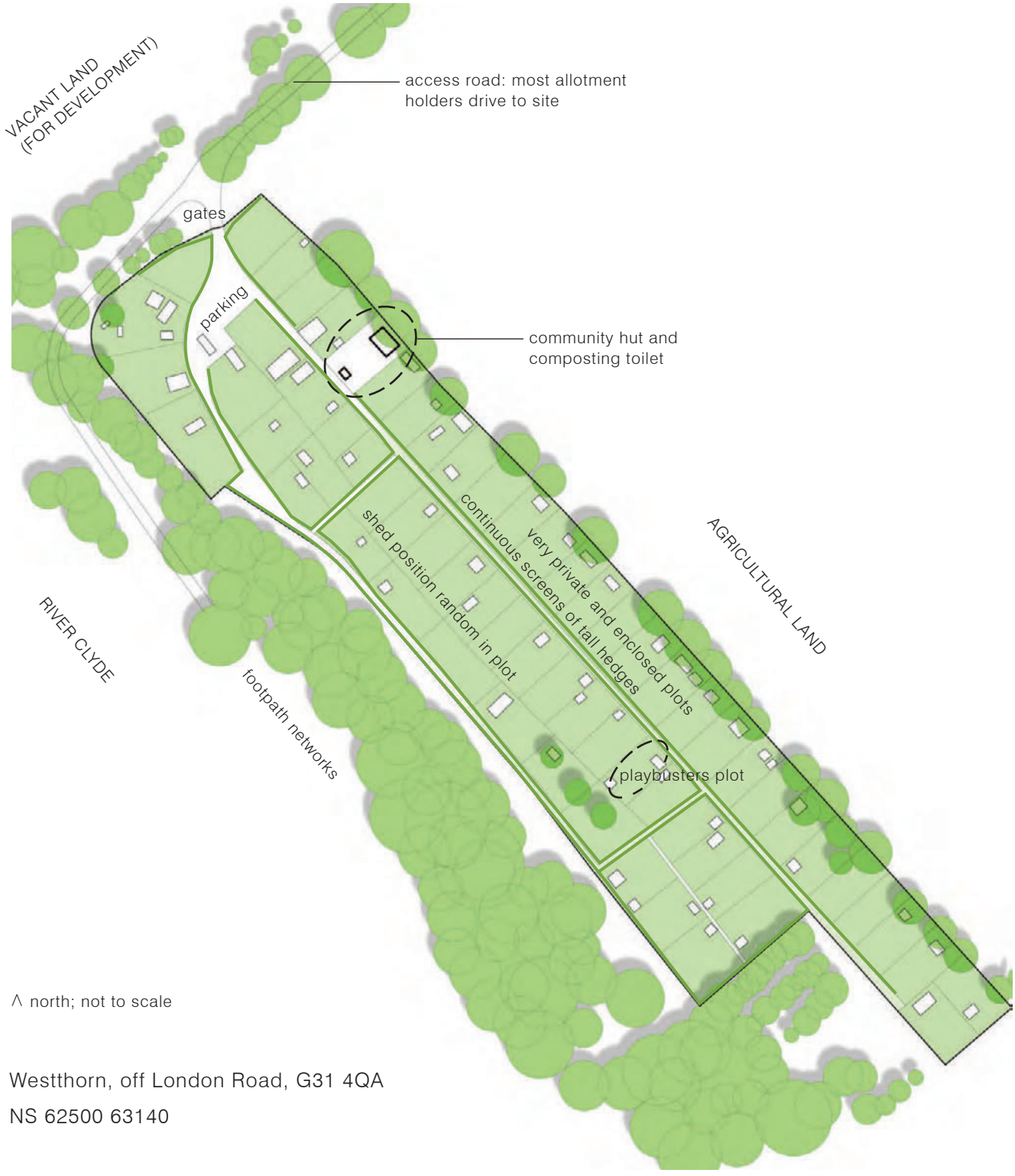

^ north; not to scale

Westthorn, off London Road, G31 4QA

NS 62500 63140

6.11 Shetland

On Shetland, the allotmenteers had to adapt the typical built forms and plot boundary designs to provide shelter and extend the growing season. The perimeter boundary is created by earth filled tyres stacked with a battered face on either side. Sheds are Anderson Shelters: their low, squat form adapting well to wind loading and exposure.

More detail about the design of allotments on very exposed sites can be obtained from the Shetland Islands Council Environmental Management Officer.

6.12 Longbarrow Allotments, Bournemouth

Longbarrow Allotments is situated in a semi-rural setting, to the north east of Bouremouth. It was relocated, and the allotments have been at this new site for around 15 years. During the relocation, purpose built facilities were installed including a large building that has a site shop, equipment storage, meeting room, kitchen and toilets (including disabled). There is a concrete road structure and an extensive water supply system. The site is rented from the local Council but self-managed by an elected committee.

Members of the committee help at a local school to set up growing areas for the children, fostering links with the wider community.

6.13 Naerum, Denmark

The allotment gardens in Naerum were designed by the landscape architect C.Th.Sorensen in 1948. The site consists of 40 oval allotment gardens, each measuring approximately 25 × 15 m. They were laid out on a rolling lawn which provides common space, and are placed so that the oval lies across the curves of the slope. Each garden plot is completely enclosed by hedges, with a gate into the individual's space. There is no order to the fronts and backs of plots, therefore the whole site becomes a park within which to wander.

Within the plot there is a wide variety of growing styles, from purely ornamental to some producing food. Sorensen provided a guide for garden design. These gardens are used in the summer time only, when families may spend weeks at a time in their 'holiday home'. Thus, the huts are more like miniature houses. To prevent people living here all year round, the local authority turns off the water supply over the winter months.

6.14 Prinzessinnengarten, Berlin

In 2009, a group calling themselves Nomadisch Grün (Nomadic Green) launched Prinzessinnengärten (Princess Gardens) as a pilot project on a site which had been a wasteland for over half a century. The group cleared away rubbish and built transportable organic vegetable plots as a new urban place for growing, learning, experimenting. It was created as a place for learning more about organic food production, and urban biodiversity.

appendices

© Pamela Grace: The Old Huts

7.1 suitable trees, shrubs and plants for encouraging biodiversity

Allotment vegetables, fruit trees and companion plants are beneficial for wildlife. Native species with single flowers attract bees and butterflies. Generally the more old-fashioned varieties tend to have more nectar than more modern forms and hybrids. In particular double flowers have little or no nectar, so it is better to choose varieties with single flowers. It is important to grow a range of different flowers as bee species vary in the length of their tongues and how far into the flower they can delve in order to obtain the nectar.

Many of the plants grown on an allotment will provide flowers right through the butterfly and bumble bee season. Spring flowers are vital for insects coming out of hibernation and Autumn flowers help them build up their reserves for winter. The butterfly experts warn that insecticides and pesticides kill butterflies and many pollinating insects as well as ladybirds, ground beetles and spiders. Also that peat bogs are home to many special animals and plants, and so peat compost should not be used. Allowing one or two onions and brassica to flower and using clover as a green manure will increase the flowers available. Also some stalks should be left on plants in the Autumn so ladybird larvae and other insects can hibernate in them.

plant species	flowers and fruit	benefits
herbs and companion plants		
Chives Thyme Sweet rocket Brassica	Spring	Butterflies / bees
Apple Gooseberry Black currant Lambs ears Poached egg plant Sweet Cicely		Bees
Nettles Sorrel Burdock		Caterpillars
Feverfew Valerian	Early summer	Butterflies / bees
Poached egg plant Sage		Bees
Lavender Runner bean Marjoram Pot marigold	Summer and autumn	Butterflies / bees

http://butterfly-conservation.org/files/g4l-butterflies.pdf

plant species	flowers and fruit	benefits
herbs and companion plants (continued)		
Bergamot Betony Borage Raspberry	Summer and autumn	Bees
Evening primrose		Moths
Nasturtium		Butterflies, caterpillars
Mint / catmint Hyssop Clover Onion	Late autumn	Butterflies / bees
Cardoon Lemon balm Phacelia Rosemary Chicory Sunflower		Bees
hedging plants		
Blackthorn	flowers Mar-April sloe fruit in autumn	thorny, insects, jam-making
Worcesterberry	flowers in March fruit July-Aug	very thorny, insects, jam-making
Holly	flowers April-May berries in autumn	prickly, good cover for birds
Hawthorn	flowers May-June haws in autumn	birds and insects, especially wasps
Guelder rose	flowers June-July berries in autumn	insects and birds
Firethorn	flowers early summer, berries in autumn	nectar for insects and berries for birds
Honeysuckle	flowers June-Sept berries in autumn	birds, moths, bees
Bramble	flowers July-Sept	very thorny, insects, pies and jam-making
Buddleia	flowers summer to autumn	butterflies

Taken from the Allotments and Biodiversity booklet
www.glasgow.gov.uk/CHttpHandler.ashx?id=6815&p=0

7.2 fruit trees

Dwarf fruit trees, particularly espaliers may be grown on a plot. These should be on dwarf or semi-dwarf rootstock so the trees do not grow too vigorously. Association rules should prescribe procedures for agreements on planting such trees so neighbouring plots are not affected. An interesting description of a community orchard on an allotment site is on St Ann's allotments.

Espaliers: Training system: horizontal wires 35 - 45cm apart between posts, or straining 'eyes' on walls or fences. Trees should be planted 3.75m - 6m apart, according to their vigour.

Cordons: 'Cordon' refers to a single stem with short side-shoots (the fruiting spurs). This is usually trained angled to 45 degrees, but can be trained vertically. Angled cordons are more productive and less prone to getting out of hand. They are trained against a wall, fence or on wires between free-standing posts. Cordon training is suitable for all pears and apples that bear fruit on short side-shoots (spur-bearing).

tree	rootstock	suitable forms	final height as bush	growing conditions	staking
apple	M27 (extremely dwarfing)	dwarf pyramids	1.2-1.8m x 1.5m	unsuitable on poor soil. Grass free	permanently
	M9 (dwarfing)	bush, pyramid, cordons	1.8-2.4 x 2.7m	grass free	permanently
	M26 (dwarfing)	bush, pyramid, cordon, espalier	2.4-3m x 3.6m	average soils	permanently
pear	Quince C (dwarfing)	cordon, bush	2.5-3m	fertile, moisture retentive soil	permanently
	Quince A (semi-vigorous)	cordon, bush, espalier	3-4.5m	most medium to heavy fertile soils	5 years
plum gage damson	Pixy (semi-dwarfing)	cordon, dwarf, bush	3-4m	good, light, loamy soil	permanently

Reference for fruit tree rootstock, spacing etc:
apps.rhs.org.uk/advicesearch

7.3 suitable trees and shrubs for windbreaks (inland and coastal)

Deciduous

Trees for windbreaks / shelter belts

Acer campestre (field maple)
Acer platanoides (norway maple)
Acer saccharinum (sugar maple)
*Acer pseudoplatanus** (sycamore)
*Alnus glutinosa** (common alder)
*Alnus cordata** (Italian alder)
*Carpinus betulis** (hornbeam)
Fraxinus excelsior (ash)
Populus alba f. pyramidalis (white poplar)
Populus 'Balsam Spire' (poplar)
*Salix alba** (white willow)
Sorbus aria (whitebeam)
*Sorbus aucuparia** (rowan)
Tilia americana (American lime)
Tilia cordata (small-leaved lime)
Ulmus pumila (Siberian elm)

Large shrubs

Amelanchier canadensis (serviceberry)
Corylus avellana (hazel)
*Crataegus laevigata** (midlands hawthorn)
*Crataegus monogyna** (hawthorn)
Elaeagnus angustifolia (oleaster)
*Hippophae rhamnoides** (sea buckthorn)
*Prunus spinosa** (blackthorn)
*Sambucus nigra** (elder)
Sambucus racemosa (American red-veined elder)
Syringa vulgaris (lilac)

Medium size shrubs

Berberis (berberis)
*Rosa rubiginosa** (eglantine rose)
*Rosa rugosa** (hedgerow rose)
*Rosa pimpinellifolia** (Scotch rose)
*Tamarix** (tamarisk)

Evergreen

Trees for windbreaks/shelter belts

Calocedrus decurrens (incense cedar)
Juniperus scopulorum (Rocky Mountain juniper)
Picea abies (Norway spruce)
*Pinus contorta var. contorta** (shore pine)
*Pinus nigra** (European black pine)
*Pinus radiata** (Monterey pine)
Pinus sylvestris (Scots pine)
*Quercus ilex** (holm oak)
Thuja plicata (western red cedar)

Shrubs

*Elaeagnus × ebbingei**
Juniperus communis (juniper)
*Pinus mugo** (dwarf pine)
*Pyracantha** firethorn)
*Rhamnus alaternus** (Italian buckthorn)
Taxus baccata (yew)
*Ulex europaeus** (gorse)

* tolerant of coastal sites

7.4 non-native invasive plants

Japanese knotweed (*Fallopia japonica*)

Japanese knotweed is an ornamental plant which was introduced in the mid-nineteenth century. It is listed on Schedule 9 of the Wildlife and Countryside Act 1981, which makes it an offence to plant or cause this plant to grow in the wild. It is not an offence if it is growing in your garden or on your land and there is no specific duty either to notify anyone of its presence or to control it (unless doing so forms part of a legally binding contract or agreement with another party).

Japanese knotweed is able to regenerate from very small pieces of plant (fingernail size) and its rhizome system can be up to 3 metres deep, making it extremely difficult to eradicate once established. It is easily spread to new sites through illegal fly-tipping or the careless disposal of "infected" soil and as a result of natural processes such as flooding and erosion. Japanese knotweed causes ecological problems as a result of out-competing native plants. It can also be commercially damaging because of the cost of eradication on development sites and its ability to damage structures and road surfaces. Removal by specialist contractors.

Rhododendron ponticum

Rhododendrons are a group of ornamental plant species introduced in the 1700s. Since then, *Rhododendron ponticum* has become widespread particularly in woodland habitats on the west coast of Scotland. Although the flowers give a colourful display, it creates dense thickets and shades out native plants and will eventually come to dominate the habitat, to the total exclusion of virtually all other vegetation. Its root system and leaf litter is also toxic to other plants. As a non-native species it provides few compensating benefits for native birds or animals. Removal by digging and burning

Himalayan balsam (*Impatiens glandulifera*)

Found along riverbanks, Himalayan balsam can outgrow native grasses and other plant species creating an ecologically-harmful monoculture in which native species are unable to thrive. It is able to project its seed over a radius of up to four metres and spreads readily to new areas. The seeds remain viable for years, making eradication a time-consuming and difficult long-term project. Easily weeded and burnt and in time can be eradicated.

Giant hogweed (*Heracleum mantegazzianum*)

Giant hogweed is another garden escapee which was introduced into Britain in the late 1800s and can often be found on waste ground and riverbanks. It grows up to 5 metres tall and each flower head produces thousands of seeds that are readily dispersed by wind and water. The seeds remain viable for years, making eradication a time-consuming and difficult long-term project. If sap from the plant gets on to the skin and is then exposed to sunlight, it can blister and cause severe skin irritation. Children in particular are at risk and there are a number of cases each year of injuries caused by contact with this plant. The root is deep with a long tap. It must not be allowed to seed. Regular treatment with glysophate, and hoeing of seedlings will in time eradicate it.

7.5 industrial contaminants from some industries found in Scotland

- Agriculture: volatile organic compounds (VOC); arsenic; copper; carbon tetrachloride; ethylene dibromide; methylene chloride; pesticides; insecticides; herbicides; grain fumigants.
- Automobile refinishing and repair: some metals and metal dust; various organic compounds; solvents; paint and paint sludges; scrap metal; waste oils.
- Battery recycling and disposal: lead; cadmium; acids.
- Cosmetics manufacturing: heavy metals; dusts; solvents; acids.
- Hospitals: formaldehyde; radionuclides; photographic chemicals; solvents; mercury; ethylene oxide; chemotherapy chemicals.
- Landfills (municipal and industrial): metals; VOCs: polychlorinated biphenyl (PCB); ammonia; methane; household products and cleaners; pesticides; various wastes.
- Lead works: Lead; arsenic; cadmium; sulphides; sulphates; chlorides; sulphuric acid; sodium hydroxide.
- Machine shops / metal fabrication: metals; VOCs; dioxin; beryllium; de-greasing agents; solvents; waste oils
- Marine maintenance industry: solvents; paints; cyanide; acids; VOC emissions; heavy metal sludges; de-greasers.
- Oil refineries: fuel oil, lubricants; bitumen; alcohols; organic acids; PCBs; cyanides; sulphur; vanadium.
- Pesticide manufacturing: dichloromethane; fluorobenzene; acetone; methanol; benzene; arsenic; copper sulphate; thallium.
- Petroleum refining and reuse: petroleum hydrocarbons; benzene; toluene; ethylbenzene; xylene (BTEX); fuels; oil and grease.
- Pharmaceutical manufacturing: lead; various organic chemicals; organic solvents.
- Photographic manufacturing and uses: Silver bromide; methylene chloride; solvents; photographic products.
- Plastics manufacturing: polymers; phthalates; cadmium; solvents; resins; chemical additives; VOCs.
- Printing industry: silver; solvents; acids; waste oils; inks and dyes; photographic chemicals.
- Railway Sidings: lubricants; fire-box bottom ash containing oxidised coal residues; petroleum hydrocarbons; VOCs; BTEX; solvents; fuels; oil and grease; lead; PCBs.
- Research and educational institutions: inorganic acids; organic solvents; metals and metal dust; photographic waste; oil; paint; heavy metals; pesticides.
- Scrap metal operations: various metals (such as lead and nickel); PCBs; dioxin; transformers.
- Smelter operations: metals (such as lead, copper, and arsenic)
- Semiconductor manufacturing: metals (e.g. lead, copper, and arsenic).
- Textile and dye works: aluminium; cadmium; mercury; bromides; fluorides; ammonium salts; trichloroethene.
- Wood pulp / paper manufacturing: chlorinated organic compounds; dioxin; furans; chloroform; resin acids.
- Wood preserving: creosote; pentachlorophenol; arsenic; chromium; copper; PCB; PAHs; beryllium; dioxin; wood preservatives.

7.6 electricity microgeneration

Wind power (micro-generation)

Case study: Spa Hill Allotment Society Ltd, Croydon: Spa Hill had a 2.5kw wind turbine on an 11m mast installed to provide electricity to a community building which includes a trading hut, café, meeting room, office, library, kitchen and toilets. After a survey of the site conditions, wind was identified as the most effective option. A local renewable energy consultant was engaged, who helped secure funding and planning permission. The local residents were consulted as part of this process. The turbine was installed using an excavator and manual labour, trenches were dug to bury ducting and cabling to connect the turbine with the site's electricity control boxes. Assembly and installation was carried out by a professional installer.

Local scale wind turbine. Spa Hill, Croydon

Advantages

- Can produce a lot more electricity than solar panels.
- Opportunity to sell surplus electricity back to the grid, site income.

Disadvantages

- Complex planning procedures and requirement for full community consultation process.
- High initial cost, however renewable energy grants are available.

Solar power (Photovoltaic)

Case study: Lidgett Lane Allotments, Leeds: The allotment committee decided that there was a need was for a mains-voltage power (230V a.c.) to run power tools in the site workshop. A pole-mounted solar panel was selected, which suited the site and its aspect. Component parts were sourced from suppliers via the internet. The total cost for the system was £1,798. The free-standing pole-mount was cabled-up before being placed into a vertical position and set in concrete. The cables were then run underground and finally an alarm was fitted to the pole in case of vandalism. The group find there is minimal maintenance needed.

An allotment committee erected a pole mounted solar panel. Lidgett Lane, Leeds

Advantages

- It is possible to obtain small capacity solar panels relatively cheaply, e.g. to 12v, which is adequate for low voltage applications. When using solar panels, select low wattage lights and electrical hardware.

Disadvantages

- Solar panels are vulnerable to vandalism by thrown objects; they can be smashed, and are targets for thieves.
- Infrastructure requires storage space in a secure structure to house the charge controller / inverter and battery.
- Some standard structures require reinforcement to take the weight.

7.7 tributes

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All of nature for all of Scotland
Nàdar air fad airson Alba air fad

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www.scotland.gov.uk

Scottish Allotments and Gardens Society
(SAGS) is a voluntary organisation representing allotment associations and gardeners in Scotland.. Membership includes people with wide experience of allotment management and regeneration who can offer individual help and advice on request.
www.sags.org.uk

The City of Edinburgh Council
Manages 1333 allotment plots, spread over 26 sites across the city.
www.edinburgh.gov.uk

Community Food and Health (Scotland)
CFHS aims to ensure that everyone in Scotland has the opportunity, ability and confidence to access a healthy and acceptable diet for themselves, their families and their communities.
www.communityfoodandhealth.org.uk

Community Growing Solutions
A social enterprise that brings together, provides information and support in various capacities about growing activities throughout Scotland for individuals, organisations, schools, communities and government.
www.communitygrowingsolutions.co.uk

Community Land Advisory Service
Aims to help community groups, landowners and other interested people to find information on making more land available for community use.
http://sc.communitylandadvice.org.uk

COSLA
The Convention of Scottish Local Authorities, is the representative voice of Scottish local government and also acts as the employers' association on behalf of all 32 Scottish Councils.
www.cosla.gov.uk

Edible Estates
An initiative to promote best practice in the regeneration of greenspace within social housing estates.
www.edibleestates.co.uk

Edinburgh & Lothians Greenspace Trust
An independent charity providing a comprehensive portfolio of professional environmental project development, management and fundraising services, to help ensure everyone has an equal opportunity to enjoy their natural environment.
www.elgt.org.uk

Federation of City Farms and Community Gardens
(FCFCG) supports, represents and promotes community managed farms and gardens across the UK.
www.farmgarden.org.uk

Fife Council
Manages 28 allotments at the moment
www.fifedirect.org.uk/

Forestry Commission Scotland
Serves as the forestry directorate of the Scottish Government.
www.forestry.gov.uk/Scotland

greenspace scotland
A social enterprise and an independent charitable company working with a wide range of local and national partners to support the planning, development and sustainable management of greenspaces and green networks as a key part of the green infrastructure of our towns and cities.
www.greenspacescotland.org.uk

Growforth Limited
An award winning wholesale nursery providing an unparalleled service to our garden centre and landscape customers.
http://growforth.co.uk

Kingdom Housing Association
Provider of social housing. Includes information about renting and shared ownership schemes.
www.kingdomhousing.org.uk

Landshare
Connecting growers to people with land to share
www.landshare.net/index/

National Farmers Union Scotland
NFUS represents all sectors of agriculture with access to agricultural expertise, including helping out with business issues.
www.nfus.org.uk

Nourish Scotland's Sustainable Local Food Network
working towards a sustainable Scotland in which, in every region we produce more of what we eat and eat more of what we produce.
www.nourishscotland.org.uk/

Scottish Federation of Housing Associations
SFHA is the national representative body for Scotland's housing associations and co-operatives.
www.sfha.co.uk

Scottish Land & Estates
Promotes the wide range of benefits land-based businesses provide: the tourist attractions, leisure facilities and landscapes enjoyed by the public, as well as, housing, employment, tourism & enterprise and farming opportunities.
www.scottishlandandestates.co.uk

Scottish Natural Heritage
Funded by the Scottish Government. Our purpose is to promote care for and improvement of the natural heritage; help people enjoy it responsibly; enable greater understanding and awareness of it; promote its sustainable use, now and for future generations. All our work supports our mission: All of nature for all of Scotland.
www.snh.gov.uk/

Scottish Orchards
A network to help people develop their own community orchards, share information with others across the country and help create a Fruitful Scotland.
www.scottishorchards.com

Soil Association
Campaigning for healthy, humane and sustainable food, farming and land use.
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Scotland's

allotment

site design guide

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