

Outdoor Access Design Guide





FOR A HAPPIER,
HEALTHIER SCOTLAND

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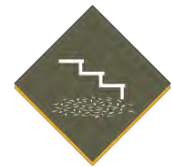
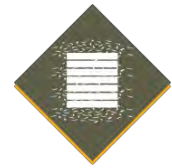
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

Scottish Natural Heritage (SNH) is the government's adviser on all aspects of nature and landscape across Scotland.

Our role is to help people understand, value and enjoy Scotland's nature now and in the future. For more information, visit our website at www.snh.gov.uk

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Photography

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1 Introduction

This is the first revision of the Countryside Access Design Guide, which was published in 2002. The Guide has been updated and renamed to take account of Part 1 of the Land Reform (Scotland) Act 2003, as well as the Equality Act 2010, British Standards and good practice.

The Guide aims to provide consistent and clear advice on the selection and design of outdoor access furniture and structures, such as gates, fences and boardwalks. It is aimed at land managers, access professionals, rangers, planners, surveyors, and community and interest groups involved in the development and management of outdoor access in Scotland.

Designs for stiles and kissing gates are not part of this Guide, as they do not cater for the needs of all the potential users of a path.

The Guide brings together widely sourced designs, which are tried, tested, and regularly used throughout Scotland to manage outdoor access.

Scottish Natural Heritage and Paths for All cannot guarantee the site-specific appropriateness of the designs and installation details in this Guide. You should always seek competent technical advice before modifying and installing the designs.

This Guide complements other publications providing good practice guidance on the development and management of outdoor access infrastructure in Scotland.

How to use this Guide

All of the designs within the Guide comply with the Land Reform (Scotland) Act 2003 and the Equality Act 2010, and are consistent with the appropriate British Standards.

The Guide is divided into six design sections. Each section includes:

- ❖ an overview of content;
- ❖ key design considerations to help you to make the most appropriate choice; and
- ❖ design sheets with drawings, a materials list and installation instructions.

All measurements referred to in this Guide are expressed in millimetres, unless explicitly stated otherwise. The drawings are not to scale.

This Guide looks specifically at the design of outdoor access furniture and structures, and therefore does not cover planning considerations in any depth. You need to make sure you have completed all of the necessary planning tasks before proceeding to the project's design stage. Things to think about include: all relevant planning permissions and consents, any designations, biodiversity considerations, and longer-term sustainability. More information on planning can be found in the „Planning for paths“ section of the „Lowland Paths Guide“:

<http://www.pathsforall.org.uk/pfa/lowland-paths-guide/planning-for-paths.html>.

Information regarding assessing your site, the choice of materials, and reducing maintenance is included in Section 4 of this Guide.



2 Legal context

This section sets out legal obligations that you must take into consideration when choosing, modifying, or installing any infrastructure you will use to manage outdoor access in Scotland.

In choosing a design for managing access, you must ensure that it complies with current legislation.

The Land Reform (Scotland) Act 2003

The Land Reform Act established a statutory right of responsible access to most areas of land and inland water in Scotland.

The right to responsible access does not apply to most vehicles, with the exception of, for example, motorised wheelchair and mobility scooter users. Your right of access to the outdoors comes with responsibilities, which are fully explained in the Scottish Outdoor Access Code (the Code). The three main principles of the Code are to:

- ❖ take responsibility for your own actions;
- ❖ respect the interests of other people; and
- ❖ care for the environment.

Please refer to the Land Reform Act and the Scottish Outdoor Access Code for more information. The Act and the Code can be found at: <http://www.outdooraccess-scotland.com>.

The Equality Act 2010

The Equality Act brings together several separate pieces of legislation, including the Disability Discrimination Act 1996, into one single Act.

The Equality Act aims to protect people from discrimination, and promotes equality of opportunity. Under the Act, you are legally required to anticipate the needs of people with a disability or other protected characteristic, and to make reasonable adjustments to satisfy these needs. The Act places general and specific duties on public bodies. More information about the Equality Act 2010 can be found at:

www.gov.uk/government/uploads/system/uploads/attachment_data/file/85011/disability.pdf.

Health and safety

When designing and installing outdoor access furniture or structures, you must ensure that you comply with health and safety requirements. Your employer, you and others have a reasonable duty of care to protect the health and safety of everyone affected by your outdoor access furniture or structure, and by your installation work.

It is your employer's responsibility to:

- ❖ protect the health and safety of everyone carrying out the work;
- ❖ provide and maintain safe systems of working during the access structure work;
- ❖ provide and maintain adequate welfare facilities during the work;
- ❖ establish and maintain a healthy and safe working environment during the work, including safe site access;
- ❖ provide information, instructions and training to make sure everyone carrying out the work is doing so safely;
- ❖ provide effective supervision to ensure risk assessments and method statements for the work are followed;
- ❖ provide and maintain safe hand tools, machinery and equipment during the work;
- ❖ provide protective clothing to carry out the work safely;
- ❖ engage and work with you and others on matters of health and safety and welfare; and
- ❖ arrange for, or provide, safe methods of using, handling, storing and transporting harmful materials during the work.

It is your responsibility to work in a responsible manner, to:

- ❖ take reasonable care of your own and other people's health and safety;
- ❖ co-operate with your employer in all matters of health and safety and welfare;
- ❖ tell someone if you think the work is putting your or anyone else's health and safety at serious risk;
- ❖ follow the information, instructions and training given to you to carry out the work safely; and
- ❖ use and maintain the hand tools, machinery and equipment, including protective clothing and equipment, given to you to carry out the work safely.

Risk assessment

Risk assessment applies to the design and installation of outdoor access furniture and structures. The Management of Health and Safety at Work Regulations 1999 place a legal duty on your employer to carry out an assessment of health and safety risks at your place of work, to ensure that risks are managed properly.

If you design outdoor access structures, you must assess the health and safety risks of your design. You should eliminate the risks, if possible, and reduce any remaining ones. You then need to inform others of those risks by providing relevant information about them. This is a process of design risk assessment.

If you install outdoor access structures, your employer must complete a risk assessment of the works and site before any work is carried out. The assessment will involve these five steps:

- ❖ looking for the hazards;
- ❖ deciding who might be harmed and how;
- ❖ evaluating the risks and deciding on control measures (precautions);
- ❖ recording significant findings; and
- ❖ reviewing and updating the assessment, if necessary.

If your employer has fewer than five employees, then he or she does not have to record anything in writing – but it is good practice to do so.

Risk assessment is simple and careful examination of the potential risks in your place of work. It is not about creating lots of paperwork. It is more about identifying sensible measures to control the risks, so that no one comes to any harm.

For more information about risk assessment in the workplace, read the Health and Safety Executive document „Controlling the risks in the workplace“, found at:
<http://www.hse.gov.uk/risk/controlling-risks.htm>.

Risk assessment can also help to assess the need for controlling access on paths. It will help you to decide what level and type of least restrictive access option is required to deal with a risk. For more information about this, read Sustrans’ „A Guide to Controlling Access on Paths“, found at:
http://www.sustrans.org.uk/sites/default/files/file_content_type/access_control_guide_jan_2012.pdf.

Construction, design and management (CDM)

The aim of the Construction (Design and Management) Regulations 2015 is to make health and safety an essential part of delivering successful construction projects. The CDM Regulations 2015 prioritise the health and safety of everyone working on the construction site where the path or other structure is being built, and of those who will be maintaining or using the path or other structure once it is finished.

The design sheets in this Guide are „designs“. If you make use of or modify a design sheet for use in a path construction project, you are carrying out the role of a „designer“. A designer carries out the legal duties of designer under the Construction (Design and Management) Regulations 2015.

One of the designer's duties is to prepare or modify designs, taking health and safety risks into account. Taking health and safety risks arising from the modification of designs into account can make it easier for risks to be managed by those who will install and maintain the outdoor access furniture or structure.

When modifying a design sheet, your first responsibility is to avoid health and safety risks to all who may be affected by your changes or, if that is not possible, to reduce and control the risks to an acceptable level.

Some of the outdoor access structures featured in the design sheets, such as the gates, are available to purchase as products from a manufacturer. If you select a product from a manufacturer, you are considered a designer. The manufacturer supplying the product is not the designer, as they are not directly involved in the project for which the structure is intended. It is therefore your responsibility to take account of any health and safety risks arising from the installation and use of the product.

More information on the duties of designers and other duty holders under CDM Regulations 2015 can be found at: <http://www.hse.gov.uk/construction/cdm/2015/summary.htm>.

British Standards

British Standards are not a legal requirement, but compliance with them is considered best practice. As stated by the British Standards Institution:

“Standards define best practice in many different areas. They're put together by groups of experts and come in a number of different kinds, from a set of definitions to a series of strict rules.”

To comply with the Land Reform (Scotland) Act 2003 and the Equality Act 2010, and in order to offer least restrictive access options, all of the designs in this Guide exceed the minimum space requirement of 1200mm that is stipulated in British Standard (BS) 5709:2006 – Gaps, gates and stiles. Instead, we have opted for an inclusive width of 1500mm in all of the gap, bollard and gate designs in this Guide. Designs for stiles and kissing gates are not part of this Guide as they do not cater for the needs of all potential users of a path.

For more information about the specifications of BS5709:2006 – Gaps, gates and stiles, see Appendix 1.



3 Meeting everyone's needs

The guiding principle of access for all is to choose the „least restrictive option“, so that access is as easy as it can be for as many people as possible. Leaving a suitable gap is always preferable to installing gates, barriers, or bollards, which will restrict people’s mobility.

Understanding the needs and diversity of the people who will use a path will help you to choose the right furniture and structure, and to install it in the right place.

In making your decision, you must ensure that your choice and decision-making process comply with both the Equality Act 2010 and the Land Reform (Scotland) Act 2003.

If you decide that you need to put in furniture or a structure to manage access, always:

- ❖ choose the least restrictive access option;
- ❖ site it on firm, level ground;
- ❖ provide clear space around it and on the approach to it, to ensure people can easily and safely access it; and
- ❖ ensure that all integral mechanisms, such as latches and handles, are accessible and easy to use.

The following table outlines minimum width and minimum turning circle or space requirements for: pedestrians, cyclists, wheelchair and mobility scooter users, and horse riders and horse-drawn carriage users.

**User Group****Minimum width (mm)****Minimum turning circle or space (mm)****Pedestrians**

pedestrian	700
pedestrian with single walking stick	750
pedestrian with walking frame	900
pedestrian with double walking sticks	950
pedestrian with double push chair	1000
pedestrian with long cane	1100
pedestrian with guide dog	1100
pedestrian with child	1100
pedestrian guided by another pedestrian	1200
pedestrian guiding wheelchair user	1500

Cyclists

conventional bicycle	1200	1650	850
bicycle and child trailer cycle	1200	2050	700
tandem	1200	3150	2250
bicycle and 850mm wide trailer	1250	2650	1500

Wheelchair & mobility scooter users

manual wheelchair *	700	2000	2000
small mobility scooter	750	2100	2100
large mobility scooter	1000	2500	2500

Horse riders & horse-drawn carriage users

horse	1500	3000	3000
horse-drawn carriage users	1600	No exact dimensions are available. Turning space depends on the number of horses, size of carriage and skill of the carriage driver.	

* For a manual wheelchair user to turn 180° or 360°.

Information in the table on the page 11 was taken from the sources listed below and by consulting with the British Horse Society Scotland regarding the horse-drawn carriage detail for minimum width and turning space dimensions. For more information, refer to these publications:

- ❖ British Horse Society Scotland, Paths for All and Scottish Natural Heritage – Equestrian Access Factsheets. Available at: www.outdooraccess-scotland.com/sites/default/files/docs/equestrian_access_factsheets_bhss_snh_pfap.pdf.
- ❖ Paths for All and Scottish Natural Heritage – Shared Use Paths in Scotland. Available at: <http://www.pathsforall.org.uk/pfa/lowland-paths-guide/meeting-users-needs.html>.
- ❖ The Fieldfare Trust – Countryside for All Good Practice Guide. Available at: www.fieldfare.org.uk/countryside-for-all/countryside-for-all-good-practice-guide/.
- ❖ Sustrans – A Guide to Controlling Access on Paths. Available at: www.sustrans.org.uk/sites/default/files/file_content_type/access_control_guide_jan_2012.pdf.



4 Designing outdoor access structures

This section provides a checklist to help you assess the site where the outdoor access furniture or structure is proposed for installation. It will help you to think about initial design considerations for your structure. You will also find information in this section about the choice of materials, design considerations, and designing to reduce maintenance.



Site assessment and initial design checklist

Site location

- Assess the site**
- ❖ look for any specific problems that may affect the installation of furniture or structure at location
 - ❖ make notes and take photographs of your observations

Notes

✓

- ground conditions**
- ❖ check how hard and wet the ground is where your furniture or structure will be installed

- hazards**
- ❖ check for any hazards, for example, underground and overhead services

- problems**
- ❖ check for any issues that may affect the installation of your furniture or structure, e.g. protected wildlife, or if your installation affects anything

- access**
- ❖ check for whereabouts of the nearest access points and the routes for getting materials, etc. onto the site

Initial design considerations

- ❖ consider the initial design for your furniture or structure
- ❖ make notes and drawings and take photographs based on your observations
- ❖ refer to key design considerations in the Outdoor Access Design Guide for relevant furniture or structure

Choice of materials

Any outdoor access furniture or structure should be appropriate to the location and environment. Its appearance should also fit within the landscape.

The table below shows the advantages and disadvantages of some materials used to make outdoor access furniture or structures. It will help you to choose the most suitable material for your furniture or structure and location.

 Material	Advantages	Disadvantages	Uses
Timber	<ul style="list-style-type: none"> ❖ easily cut, treated and painted ❖ blends with natural environments, ages well ❖ readily available from sustainable sources 	<ul style="list-style-type: none"> ❖ most types of timber require treatment ❖ easily vandalised ❖ high maintenance ❖ risk of chemical leaching 	<ul style="list-style-type: none"> ❖ gates ❖ bollards ❖ barriers
Recycled Plastic	<ul style="list-style-type: none"> ❖ environmentally friendly and recyclable option ❖ durable, hardwearing with long lifespan ❖ does not rot, split or splinter ❖ requires no painting or chemical treatment ❖ less maintenance than timber 	<ul style="list-style-type: none"> ❖ more expensive than timber ❖ may bend or soften in hot weather if not strengthened ❖ heavier than dry timber of the same size ❖ can look less natural than timber in rural settings ❖ some types are flammable 	<ul style="list-style-type: none"> ❖ fences ❖ boardwalks ❖ steps ❖ seats ❖ perches ❖ picnic tables
Metal	<ul style="list-style-type: none"> ❖ durable ❖ resistant to rot ❖ minimal maintenance ❖ resistant to vandalism 	<ul style="list-style-type: none"> ❖ can look more urban than rural ❖ usually more expensive than timber ❖ needs galvanising to reduce corrosion ❖ prone to theft for scrap metal value ❖ painted surfaces may fade, crack or peel 	<ul style="list-style-type: none"> ❖ gates ❖ bollards ❖ barriers ❖ seats
Stone	<ul style="list-style-type: none"> ❖ durable ❖ easily maintained ❖ low cost option when stone is available and suitable on site 	<ul style="list-style-type: none"> ❖ if stone is not suitable or available on site, it may be a high cost option and will need transporting to the site 	<ul style="list-style-type: none"> ❖ steps ❖ informal perch

Consider using the moderately durable softwoods larch, Scots pine and Douglas fir – and oak, which is a durable hardwood.

Avoid using softwood treated with timber preservatives in wet environments, as there is a risk of copper, arsenic, and other chemicals leaching.

Use steel fittings, wire, and mesh – with a galvanised finish in coastal and other wet environments to prevent corrosion.

Designing to reduce maintenance

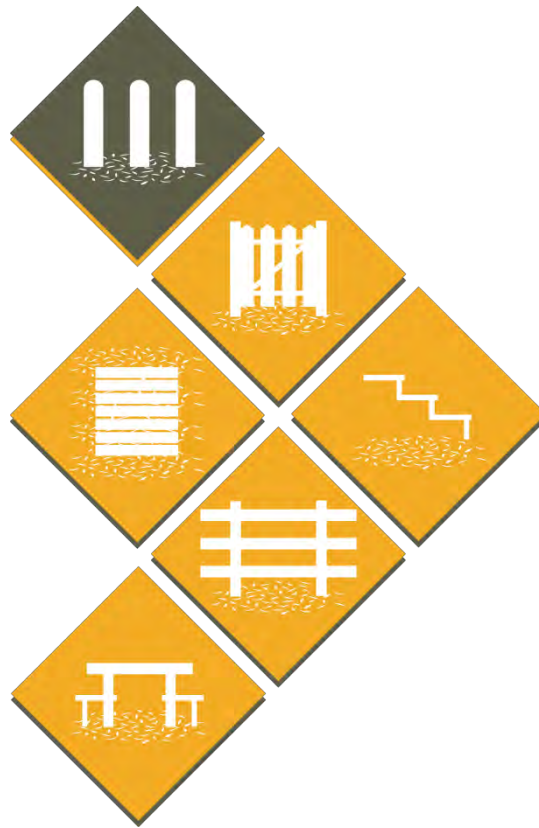
To remain usable, safe and sustainable, outdoor access furniture or structures need to be regularly maintained. You could consider designs that are low maintenance to help reduce repair and replacement costs. For example, unlike timber stobs, recycled plastic stobs that are used to support a timber boardwalk installed in wet ground will not rot or need replacing. As a result, the costs of maintaining the boardwalk in the future can be reduced.



Example



Timber boardwalk with a plastic stob



5 Gaps, bollards and barriers

As explained earlier, the guiding principle of access for all is always to choose the „least restrictive option“, which means that access is as good as it can be for as many people as possible.

Leaving or creating an open gap should always be the first choice where any path crosses a boundary such as a hedge, fence, or stone wall.

Only consider installing bollards in a gap, or barriers on a path, when you need to:

- ❖ prevent unauthorised access by vehicles or motorcycles; and
- ❖ slow down or stop people before they reach a road or a hazard.

Some of the barriers in this section are designed to control vehicle access to paths. Where this is the case, it is best practice to use barriers in combination with a 1500mm gap, or a gap with bollards.

Always make sure that the design or combination of designs you use comply with the Land Reform (Scotland) Act 2003 and the Equality Act 2010, and are consistent with BS5709:2006 – Gaps, gates and stiles.

Key design considerations

- ❖ **Location** – The location of gaps, bollards and barriers determines how effective they are. To be effective in managing people and vehicles, you must ensure that you block off any unwanted gaps in the boundary, to make them unusable.
- ❖ **Firm level ground** – Install gaps, bollards and barriers on firm, free-draining and level ground.
- ❖ **Manoeuvring space** – Provide sufficient clear space to allow users to negotiate a gap, gap with bollards, or a barrier. Provide a minimum 3000mm x 3000mm space on both sides to allow a horse or tandem to turn.
- ❖ **Position** – Install gaps, bollards and barriers at least 4000mm back from the road, to provide sufficient room for all users to approach safely and to move through or around them.
- ❖ **Width** – To ensure full accessibility, we recommend a minimum width of 1500mm for a gap or gap with bollards. This will allow unrestricted access for everyone, complies with the Land Reform (Scotland) Act 2003 and the Equality Act 2010, and is consistent with BS 5709:2006.
- ❖ **Visibility** – Make sure that the gaps are clearly visible to people as they approach them. Choose a colour that makes the bollard or barrier stand out from its surroundings. The colour will make it more visible to all users as they approach. Make sure any vegetation growing next to a gap, gap with bollards, or a barrier, is regularly cut back to maintain clear sight lines from both sides.
- ❖ **Hazards** – There should be no barbed wire or electric fence within 1000mm of the manoeuvring space. There should be no protrusions or sharp edges likely to catch clothes or cause injury. Edges should be rounded off to 3mm as a minimum.

Gaps

A gap should always be the first choice where a path crosses a boundary, and can be built into fences, dykes or hedges.

Leaving or creating an open gap at the start or end of a path is always the least restrictive option. It is preferable to installing bollards, gates or barriers, all of which will restrict people's movement.

Bollards

Using bollards with a gap is a simple way of managing the access to a path.

A single bollard or staggered row of bollards at the start or end of a path will:

- ❖ allow users to move around them;
- ❖ slow users down on their approach to them; and
- ❖ prevent unauthorised vehicles getting onto a path.

Bollards can be fixed, removable, collapsible or telescopic, and made from wood, plastic, galvanised steel, stainless steel, cast iron or concrete. A wide choice of designs and styles is available from street furniture suppliers to suit any location.

Leave a clear space of at least 1500mm around a bollard or between bollards. If the clear space of a gap at the start or end of a path does not allow for installation of a single bollard, you can offset the bollard to achieve a 1500mm wide gap.

Bollards can be installed at various heights, ranging from 400mm to 1000mm. The higher you install them, the more clearly visible they are to everyone.

The location and spacing of staggered bollards is important to make sure that they are effective at preventing vehicles from accessing a path, while ensuring that people can still safely move around and through them.

Chicanes

The purpose of chicanes is to slow users down when approaching a potential hazard, e.g. a busy road at the end of a path, or a junction or sharp bend on a path. The layout and gap in the chicane will determine who will be able to pass through.

There are many different chicane designs now available, ranging from simple to more innovative, and using various materials. You can purchase them from street furniture suppliers or have them made by a metalsmith.

Barriers

Barriers are used primarily to manage or control vehicle access to greenspaces or paths.

We recommend that you use these designs in combination with a 1500mm gap, gap with bollards, chicane, or self-closing gate. They will continue to allow access onto the path, while the barrier stops vehicles gaining access.

Design sheets

The following design sheets are contained in this section:

[5.1 Timber gap](#)

[5.2 Bollards](#)

[5.3 Kent carriage gap](#)

[5.4 Metal hoop chicane](#)

[5.5 Low level timber vehicle barrier](#)

[5.6 Triangular vehicle barrier](#)

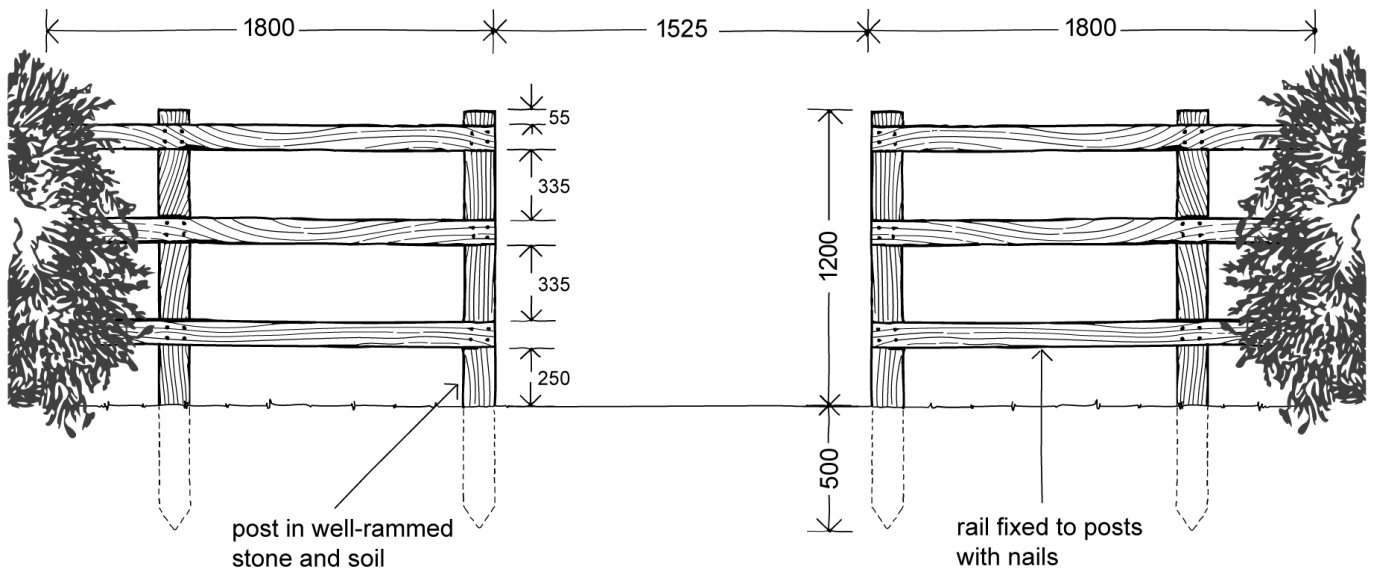
[5.7 Horse-friendly vehicle barrier](#)



5.1 Timber gap



Elevation



This basic design provides a structured gap that assists the users in following the line of a path through a boundary. The minimum width of the gap is 1525mm.



Materials List

For one fenced gap:

- ❖ 2 x treated sawn timber square posts, 1700 x 150 x 150mm
- ❖ 2 x treated sawn timber square posts, 1700 x 100 x 100mm
- ❖ 6 x treated sawn timber rails, 1800 x 75 x 50mm
- ❖ 24 x galvanised round wire nails, 100mm.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

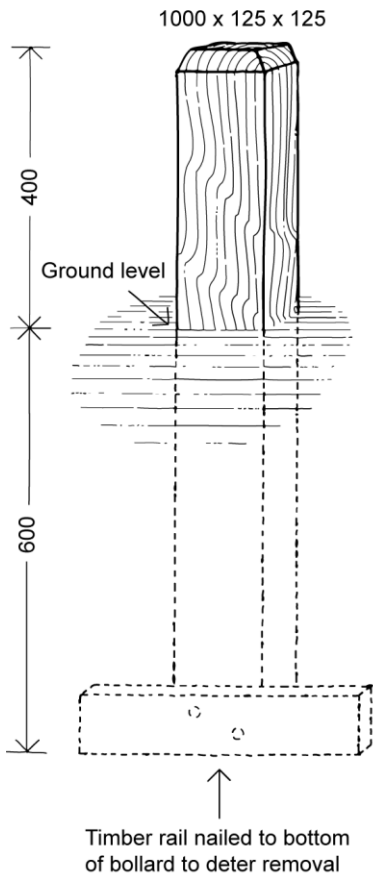
- ❖ Dig 2 x 150mm square holes to a depth of 500mm, at a spacing of 1500mm between the inside edges of the holes.
- ❖ Place the posts in the middle of the holes. Check that the posts are 1200mm above the ground.
- ❖ Carefully ram stones or rubble around the bottom of the posts. Use a spirit level to check that the posts are square and standing upright.
- ❖ Fill the rest of the holes with well-rammed soil in layers. Do not use concrete as it can cause the timber to rot quickly.
- ❖ Dig 2 x 100mm square holes to a depth of 500mm, at 1000mm centres from the inside edges of the larger posts.
- ❖ Place the posts in the holes and backfill them in the same way as the posts above.
- ❖ Fix 3 x 1800mm long rails onto the posts with 4 x 100mm nails per rail. Position the rails on the posts, the bottom rail 250mm above the ground, the middle rail 335mm above the top edge of the bottom rail, and the upper rail 335mm above the top edge of the middle rail, with 55mm gaps between the tops of the posts.



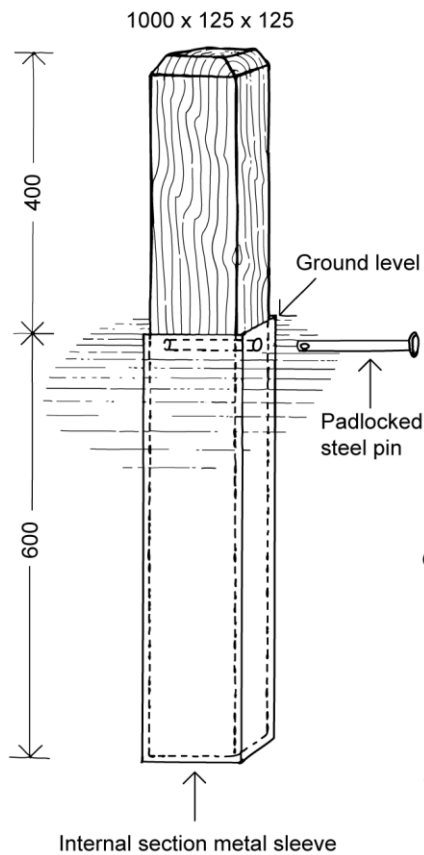
5.2 Bollards



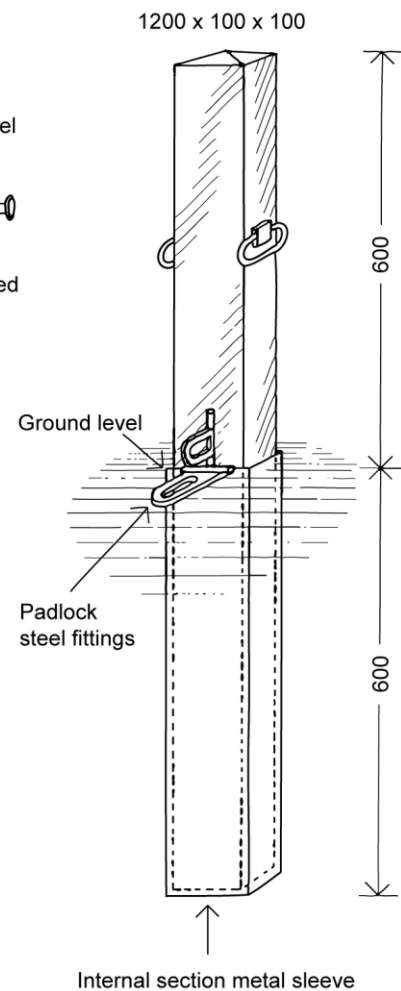
Fixed timber bollard



Removable timber bollard



Removable steel bollard

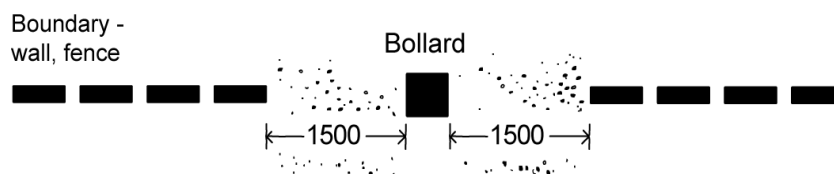


These basic bollards can be made locally or purchased from street furniture suppliers. They can be made of softwoods, hardwoods or metal. They can be fixed into the ground where vehicle access is not needed, or they can be removable, where access is necessary for certain vehicles.

Example layouts

Single bollard

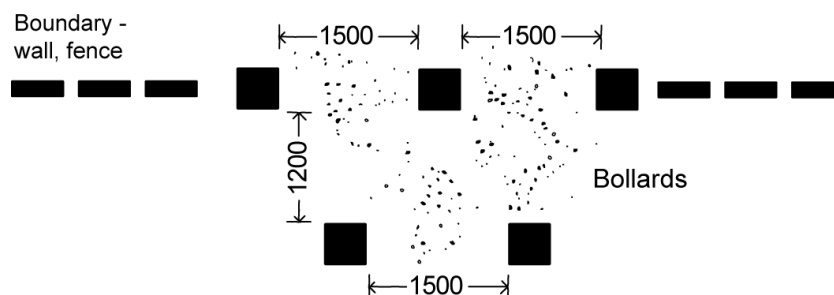
One bollard with two 1500mm wide gaps between the bollard and ends of a boundary.



Where the start or end of a path does not cross or meet a boundary, install bollards on both sides of the path on the verges to create two 1500mm wide gaps.

Where clear space will not allow for two 1500mm wide gaps, offset the bollard to one side to provide one 1500mm gap.

Staggered bollards Each row of bollards provides a clear width of 1500mm between each bollard and at least 1200mm of clear space between each row.



Materials List

Fixed timber bollard:

- ❖ 1 x treated sawn timber square bollard, 1000 x 125 x 125mm
- ❖ 1 x treated sawn timber rail, 400 x 100 x 50mm
- ❖ 2 x galvanised round wire nails, 100mm.

Removable timber bollard:

- ❖ 1 x treated sawn timber square bollard, 1000 x 125 x 125mm
- ❖ 1 x galvanised steel plate sleeve, 600 x 130 x 130 x 6mm
- ❖ 1 x galvanised steel pin, 200 x 20mm
- ❖ ST4 (C20) concrete, 150mm around the bollard.

Removable steel bollard:

- ❖ 1 x galvanised steel square bollard, 1200 x 100 x 100mm (with two handles)
- ❖ 1 x galvanised steel plate sleeve, 600 x 105 x 105 x 6mm
- ❖ 1 x galvanised steel padlock fittings
- ❖ ST4 (C20) concrete, 150mm around the bollard.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

Fixed timber bollard:

- ❖ Fix the timber rail on the bottom of the bollard with 2 x 100mm nails.
- ❖ Dig a 500 x 500mm hole to a depth of 600mm.
- ❖ Place the bollard and rail in the middle of the hole. Check the bollard is 400mm above ground.
- ❖ Carefully ram stones or rubble around the rail and bottom of the bollard. Use a spirit level to check that the bollard is square and standing upright.
- ❖ Fill the rest of the hole with well-rammed soil, in layers, to the level of the surrounding surface. Do not use concrete as it can rot the timber quickly.

Removable timber bollard:

- ❖ Dig a 500 x 500mm hole to a depth of 600mm.
- ❖ Place the steel plate sleeve in the middle of the hole. Check that the top of the sleeve is level with the surrounding ground level – it should not protrude above ground level as it could cause a trip hazard. Use a spirit level to check that the sleeve is square and standing upright. Check also that the bollard will be 400mm above the ground.
- ❖ Carefully backfill the hole around the bollard with concrete to the level of the sleeve edges and surrounding surface.
- ❖ Place the bollard in the sleeve once the concrete has set hard, and secure with a steel pin and padlock.

Removable steel bollard:

- ❖ Dig a 500 x 500mm hole to a depth of 600mm.
- ❖ Place the steel plate sleeve in the middle of the hole. Check that the top of the sleeve is level with the surrounding ground level – it should not protrude above ground level as it could cause a trip hazard. Use a spirit level to check that the sleeve is square and standing upright. Check also that the bollard will be 600mm above the ground.
- ❖ Carefully backfill the hole around the bollard with concrete to the level of the sleeve edges and surrounding surface.
- ❖ Place the bollard in the sleeve once the concrete has set hard, and attach it securely to the sleeve padlock fittings with a padlock.

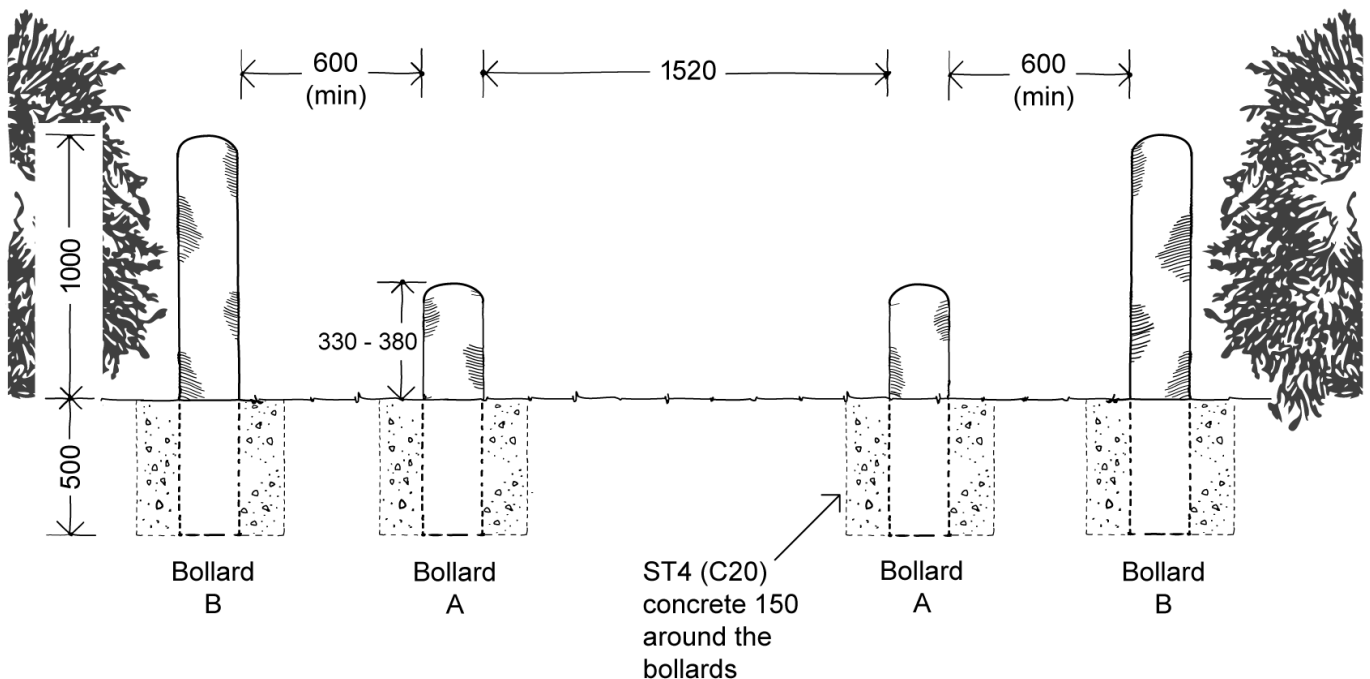


5.3 Kent carriage gap



Elevation

Place obstructions outside of Bollards 'B' to prevent bypassing of the gaps



The Kent carriage gap is designed to provide access for horse-drawn carriages and to block access to vehicles.

The line, height and gap between the bollards will allow:

- ❖ most horse-drawn carriages to pass between them; and
- ❖ walkers, cyclists, horse riders, wheelchairs and mobility scooters to move around them.

The carriage gap will not stop motorcycles from getting onto a path.

One or more of the bollards forming the 1520mm gap can be retractable or removable to allow for maintenance access by a vehicle, where required.



Materials List

Bollard A:

- ❖ 2 x galvanised steel round bollards, 880 x 200mm diameter
- ❖ ST4 (C20) concrete, 150mm around the bollard.

Bollard B:

- ❖ 2 x galvanised steel round bollards, 1500 x 200mm diameter
- ❖ ST4 (C20) concrete, 150mm around the bollard.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

Bollard A:

- ❖ Dig 2 x 500mm wide round holes to a depth of 500mm, at a spacing of 1200mm between the inside edges of the holes.
- ❖ Place the lower bollards in the middle of the holes. Check that the gap between the inside edges of the bollards is 1520mm. Check that the bollards are 380mm above the surface, and use a spirit level to check that they are square and upright.
- ❖ Carefully backfill the holes around the bollards with concrete to the level of the surrounding surface.

Bollard B:

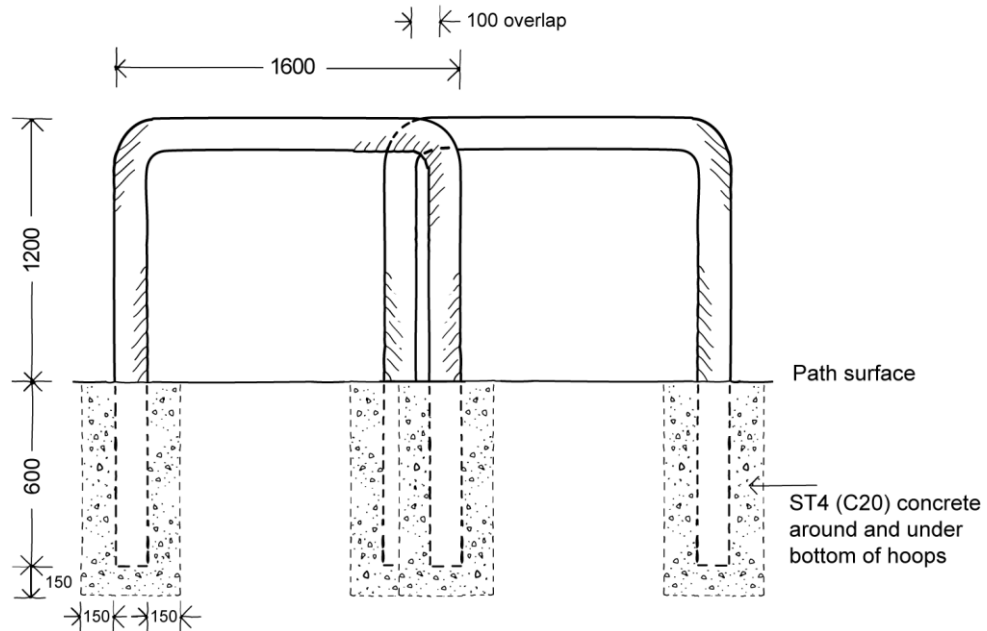
- ❖ Dig 2 x 500mm wide round holes to a depth of 500mm, at a spacing of 450mm between the inside edges of the holes and the outside edges of the lower bollards.
- ❖ Place the bollards in the middle of the holes. Check that the gap between the inside edges of the higher bollards and the outside edges of the lower bollards is 600mm. Check that the higher bollards are 1000mm above the surface, and use a spirit level to check that they are square and standing upright.
- ❖ Carefully backfill the holes around the bollards with concrete to the level of the surrounding surface.



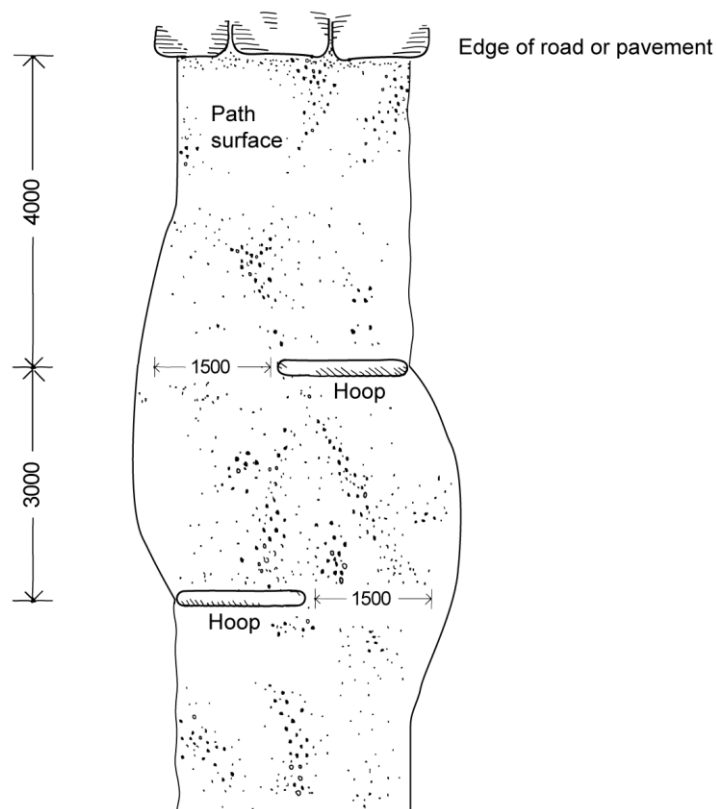
5.4 Metal hoop chicane



Elevation



Plan



This consists of prefabricated metal hoops, creating 1500mm wide gaps at the start or end of a path. The clear space of 3000mm in the chicane, and 4000mm between the chicane and road or pavement, provides room for turning.



Materials List

For one chicane:

- ❖ 2 x galvanised steel hoops, 1800 x 1600 x 100mm diameter
- ❖ ST4 (C20) concrete, 150mm around and under bottom of hoops.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

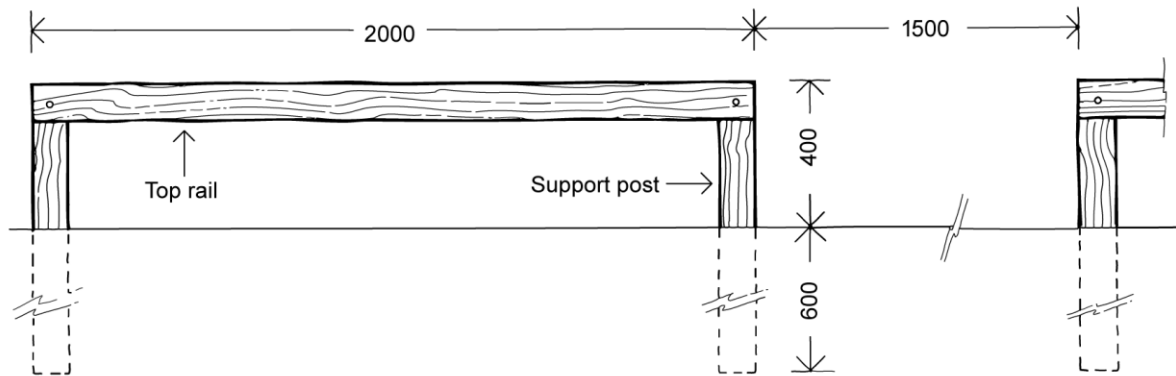
- ❖ On the left side of the path, 7000mm from the edge of the road or pavement and 100mm inwards from the edge of the path surface, dig a 400mm wide round hole to a depth of 600mm.
- ❖ On the right side of the path and at the edge of the surface, 4000mm from the edge of the road or pavement, dig a 400mm wide round hole to a depth of 750mm.
- ❖ From the inside edges of those holes and towards the middle of the path, dig 2 x 400mm wide round holes to a depth of 600mm and at a spacing of 1300mm.
- ❖ We recommend that the spacing between the middle of those holes is 3000mm, and that the inside edges of the holes overlap by 100mm.
- ❖ Place concrete in the bottom of the holes to form 150mm thick base layers.
- ❖ Place the hoops in the middle of the holes on concrete base layers. Check that the gap between the hoops is 3000mm wide and that the gaps between the ends of the hoops and edges of the path surface are 1500mm wide. Check that the hoops are overlapping by 100mm. Check that the hoops are 1200mm above the surface, and use a spirit level to check that they are square and standing upright.
- ❖ Carefully backfill the holes around the hoops with concrete to the level of the surrounding surface.



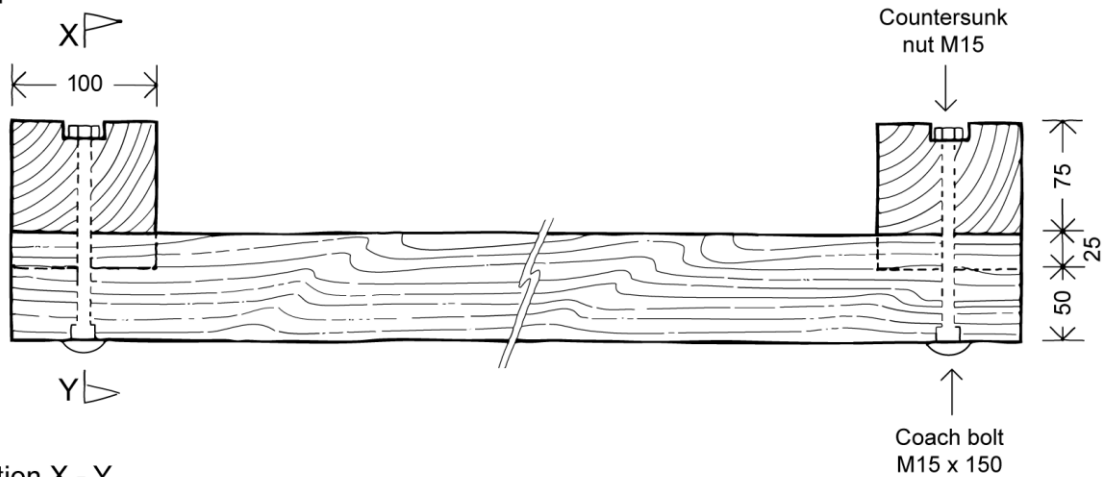
5.5 Low level timber vehicle barrier



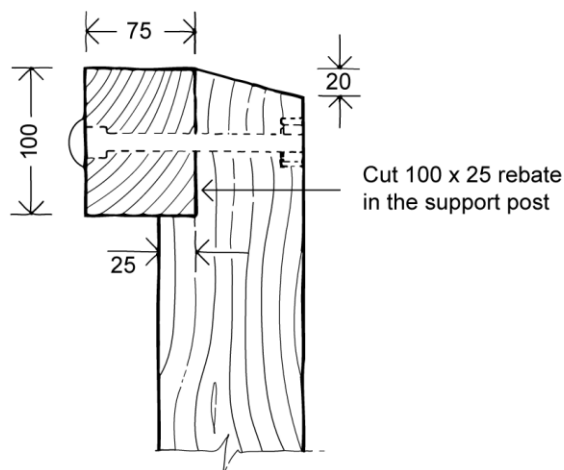
Elevation



Plan



Section X - Y



This basic timber barrier stops vehicles driving onto or parking on verges. Leave a gap of 1500mm between each section so people can walk through.



Materials List

For one rail section:

- ❖ 1 x treated sawn timber top rail, 2000 x 100 x 75mm
- ❖ 2 x treated sawn timber support posts, 1000 x 100 x 100mm
- ❖ 2 x galvanised coach bolts, 150mm x M15 diameter
- ❖ 2 x galvanised nuts, M15 diameter.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

Off site:

- ❖ Cut 1 x top rail, 2000mm long, and 2 x support posts, each 1000mm long.
- ❖ Cut 100 x 25mm rebates in each support post.
- ❖ Weather the tops of the support posts by 20mm to allow water to run off.
- ❖ Squarely clamp the top rail to the support posts in the rebates.
- ❖ Drill the holes for coach bolts and countersink the nuts in and through the support posts and top rail.
- ❖ Fix the top rail to the support posts with 2 x 150mm coach bolts and countersink the nuts (one bolt and nut per post).

On site:

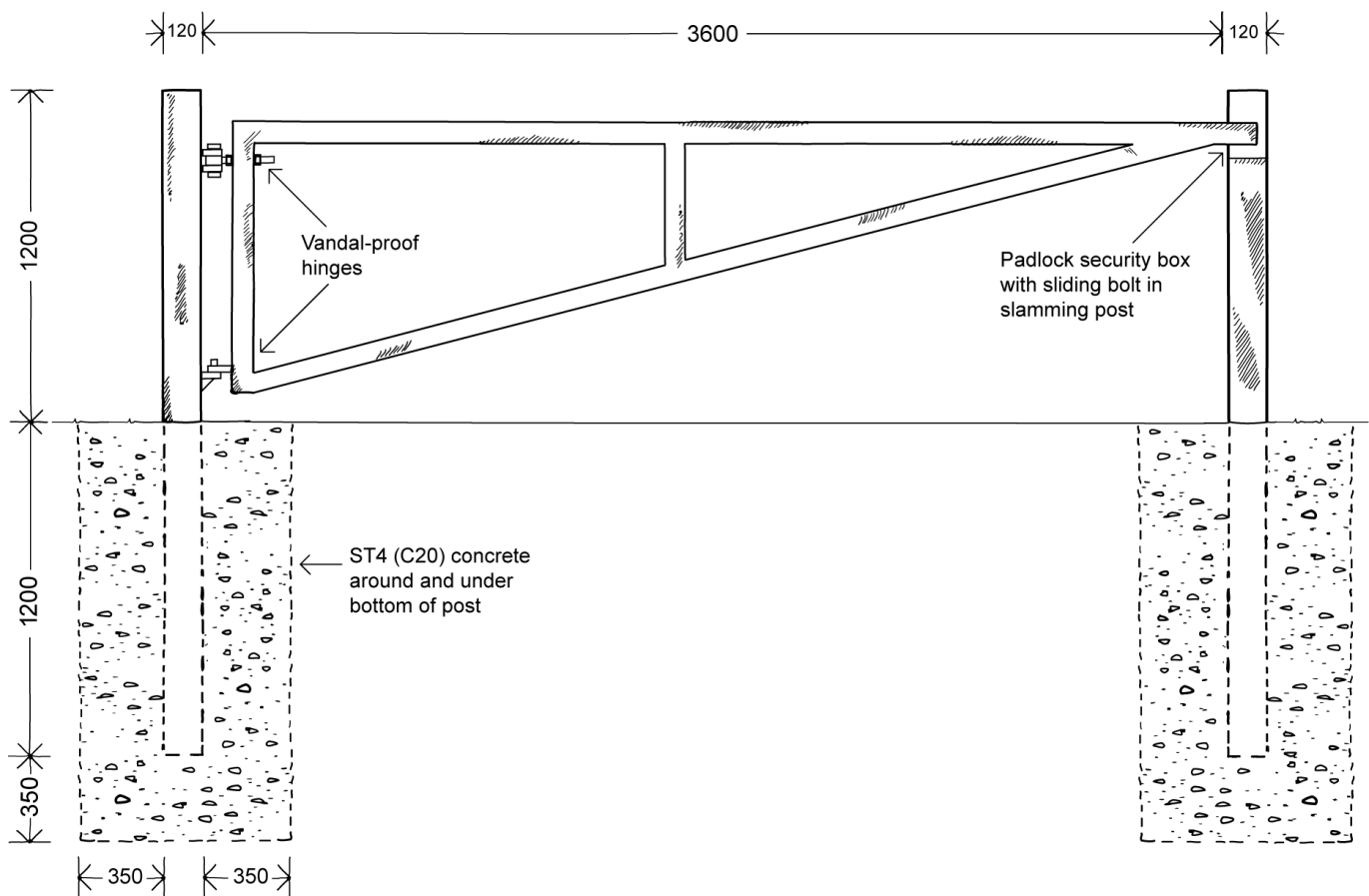
- ❖ Dig 2 x 300mm square holes to a depth of 600mm, and 2000mm apart.
- ❖ Place the support posts in the holes with the top rail attached. Check that the top of the top rail is 400mm above the ground.
- ❖ Carefully ram stones or rubble around the bottom of the posts. With a spirit level, check that the posts and top rail are square and standing upright.
- ❖ Fill the rest of the holes with well-rammed soil in layers to the level of the surrounding surface. Do not use concrete as it can cause the timber to rot quickly.



5.6 Triangular vehicle barrier



Elevation



This strong lockable steel barrier is used to control vehicle access. The barrier opens one way, but can be hung either right- or left-handed. A padlock security box attached to the slamming post protects the padlock from vandalism.



Materials List

- ❖ 1 x galvanised steel barrier, 100 x 50mm rectangular hollow sections, 3600mm wide
- ❖ 1 x galvanised steel hanging post, 2400 x 120 x 120mm
- ❖ 1 x galvanised steel slamming post, 2400 x 120 x 120mm
- ❖ 1 x galvanised steel padlock security box with sliding bolt in slamming post
- ❖ ST4 (C20) concrete, 350mm around and under bottom of posts.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

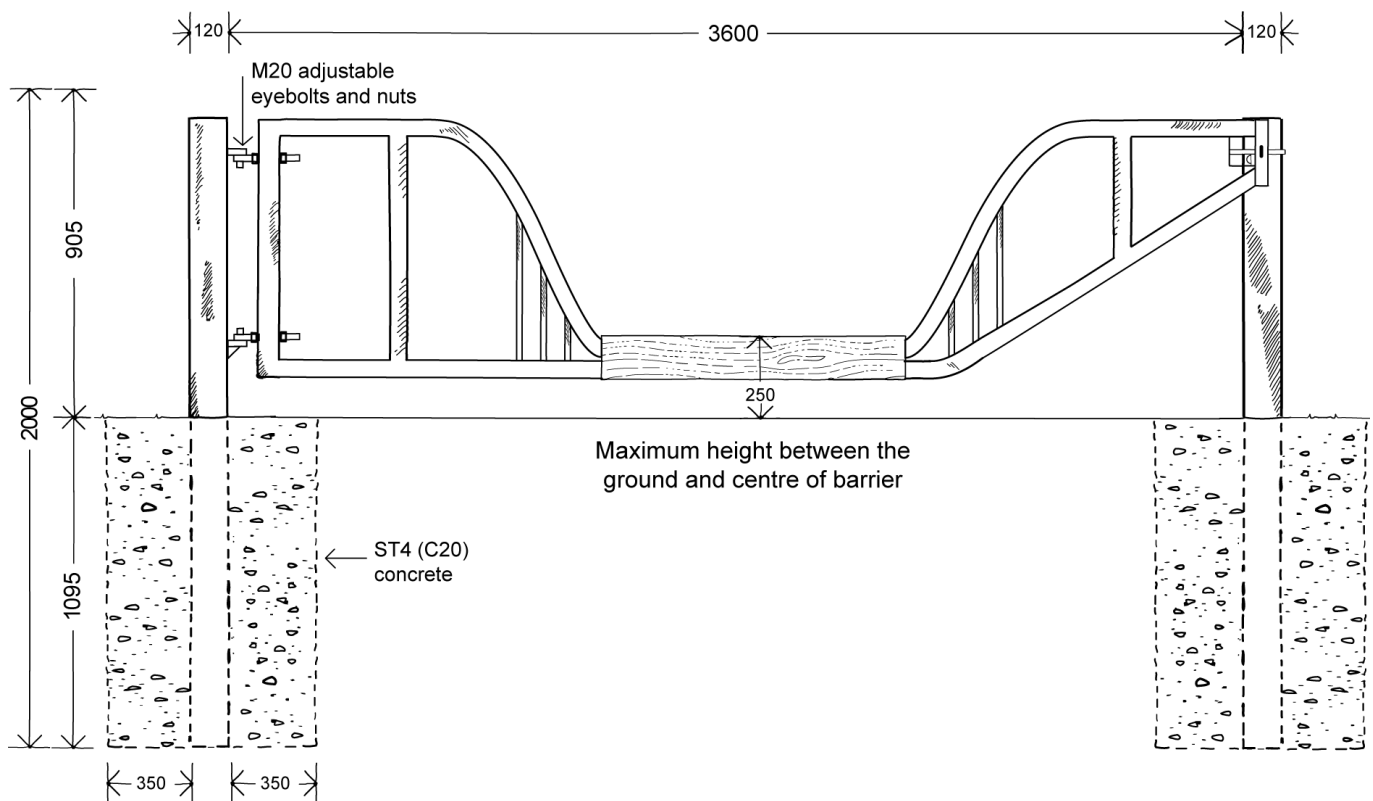
- ❖ Install the barrier in accordance with the manufacturer's instructions.
- ❖ Dig an 820mm square hole to a depth of 1550mm for the hanging post.
- ❖ Place concrete in the bottom of the hole to form a 350mm thick base layer.
- ❖ Place the hanging post in the hole on the concrete base layer. Check that the post is 1200mm above the ground and, with a spirit level, that it is square and standing upright.
- ❖ Carefully backfill the hole around the post with concrete to the level of the surrounding surface.
- ❖ Hang the barrier on the hanging post once the concrete sets hard.
- ❖ Dig another 820mm square hole to a depth of 1550mm for the slamming post – 3600mm from the hanging post – and install it in the same way as the hanging post.



5.7 Horse-friendly vehicle barrier



Elevation



This barrier controls vehicle access but allows horses to step over it. The gap within the gate is 1200mm wide at the bottom and 2000mm wide at the top. The timber rails at the bottom reduce the noise of horses' hooves catching as they step over. The surface under the barrier and on its approach should be level, firm and well drained (not hard, slippery or stony) so that a horse can safely jump over without slipping. This barrier is not suitable for use on concrete or bitmac surfaces as there is a risk of horses slipping on these surfaces when stepping over the barrier in wet conditions. We recommend leaving a 1500mm gap to the side of the barrier to ensure that everyone can access the path.



Materials List

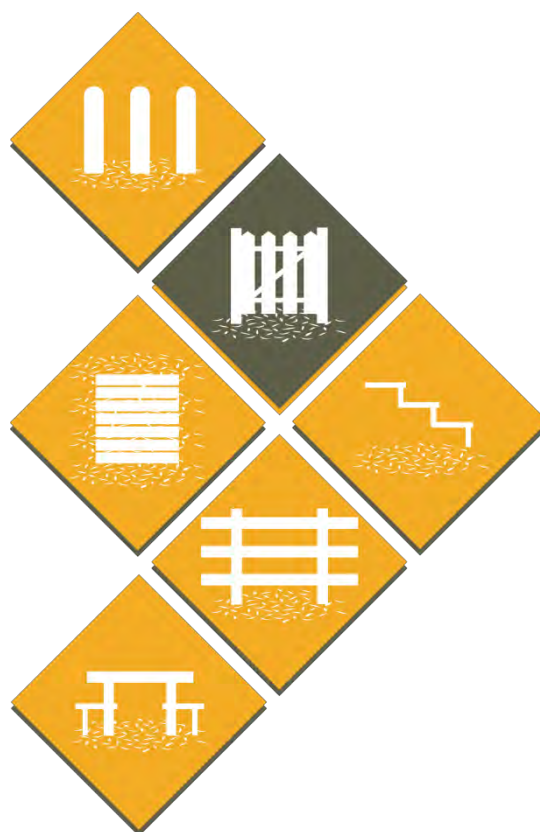
- ❖ 1 x galvanised steel tubular barrier with 50 x 50mm box section stiles and timber cladding rails, 3600mm wide
- ❖ 1 x galvanised steel hanging post, 2000 x 114 x 114mm
- ❖ 1 x galvanised steel slamming post, 2000 x 114 x 114mm
- ❖ 2 x galvanised adjustable eyebolts and nuts, 180mm x M20 diameter
- ❖ ST4 (C20) concrete, 350mm around the posts.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

- ❖ Install the barrier in accordance with the manufacturer's instructions.
- ❖ Dig an 814mm square hole to a depth of 1095mm for the hanging post.
- ❖ Place the hanging post in the hole. Check that the post is 905mm above the ground and, with a spirit level, that it is square and standing upright.
- ❖ Carefully backfill the hole around the post with concrete to the level of the surrounding surface.
- ❖ Hang the barrier on the hanging post once the concrete sets hard. Adjust the eyebolts and nuts so the barrier is horizontal and the height of the barrier between the ground and top of the barrier timber cladding rails is 250mm.
- ❖ Dig another 814mm square hole to a depth of 1095mm for the slamming post – 3600mm from the hanging post – and install it in the same way as the hanging post.



6 Gates

Only use gates where a gap would be unsuitable and when you need to provide access for vehicles and manage livestock.

This Guide includes designs for one- and two-way opening, self-closing gates and field gates. These gates are now available in a variety of designs from agricultural and specialist suppliers.

You should always choose the least restrictive gate to use on a path. A gate that opens towards and away from you provides better access for everyone.

Kissing gates are not included in this Guide, as they do not comply with the Land Reform Act 2003 and Equality Act 2010. Kissing gates provide pedestrian access, but they will restrict access for anyone with a pram, buggy, wheelchair or mobility scooter, or anyone on a bicycle or horse.

Key design considerations

- ❖ **Material** – Timber and metal are the most commonly used materials for gates.
- ❖ **Manoeuvring space** – Leave sufficient clear space to allow users to get into position to open, pass through and close a gate. A minimum of 3000mm x 3000mm space on either side of a gate is suitable for most users.

- ❖ **Firm level ground** – Install gates on firm, free-draining and level ground.
- ❖ **Position** – Install gates at least 4000mm back from the road, to provide sufficient room for all users to safely approach, turn, and move through them.
- ❖ **Width** – The recommended minimum width for gates in this Guide is 1500mm. This will allow unrestricted access for everyone, complies with the Land Reform (Scotland) Act 2003 and the Equality Act 2010, and is consistent with BS 5709:2006 – Gaps, gates and stiles.
- ❖ **Visibility** – Make sure that the gate is clearly visible to people as they approach. Make sure any vegetation growing next to a gate is regularly cut back to maintain clear sight lines from both directions.
- ❖ **Hazards** – There should be no barbed wire or electric fence within 1000mm of the manoeuvring space of a gate. There also should be no protrusions or sharp edges, which could catch clothes or cause injury. Edges should be rounded off to a 3mm minimum.
- ❖ **Catches and latches** – These should be:
 - visible;
 - accessible to all users (including those with restricted reach) from both sides of the gate;
 - safe and simple to open (not stiff or liable to trap fingers);
 - easy to grasp in one hand without requiring great strength or dexterity to twist, pinch or pull; and
 - well maintained as they can become difficult to open.

(See the examples on the next page.)

- ❖ **One-way opening gate** – This gate is better for providing access where livestock is always present. It should be used next to roads and always open inwards, away from the road. It also needs more space next to it to allow cyclists, wheelchair users, mobility scooter users and horse riders the necessary turning space to move around and through the gate.
- ❖ **Two-way opening gate** – This gate opens in both directions, towards and away from you. It is less restrictive, easier to use, and preferable to one-way opening gates.



Catches and latches examples



Easy latch

This is a spring latch handle mechanism used on one- and two-way opening, self-closing gates made only by Centrewire Limited.



Stock-proof handle

This handle prevents cattle accidentally opening a gate when rubbing against it. The sliding metal sleeve that fits over the top of the easy latch handle has a latch that catches on a retaining handle bracket when the sleeve is lowered back down the inside handle. To open the stock-proof handle, you lift the sleeve up at the same time as pulling the main handle across to open the gate.



Trombone handle

This handle, which looks like the sliding part of a trombone, is easy to reach from both sides of a gate and requires less effort to open than other handles. A cow rubbing its head against this type of handle will easily move it, so its use is not recommended in fields where cattle are present. Horse riders' reins may also get caught by the open end of the handle.

Timber self-closing gates

Timber self-closing gates are often preferred in the countryside to metal versions of the same gate because they can look more appropriate to the location. They are more difficult to install than the metal gates and require regular maintenance to ensure that all of the individual fittings continue to work properly.

Metal self-closing gates

Metal self-closing gates are stock-proof and made from galvanised steel and steel mesh. The gates have offset hinges, which automatically swing the gate shut. The H-frame design keeps the latch and gate aligned, and makes it easier to install the crossbar in the ground. The manufacturer normally assembles the gate, H-frame, latch, and handle and catch together. To make the handling and installation of the H-frame easier, you can separate the gate from the frame.

Field gates

You should use field gates when you need to manage vehicle access and the movement of livestock. Large field gates can be difficult for some users to open and close. The distance between the posts is determined by how and where the hinges and latching mechanism are attached. You can install field gates to make them one- or two-way opening.

Design sheets

The following design sheets are contained in this section:

[6.1 Timber two-way self-closing gate](#)

[6.2 Timber one-way self-closing gate](#)

[6.3 Metal two-way self-closing gate](#)

[6.4 Metal one-way self-closing gate](#)

[6.5 Metal two-way self-closing deer gate](#)

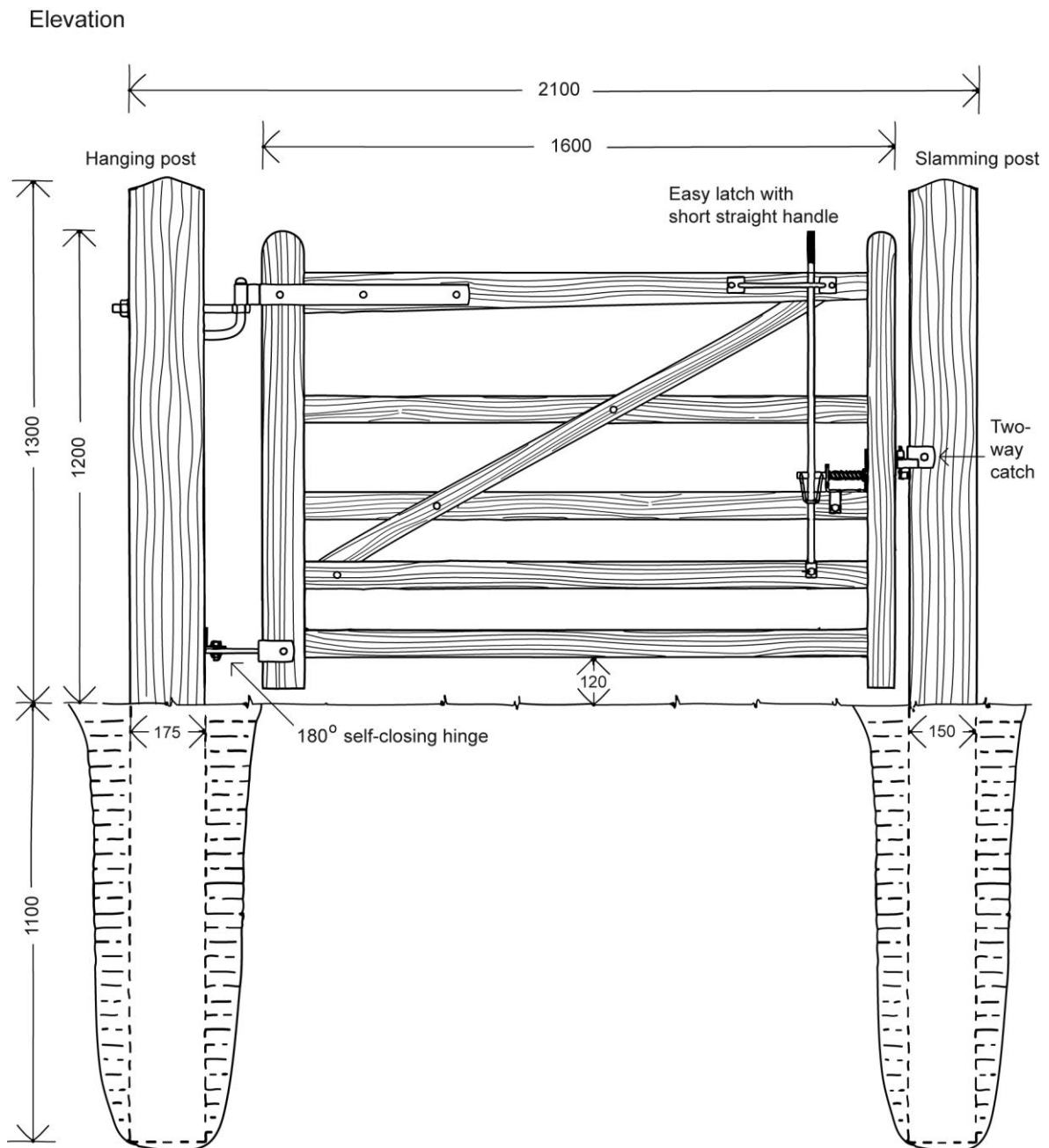
[6.6 Timber field gate](#)

[6.7 Metal field gate](#)

[6.8 Metal 2-in-1 combination gate \(two-way self-closing\)](#)



6.1 Timber two-way self-closing gate



This is a timber gate that opens forwards, avoiding the need to move backwards when opening the gate. It has a two-way catch and an easy latch with a short straight handle, which can be replaced with a longer straight handle, stock-proof handle or trombone handle. This gate opens by either lifting the catch then pushing the gate, or pulling the handle then pushing the gate. People in wheelchairs, mobility scooters or bicycles find it easier to open the gate using the catch. In contrast, mounted horse riders find it easier to use the handle, as they do not need to reach down.



Materials List

- ❖ 1 x treated timber gate, 1600 x 1200mm
- ❖ 1 x treated timber hanging post, 2400 x 175 x 175mm
- ❖ 1 x treated slamming post, 2400 x 150 x 150mm
- ❖ 1 x galvanised hook to bolt hinge, 20mm pin, 330mm
- ❖ 1 x galvanised 180° self-closing hinge
- ❖ 1 x galvanised double strap band with offset eye, 20mm pin, 600mm
- ❖ 1 x galvanised adjustable bottom strap, 20mm pin
- ❖ 1 x galvanised handle (options: straight, stock-proof or trombone handle)
- ❖ 1 x galvanised two-way easy latch kit
- ❖ 1 x two-way catch
- ❖ 2 x plastic „Lift catch then push gate“ sign to attach to slamming post above catch.



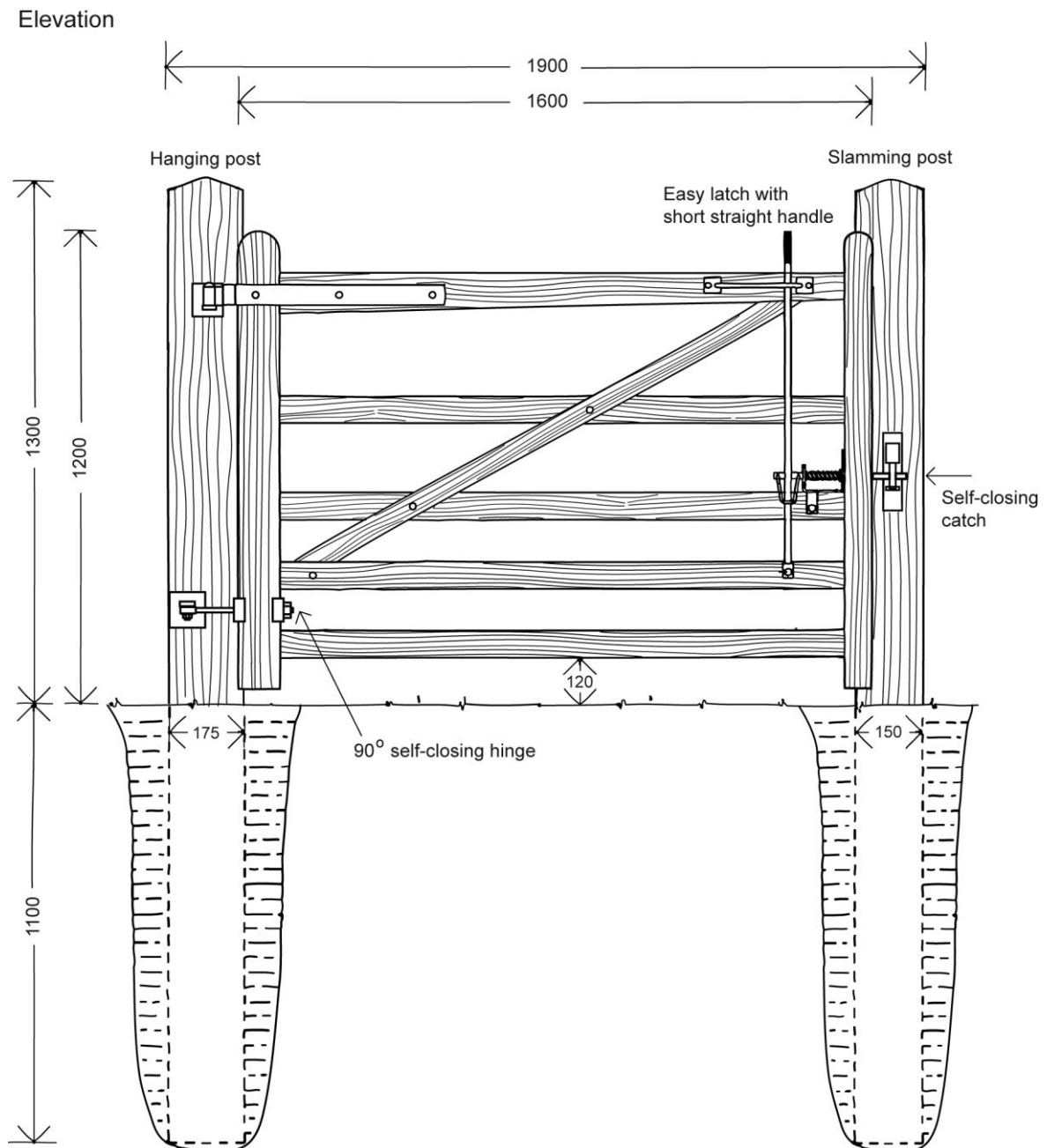
Installation

Before you start to dig holes, check the area for underground pipes and cables.

- ❖ Fix the self-closing hinges to the gate and hanging post.
- ❖ Dig a 300mm square hole for the hanging post, to a depth of 1100mm.
- ❖ Place the post in the middle of the hole and carefully ram stones or rubble around the bottom so it stands upright. Check that the post is 1300mm above the ground, and use a spirit level to check that it is square.
- ❖ Fill the rest of the hole with layers of well-rammed soil. Do not use concrete as it can cause the timber to rot quickly.
- ❖ Attach the gate to the hanging post. Check that the gate is horizontal between the posts, and 120mm clear of the ground.
- ❖ Dig the hole for the slamming post and install it in the same way as the hanging post.
- ❖ Fix the latch and handle on the gate, and the catch to the slamming post.



6.2 Timber one-way self-closing gate



This one-way self-closing gate is designed to hang on one side of the posts so it opens inwards into the field where the livestock is present. It has a one-way easy latch with a short handle and a self-closing catch.



Materials List

- ❖ 1 x treated timber gate, 1600 x 1200mm
- ❖ 1 x treated timber hanging post, 2400 x 175 x 175mm
- ❖ 1 x treated timber slamming post, 2400 x 150 x 150mm
- ❖ 1 x galvanised 90° self-closing hinge
- ❖ 1 x galvanised double strap band with offset eye, 20mm pin, 600mm
- ❖ 1 x galvanised adjustable bottom strap, 20mm pin
- ❖ 1 x galvanised handle (options: straight, stock-proof or trombone handle)
- ❖ 1 x galvanised one-way easy latch kit
- ❖ 1 x self-closing catch.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

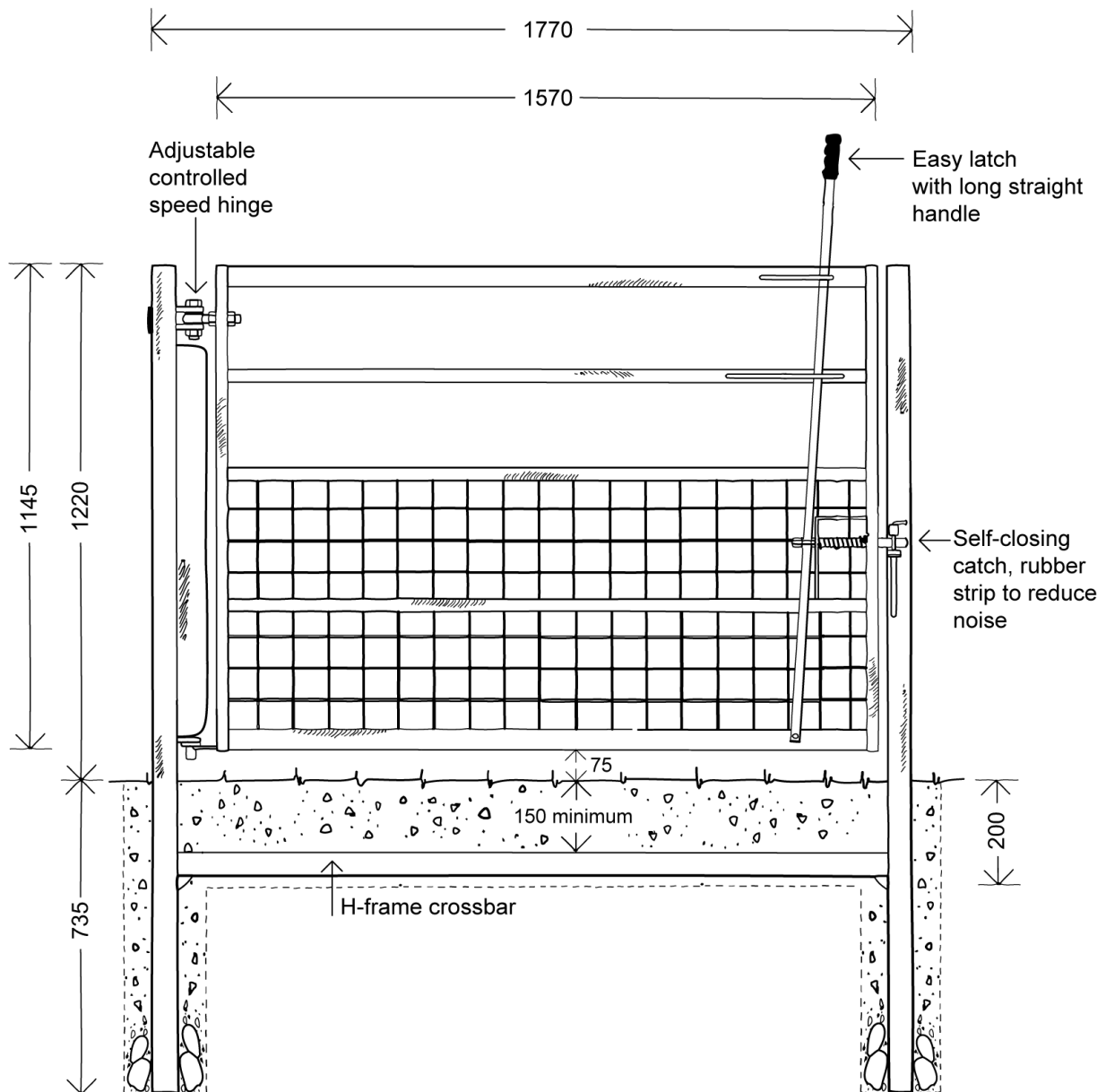
- ❖ Fix the self-closing hinges to the gate and hanging post.
- ❖ Dig a 300mm square hole for the hanging post, to a depth of 1100mm.
- ❖ Place the post in the middle of the hole and carefully ram stones or rubble around the bottom so it stands upright. Check that the post is 1300mm above the ground, and use a spirit level to check that it is square.
- ❖ Fill the rest of the hole with layers of well-rammed soil. Do not use concrete as it can cause the timber to rot quickly.
- ❖ Attach the gate to the hanging post. Check that the gate is horizontal between the posts, and 120mm clear of the ground.
- ❖ Dig the hole for the slamming post and install it in the same way as the hanging post.
- ❖ Fix the latch and handle on the gate, and the catch to the slamming post.



6.3 Metal two-way self-closing gate



Elevation



This is a galvanised steel mesh gate with a steel H-frame, two-way self-closing gate system, an easy latch with a straight long handle, and self-closing catches. It also has an adjustable controlled speed hinge system to control the closing speed of the gate.



Materials List

- ❖ 1 x galvanised steel mesh gate, 1145 x 1570mm
- ❖ 1 x galvanised steel H-frame, 1955 x 1770mm
- ❖ 1 x galvanised two-way easy latch kit
- ❖ 1 x galvanised long straight handle
- ❖ 2 x galvanised self-closing catches
- ❖ ST4 (C20) concrete, 150mm around the frame uprights.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

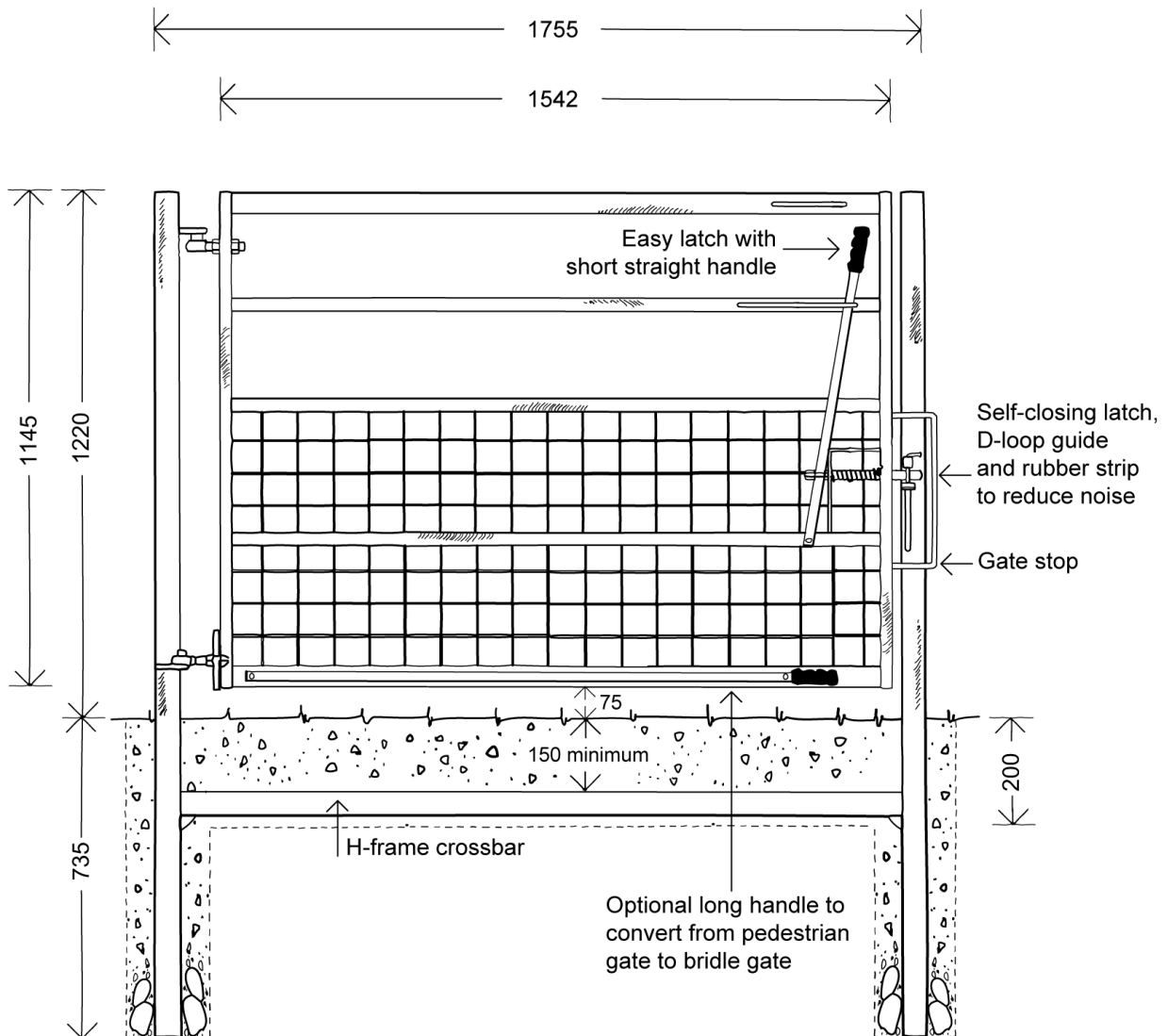
- ❖ Dig 2 x 350mm square holes to a depth of 735mm and a 1 x 150mm wide trench between the holes to a depth of 200mm. The crossbar of the frame should be a minimum of 150mm below the path surface.
- ❖ Lift the frame and crossbar into the two holes and trench. Check the horizontal level of the crossbar – it must be level, even if the path surface is not level. Check that the frame is 1220mm above the ground and use a spirit level to check it is vertically upright.
- ❖ Carefully ram stones or rubble around the bottom of the frame uprights, so the frame can stand upright on its own.
- ❖ Carefully backfill the holes around the frame uprights with concrete. Backfill the trench between the holes around the crossbar with excavated spoil. Let the concrete set hard before attaching the gate to the frame.
- ❖ Attach the gate to the hinges, adjusting the nuts on the eyebolts of the gate so it hangs squarely between the uprights of the frame. Check that the gate is clear of the ground by 75mm.
- ❖ Check that the nuts are tight and that the gate does not close too fast. If it does, adjust the self-closing speed to slow the gate down by tilting the eyebolts on the gate to increase the friction on the hinges.



6.4 Metal one-way self-closing gate



Elevation



This is a galvanised steel mesh gate with a steel H-frame, one-way self-closing gate system, an easy latch with a short straight handle, and self-closing catch. This one-way version is slightly narrower than the two-way gate, measuring 1755mm between the posts, with a gate 1542mm wide. The one-way version of the gate also incorporates a D-loop guide below the self-closing catch to avoid any risk of injury from the latch pin. To prevent the gate opening beyond 90°, a gate stop is fitted. Without the gate stop, the gate will not automatically self-close.



Materials List

- ❖ 1 x galvanised steel mesh gate, 1145 x 1542mm
- ❖ 1 x galvanised steel H-frame, 1955 x 1755mm
- ❖ 1 x galvanised one-way easy latch kit
- ❖ 1 x galvanised short straight handle
- ❖ 1 x galvanised D-loop guide
- ❖ 1 x galvanised gate stop
- ❖ 1 x galvanised self-closing catch
- ❖ ST4 (C20) concrete, 150mm around the frame uprights.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

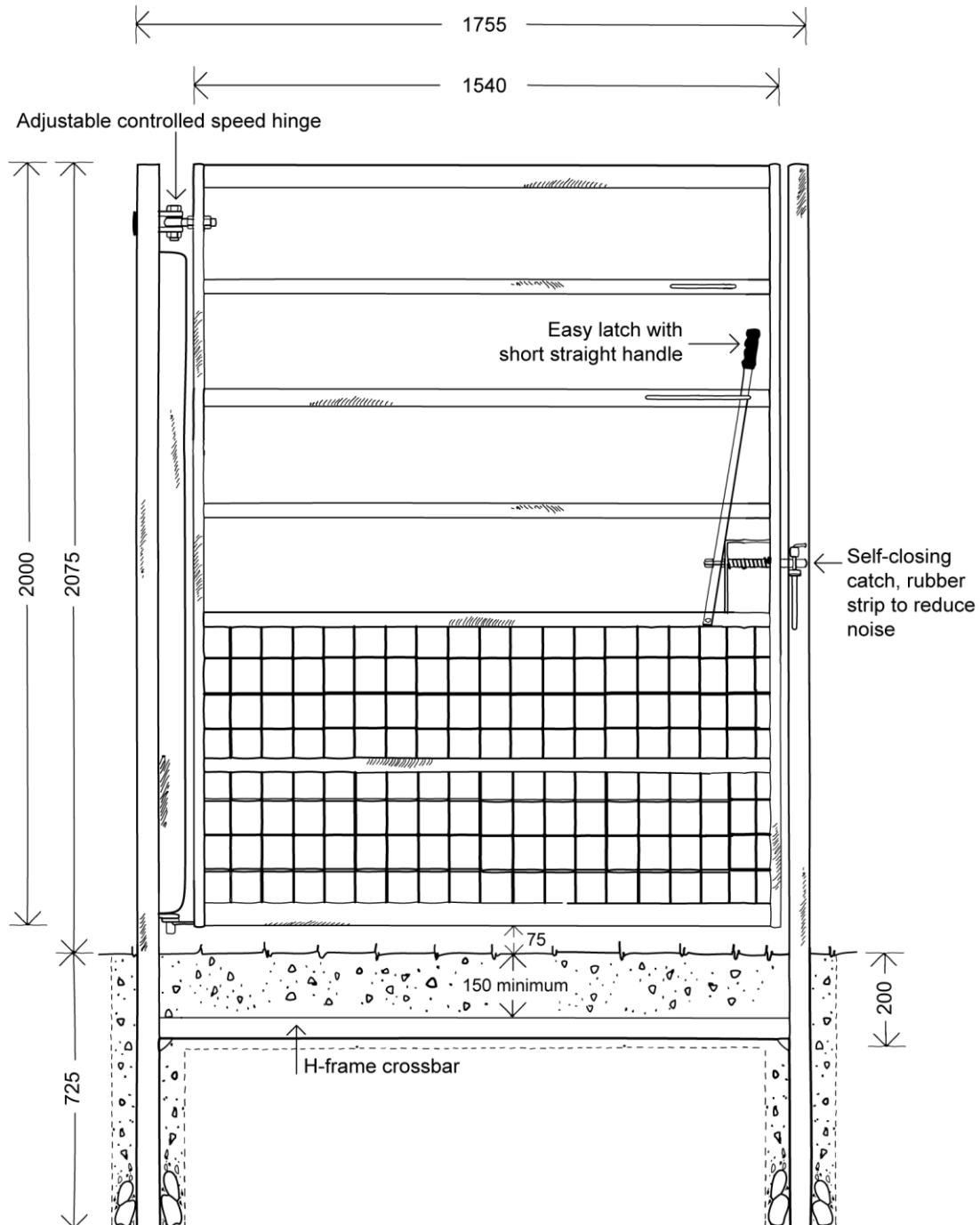
- ❖ Dig 2 x 350mm square holes to a depth of 735mm and a 1 x 150mm wide trench between the holes to a depth of 200mm. The crossbar of the frame should be a minimum of 150mm below the path surface.
- ❖ Lift the frame and crossbar into the two holes and trench. Check the horizontal level of the crossbar – it must be level, even if the path surface is not level. Check that the frame is 1220mm above the ground and use a spirit level to check it is vertically upright.
- ❖ Carefully ram stones or rubble around the bottom of the frame uprights, so the frame can stand upright on its own.
- ❖ Carefully backfill the holes around the frame uprights with concrete. Backfill the trench between the holes around the crossbar with excavated spoil. Let the concrete set hard before attaching the gate to the frame.
- ❖ Attach the gate to the hinges, adjusting the nuts on the eyebolts of the gate so it hangs squarely between the uprights of the frame. Check that the gate is clear of the ground by 75mm.
- ❖ Check that the nuts are tight and that the gate does not close too fast. If it does, adjust the self-closing speed to slow the gate down by tilting the eyebolts on the gate to increase the friction on the hinges.



6.5 Metal two-way self-closing deer gate



Elevation



This is a galvanised steel mesh gate with a steel H-frame. It is self-closing and two-way opening. It has an easy latch with a short straight handle, and self-closing catches, which allows the opening of the gate from both sides of the fence. It also has an adjustable controlled speed hinge system to control the closing speed of the gate.



Materials List

- ❖ 1 x galvanised steel mesh gate, 2000 x 1540mm
- ❖ 1 x galvanised steel H-frame, 2800 x 1755mm
- ❖ 1 x galvanised two-way easy latch kit
- ❖ 1 x galvanised short straight handle (option: trombone handle)
- ❖ 2 x galvanised self-closing catches
- ❖ ST4 (C20) concrete, 150mm around the frame uprights.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

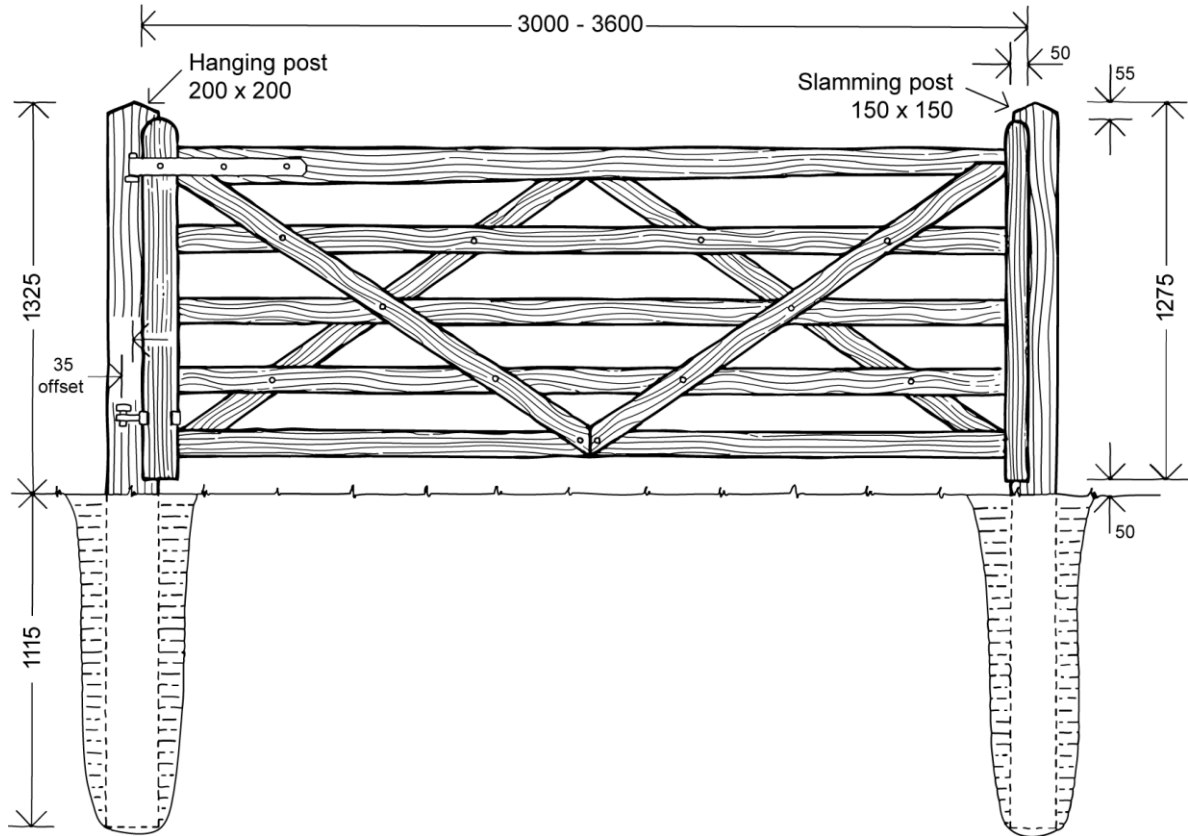
- ❖ Dig 2 x 350mm square holes to a depth of 725mm and a 1 x 150mm wide trench between the holes to a depth of 200mm. The crossbar of the frame should be a minimum of 150mm below the path surface.
- ❖ Lift the frame and crossbar into the two holes and trench. Check the horizontal level of the crossbar – it must be level, even if the path surface is not level. Check that the top of the frame is 2075mm above the ground and use a spirit level to check it is vertically upright.
- ❖ Carefully ram stones or rubble around the bottom of the frame uprights, so the frame stands upright on its own.
- ❖ Carefully backfill the holes around the frame uprights with concrete. Backfill the trench between the holes around the crossbar with excavated spoil. Let the concrete set hard before attaching the gate to the frame.
- ❖ Attach the gate to the hinges, adjusting the nuts on the adjustable hinge of the gate so it hangs squarely between the uprights of the frame. Check that the gate is clear of the ground by 75mm.
- ❖ Check that the nuts are tight and that the gate does not close too fast. If it does, adjust the self-closing speed to slow the gate down by tilting the eyebolts on the gate to increase the friction on the hinges.

Note: Do not strain the wires of a fence off the H-frame. The tension on the wires will pull the frame and gate apart, stopping the gate opening and closing properly.

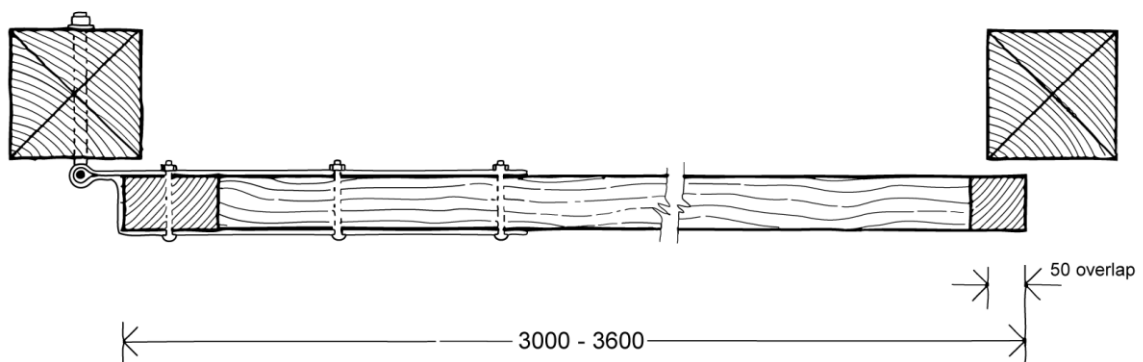


6.6 Timber field gate

Elevation



Plan



Timber field gates are often preferred to metal gates. They can be prone to warping and require regular maintenance to ensure all of the individual fittings continue to work properly. Timber field gates are available from fencing and agricultural suppliers in standard sizes.



Materials List

- ❖ 1 x treated timber gate, five rails, 3000 or 3600 x 1220mm
- ❖ 1 x treated timber square hanging post, 2440 x 200 x 200mm
- ❖ 1 x treated timber square slamming post, 2440 x 150 x 150mm
- ❖ 1 x galvanised hook to bolt hinge, 20mm pin, 330mm
- ❖ 1 x galvanised hook to drive hinge, 20mm pin, 203mm
- ❖ 1 x galvanised double strap band with offset eye, 20mm pin, 600mm
- ❖ 1 x galvanised adjustable bottom strap, 20mm pin
- ❖ 1 x galvanised handy auto latch and striker.



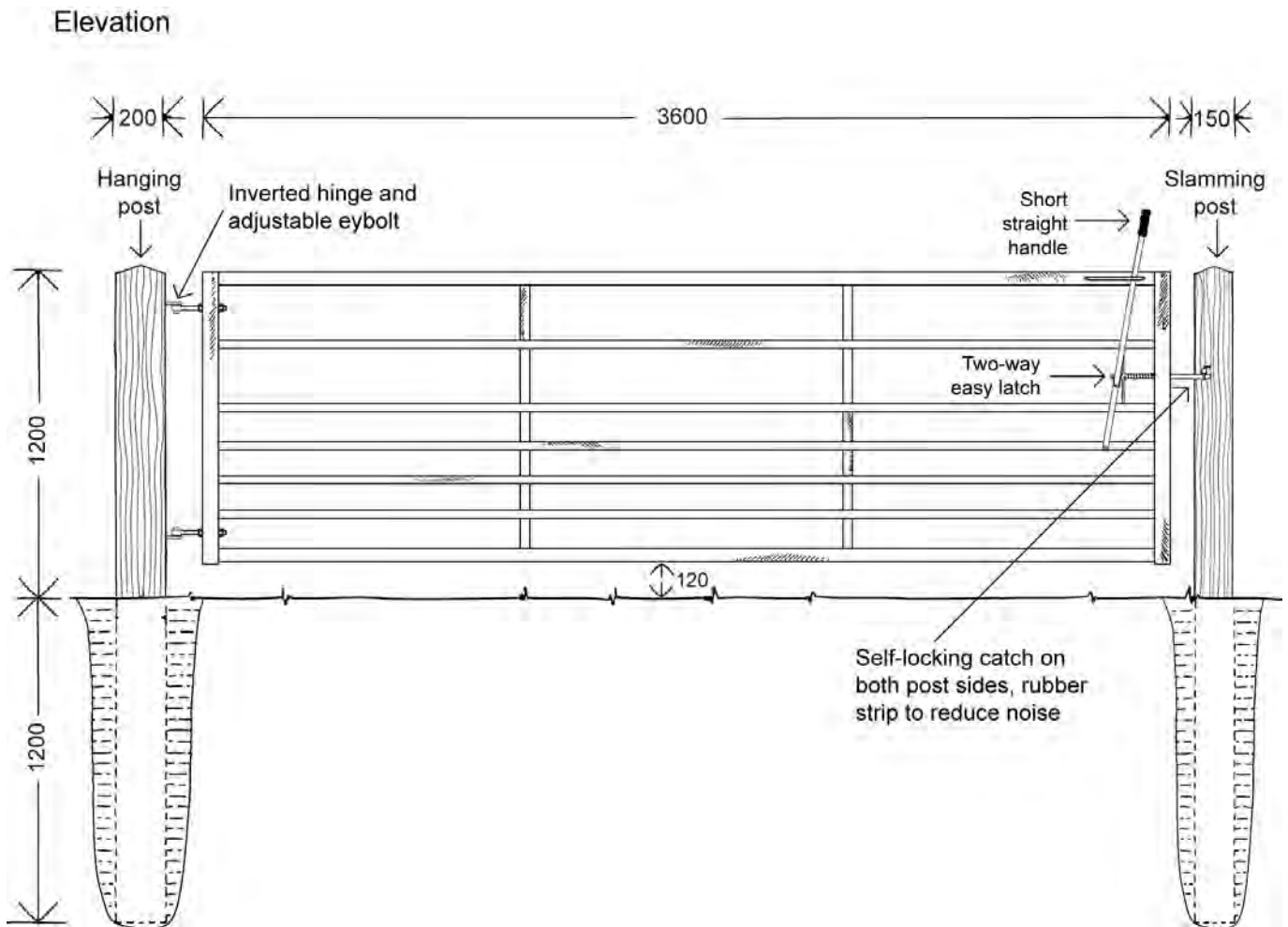
Installation

Before you start to dig holes, check the area for underground pipes and cables.

- ❖ Fix the hinges to the hanging post, and the hanging straps to the gate. Offset the bottom hinge by 35mm.
- ❖ Dig a 300mm square hole to a depth of 1115mm.
- ❖ Place the post in the middle of the hole and carefully ram stones or rubble around the bottom so it stands upright. Check that the post is 1325mm above the ground and use a spirit level to check that it is square.
- ❖ Fill the rest of the hole with well-rammed soil in layers. Do not use concrete as it can cause the timber to rot quickly.
- ❖ Attach the gate to the hanging post. Check that the gate is horizontal, that the top is 1270mm above the ground, and the bottom 50mm clear of the ground.
- ❖ Dig the hole for the slamming post and install it in the same way as the hanging post. Check that the slamming stile of the gate overlaps the slamming post by 50mm.
- ❖ Fix the auto latch and striker to the hanging and slamming posts.



6.7 Metal field gate



This is a galvanised tubular steel field gate with seven rails. Use seven rail gates where there are sheep, as the closer-spaced rails will stop lambs getting through. Metal field gates are usually more robust than timber gates, and have a longer lifespan.



Materials List

- ❖ 1 x medium or heavy duty galvanised steel gate, seven rails, 3600 x 1080mm
- ❖ 1 x treated timber square hanging post, 2400 x 200 x 200mm
- ❖ 1 x treated timber square slamming post, 2400 x 150 x 150mm
- ❖ 1 x galvanised hook to bolt hinge, 20mm pin, 330mm
- ❖ 1 x galvanised hook to drive hinge, 20mm pin, 203mm
- ❖ 2 x galvanised adjustable eyebolts, 150mm, M20 diameter
- ❖ 1 x galvanised two-way easy latch kit
- ❖ 1 x galvanised short straight handle (option: stock-proof handle)
- ❖ 2 x galvanised self-locking catches.



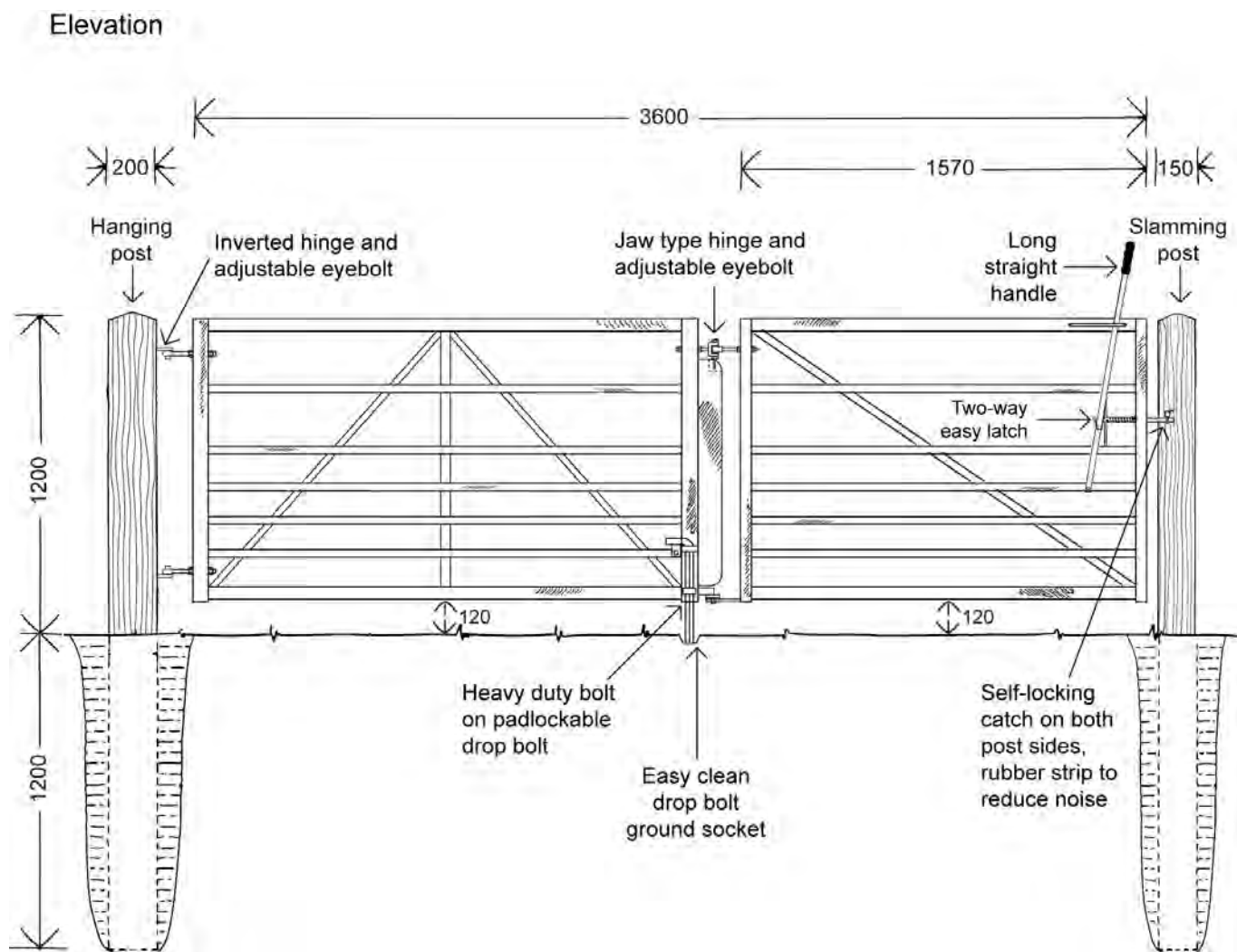
Installation

Before you start to dig holes, check the area for underground pipes and cables.

- ❖ Fix the hinges to the hanging post and adjustable eyebolts, and the nuts to the gate. Invert the top hinge so that the gate cannot be taken off the post.
- ❖ Dig a 300mm square hole for the hanging post to a depth of 1200mm.
- ❖ Place the post in the middle of the hole and carefully ram stones or rubble around the bottom so it stands upright. Check that the post is 1200mm above the ground and use a spirit level to check that it is square.
- ❖ Fill the rest of the hole with well-rammed soil in layers. Do not use concrete as it can cause the timber to rot quickly.
- ❖ Attach the gate to the hinges, adjusting the nuts on the eyebolts of the gate so that it hangs squarely on the hanging post. Check that the gate is clear of the ground by 120mm.
- ❖ Dig the hole for the slamming post and install it in the same way as the hanging post.
- ❖ Fix the self-locking one-way catches to the slamming post on both sides. The latch and handle are already attached to the gate.



6.8 Metal 2-in-1 combination gate (two-way self-closing)



This combination gate system provides a field gate and two-way self-closing gate. The gates open separately or together. The use of a heavy-duty bolt and drop bolt that can be padlocked to keep the field gate section closed prevents unwanted vehicle access, while the self-closing gate provides access onto the path. There is a one-way version of this combination gate system available where livestock is regularly present.



Materials List

- ❖ 1 x galvanised tubular steel field gate with two-way self-closing gate, seven rails, 3600 x 1080mm with 1570 x 1080mm bridle gate
- ❖ 1 x treated timber square hanging post, 2400 x 200 x 200mm
- ❖ 1 x treated timber square slamming post, 2400 x 150 x 150mm
- ❖ 1 x galvanised hook to bolt hinge, 20mm pin, 330mm
- ❖ 1 x galvanised hook to drive hinge, 20mm pin, 203mm
- ❖ 1 x galvanised jaw type hinge on M20 studding
- ❖ 1 x galvanised adjustable eyebolt, 100mm x M20 diameter
- ❖ 1 x galvanised adjustable eyebolt, 200mm x M20 diameter
- ❖ 2 x galvanised adjustable eyebolts, 150mm x M20 diameter
- ❖ 1 x galvanised two-way easy latch kit
- ❖ 1 x galvanised long straight handle or stock-proof handle
- ❖ 1 x galvanised easy-clean drop bolt ground socket
- ❖ 1 x galvanised heavy duty bolt on padlockable drop bolt, 25mm
- ❖ 2 x galvanised self-locking catches.

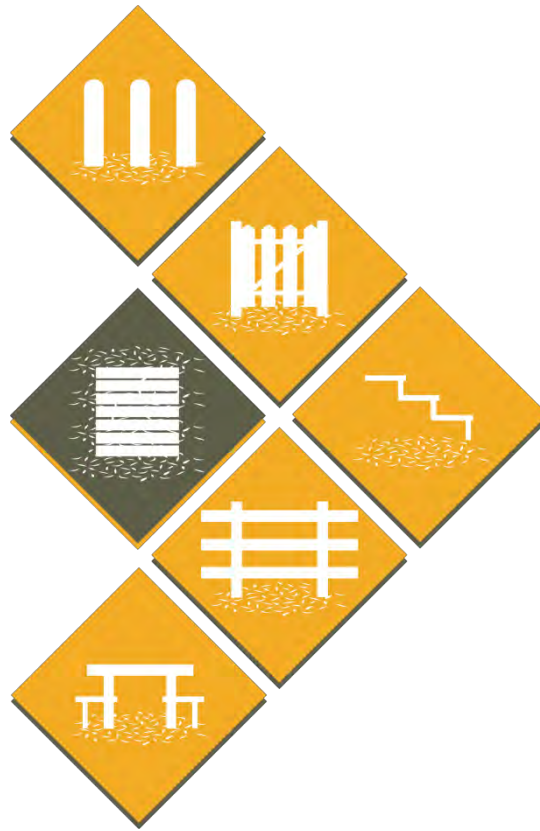


Installation

Before you start to dig holes, check the area for underground pipes and cables.

- ❖ Fix the hinges to the hanging post and adjustable eyebolts, and the nuts to the gate. Invert the top hinge so the gate cannot be taken off the post.
- ❖ Dig a 300mm square hole for the hanging post to a depth of 1200mm.
- ❖ Place the post in the middle of the hole and carefully ram stones or rubble around the bottom so that it stands upright. Check that the post is 1200mm above the ground and use a spirit level to check that it is square.
- ❖ Fill the rest of the hole with layers of well-rammed soil. Do not use concrete as it can cause the timber to rot quickly.
- ❖ Attach the field gate section to the hinges, adjusting the nuts on the eyebolts of the gate so it hangs squarely on the hanging post. Check that the gate is clear of the ground by 120mm.
- ❖ Fit the self-closing gate section to the field gate section with the adjustable eyebolts and jaw type hinge and nuts. Adjust the nuts on the eyebolts and hinge so that the self-closing gate hangs squarely on the end of the field gate. Check that the gate is clear of the ground by 120mm.

- ❖ Dig the hole for the slamming post and install it in the same way as the hanging post.
- ❖ Fix the self-locking one-way catches to the slamming post on both sides. The latch and handle should already be attached to the self-closing gate.
- ❖ With a full combination gate system in the closed position and straight, install a drop bolt ground socket in the ground.
- ❖ Cut the drop bolt to the required length, attach it to the field gate, and install in the ground socket.



7 Boardwalks

Building a boardwalk can take a lot of time, effort and money. But it can be worth doing when you need to:

- ❖ provide access to sensitive sites where damage by visitors will occur;
- ❖ offer visitors a chance to experience places that might be difficult or impossible to access otherwise; or
- ❖ avoid changes to the hydrology of a site, where building an aggregate path might have an effect.

Key design considerations

When designing a boardwalk, the aim is to create a stable structure to support the weight of the users, so that the decking does not break.

- ❖ **Line** – In open locations, boardwalks need careful siting and design to lessen their visual impact. To improve visual appearance in a location, think about the shortest route, and design in some gentle bends in the line it takes. This will make it more interesting to follow and create less of a visual impact. Just like a path, a boardwalk should fit in with the surrounding landscape.

- ❖ **Width** – The width of a boardwalk depends on the expected level of use, the width of approach paths, the location, and whether the boardwalk needs to be one- or two-way. The minimum usable width between edge rails should be 1200mm for one-way use, and 2000mm for two-way use. Alternatively, where use is low, you could include passing places in a 1200mm wide boardwalk.
- ❖ **Prefabrication** – Making a boardwalk off site can be helpful in getting it installed more quickly, as it can reduce the amount of work required on site. However, prefabrication does have its problems. Sections can be heavy to carry and may be awkward to move to and around a site.
- ❖ **Stobs or bearers** – Installing stobs to support the stringers where the ground is not soft is generally better than using bearers – fewer materials are required and levelling the ground is easier. If the ground is soft, bearers laid directly on the ground are more suitable, as stobs sink. However, bearers are not suitable where flooding occurs, as the boardwalk will float away because the bearers are not secured in the ground.
- ❖ **Decking boards** – Fix the boards on the stringers at right angles to the direction of pedestrian flow, to avoid wheelchair wheels or canes becoming caught between the boards. The maximum gap between the boards should be 12mm.
- ❖ **Toe boards** – For wheelchair users or people with mobility difficulties who may be uncomfortable being on a raised boardwalk, it is sensible to install toe boards (a deck level edge rail) as edge protection.
- ❖ **Access** – Think about how users will get on and off the boardwalk. Where a boardwalk joins a path, avoid creating a lip greater than 5mm high. The slope of a ramp should be no more than 8% (1:12).
- ❖ **Passing places** – Passing places at the sides of a 1200mm wide boardwalk should be 1500mm wide and 2000mm long. This will provide enough space for users to pass, e.g. two wheelchairs.
- ❖ **Materials** – Boardwalks are made of timber or recycled plastic, or a combination of both materials. Recycled plastic has several benefits: it does not get as slippery as timber; it does not rot like timber; and it does not need the same level of maintenance as timber. You may find timber more visually appealing, so may choose to use the two materials together.
- ❖ **Non-slip surface** – It is not recommend that you use chicken or rabbit netting, or plastic or metal mesh to make the surface of decking boards non-slip. They are cheap to install but, over time, the netting or mesh breaks. This creates a trip hazard and maintenance issue, and will cost more to put right again. Consider one of these solutions below for your boardwalk and location as a more cost-effective option in the long term:



Non-slip surface examples



Grooved decking boards with non-slip strips



Non-grooved decking boards with non-slip strips

The boardwalk designs in this Guide are for structures without handrails, installed on or close to the ground. If you require a boardwalk with handrails to go over wet ground with open water, where the structure needs to be raised clear of the water, the designs in this Guide are not suitable. It is recommended you seek the assistance of a structural engineer to design the boardwalk for its specific location.

Design sheets

The following design sheets are contained in this section:

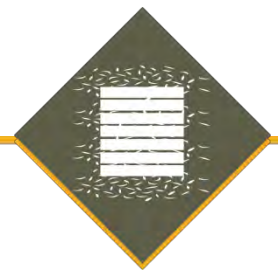
[7.1 Low level timber boardwalk](#)

[7.2 Low level recycled plastic boardwalk](#)

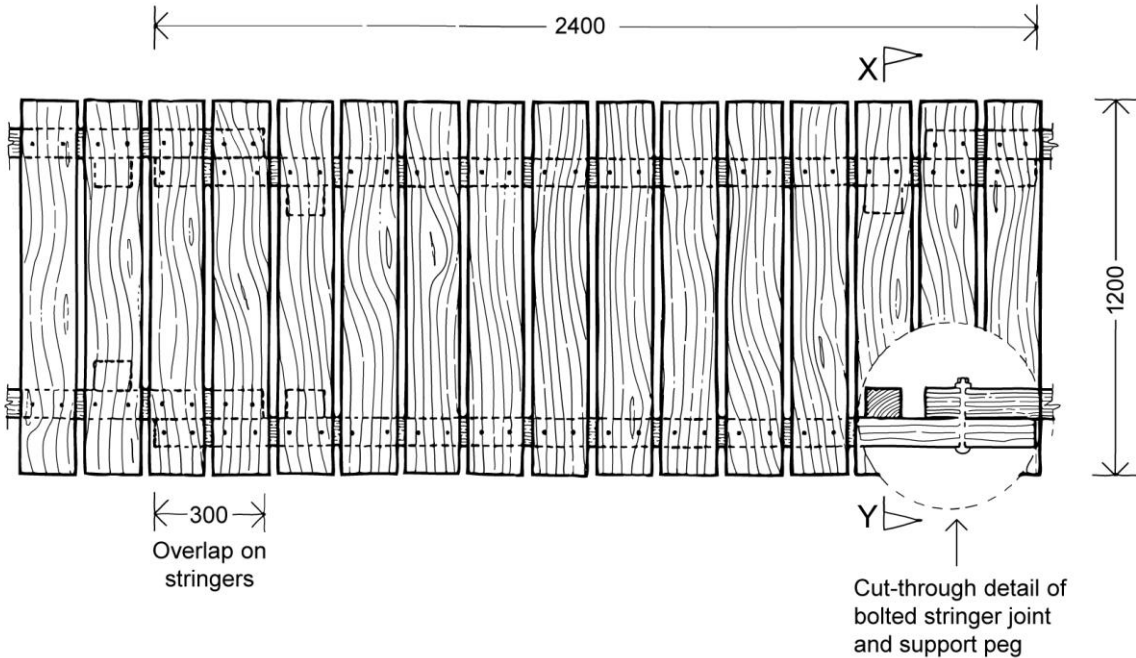
[7.3 Raised timber boardwalk with deck level edge rails \(wide design\)](#)



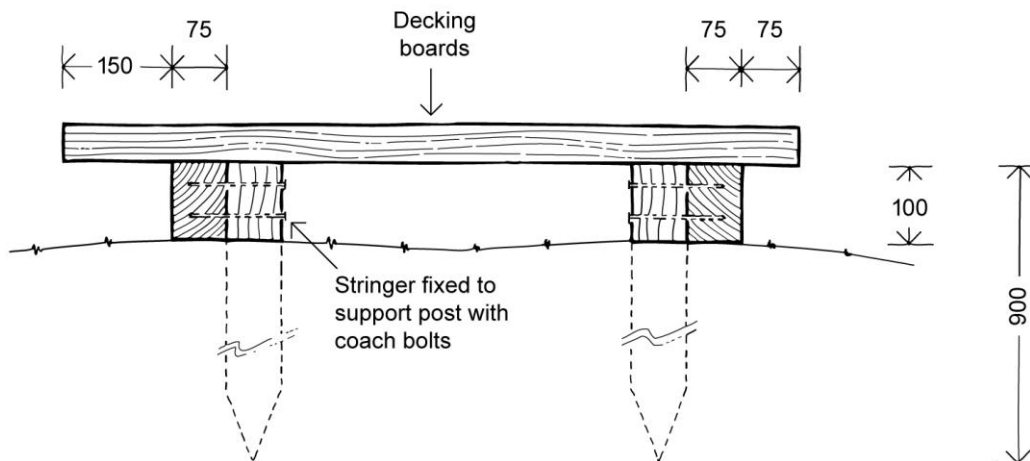
7.1 Low level timber boardwalk



Plan



Section X - Y



This simple timber boardwalk sits on the ground to provide one-way access across soft ground. It can be prefabricated off site in 2400mm long x 1200mm wide sections for easy handling on site. The weight of the individual sections allows them to be transported by a tracked vehicle, or a helicopter where the site is remote.



Materials List

For a 2400mm section of boardwalk:

- ❖ 14 x sawn timber decking boards, 1200 x 150 x 50mm
- ❖ 2 x sawn timber stringers, 2400 x 100 x 75mm
- ❖ 4 x sawn timber support posts, 900 x 100 x 75mm (alternative: recycled plastic posts)
- ❖ 2 x coach bolts with washers, 180mm x M12
- ❖ 70 x decking screws, 4.5 x 125mm.



Installation

Before you start to dig holes, check the area for underground pipes and cables.

Off site:

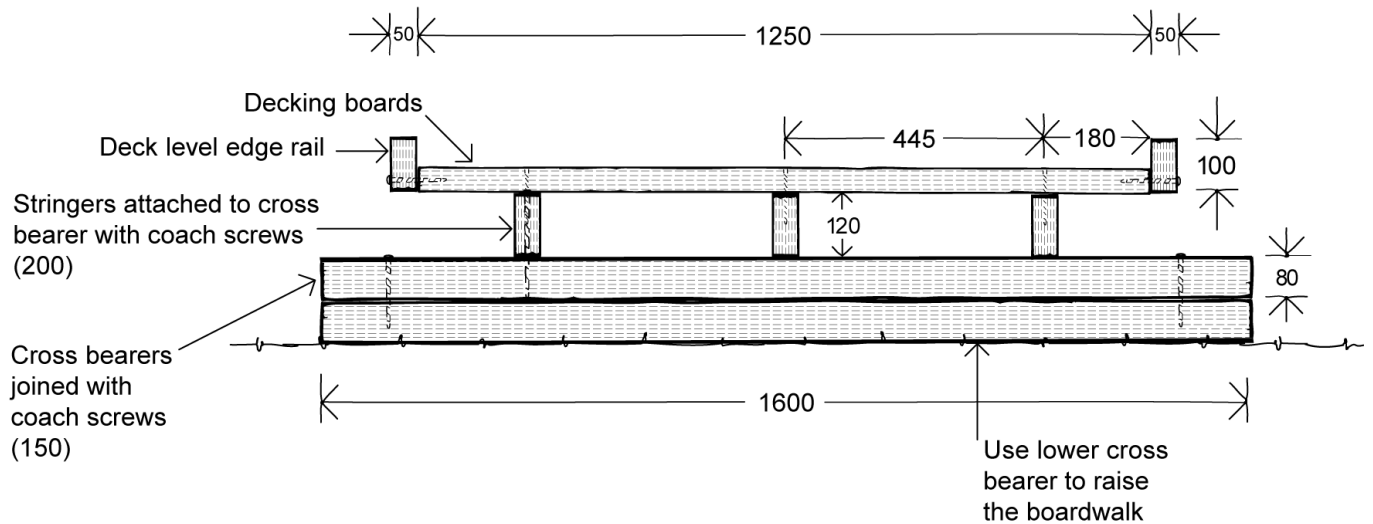
- ❖ Fix the decking boards to the two stringers, with four screws per board. Offset the stringers – one at 150mm from the edge of the boards, and the other at 75mm. Leave a maximum gap of 12mm between boards. Do not attach boards at ends where access is required to hammer in the support posts (i.e. the three boards at each end).
- ❖ Drill the holes through the stringers for two coach bolts. Drill them slightly larger than the required diameter, to provide flexibility in the joined sections so that when they're laid out it is easier to gently curve them.

On site:

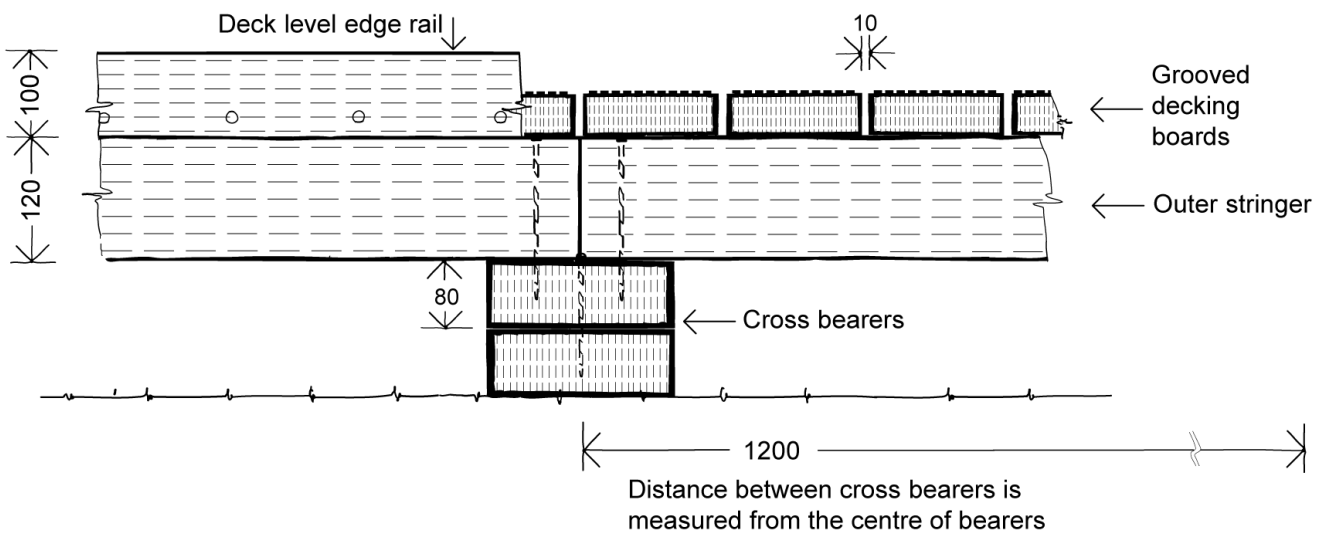
- ❖ Place several sections of prefabricated boardwalk on the ground along the line of the route, reversing alternate sections so that offset stringers are laid with a 300mm overlap.
- ❖ Bolt sections together with two coach bolts through the pre-drilled holes in the stringers.
- ❖ Knock four support posts into the ground at appropriate locations. Before you drive the posts into the ground, check the area for underground pipes and cables.
- ❖ Fix the posts to the stringers (from inside), with two screws per post.
- ❖ Finally, screw on the missing boards with two screws per stringer.

7.2 Low level recycled plastic boardwalk

Section



Side Elevation



This recycled plastic boardwalk sits on the ground to provide one-way access across wet ground. Decking boards are fixed to stringers, and deck level edge rails to the ends of the boards. The prefabricated sections sit on cross bearers, positioned on the ground to meet the joined up stringer ends, at an angle of 90° to the line of the boardwalk. The height of the boardwalk is adjusted by adding or removing cross bearers when the water table rises and falls. The individual sections can be transported to the site by a tracked vehicle or by helicopter where the site is remote.





Materials List

For a 1200mm section of boardwalk:

- ❖ 4 x recycled plastic cross bearers, 1600 x 230 x 80mm
- ❖ 3 x recycled plastic stringers, 1200 x 120 x 60mm
- ❖ 7 x recycled plastic grooved decking boards, 1250 x 165 x 50mm
- ❖ 2 x recycled plastic deck level edge rails, 1200 x 100 x 50mm
- ❖ 6 x coach screws, 200mm x M12
- ❖ 4 x coach screws, 150mm x M12
- ❖ 60 x self-driving screws, 12g x 100mm.



Installation

Off site:

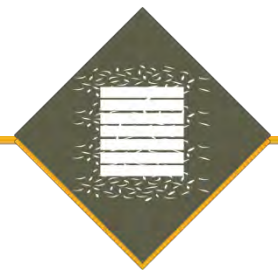
- ❖ Fix the decking boards (grooved side up) to the three stringers with six self-driving screws per board. Leave a gap of 10mm between the boards. Do not attach boards at ends where the stringers join (i.e. one board at each end).
- ❖ Fix deck level edge rails on the ends of the boards on either side, with one self-driving screw per board.

On site:

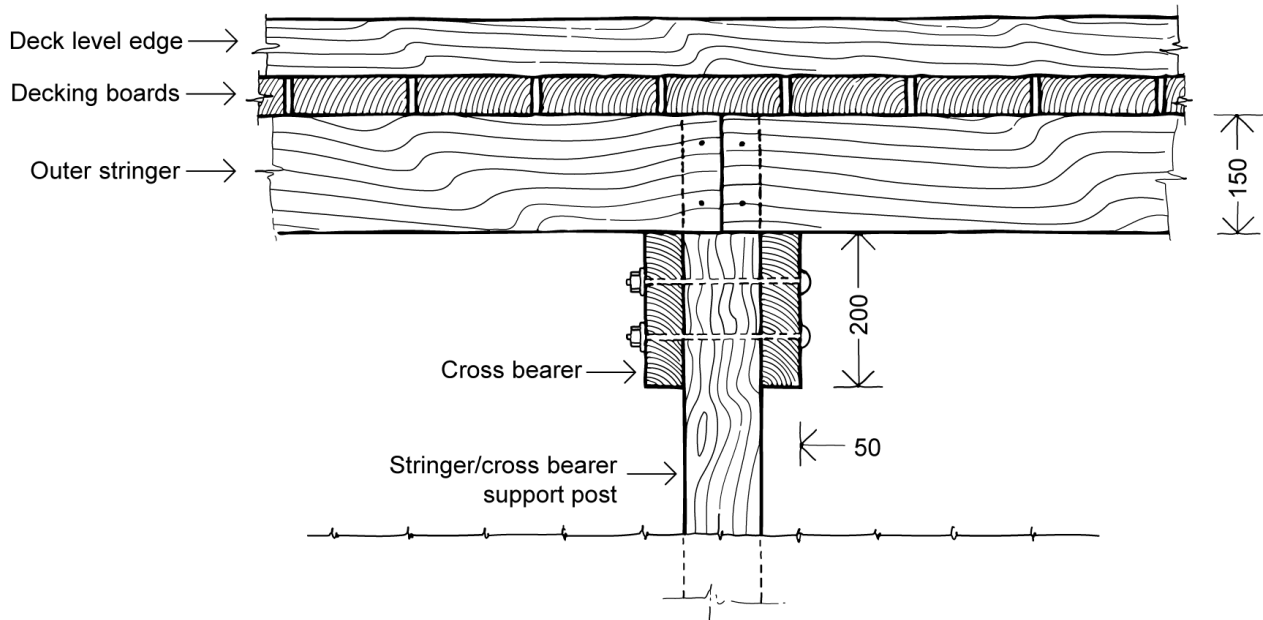
- ❖ Place several sections of prefabricated boardwalk on the ground along the line of the route, roughly where the stringer ends will join.
- ❖ Starting from one end, where the stringers will join, place four cross bearers on the ground at intervals of 1200mm, one on top of the other, to form the first two mountings. Fix cross bearers together with two coach screws, one screw at either end.
- ❖ Lay the first section of the boardwalk on top of those two mountings.
- ❖ Place the next two cross bearers on the ground, at the required distance of 1200mm from the second mounting, to form the third mounting. Fix them together with coach screws.
- ❖ Lay the second section of boardwalk on top of the second and third mountings.
- ❖ Butt the ends of the stringers up against the stringer ends of the previous section of boardwalk. Fix stringers to cross bearers with coach screws, one screw per stringer end.
- ❖ Fix the missing boards to cover the exposed stringers, with six self-driving screws per board.
- ❖ Repeat this method until you have laid all the sections.



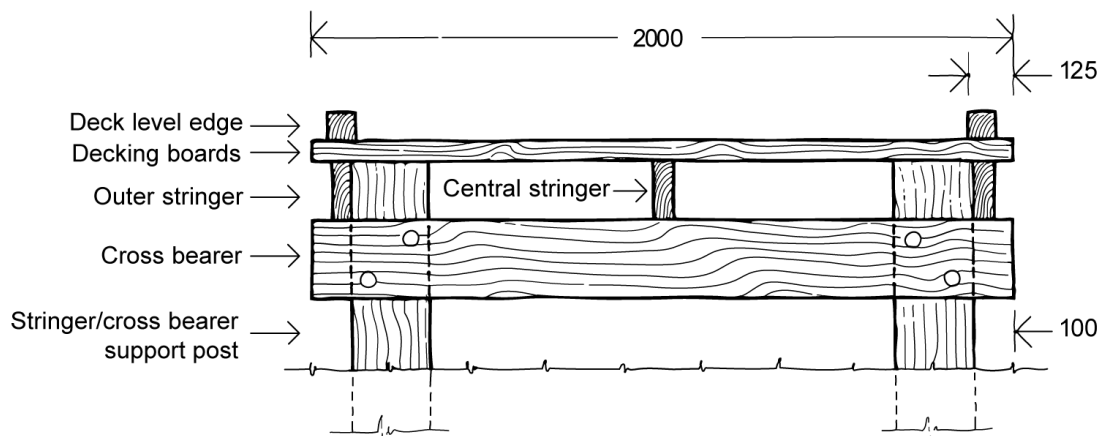
7.3 Raised timber boardwalk with deck level edge rails (wide design)



Side Elevation



Section



This wide timber boardwalk with deck level edge rails provides two-way access where the decking needs to be raised above the ground. The maximum width of the decking is 2000mm, providing a clear width of approximately 1750mm between edge rails.



Materials List

For a 3600mm section of boardwalk:

- ❖ 24 x sawn timber decking boards, 2000 x 150 x 50mm
- ❖ 2 x sawn timber outer stringers, 3600 x 150 x 50mm
- ❖ 1 x sawn timber central stringer, 3800 x 150 x 50mm
- ❖ 2 x sawn timber cross bearers, 2000 x 200 x 50mm
- ❖ 6 x sawn timber support posts, 900 x 200 x 100mm (alternative: recycled plastic)
- ❖ 2 x sawn timber deck level edge rails, 3600 x 75 x 75mm
- ❖ 12 x coach bolts with washers, M12 x 225mm
- ❖ 150 x decking screws, 4.5 x 125mm.



Installation

- ❖ Mark out the positions of the support posts, at intervals of 1800mm along the line of the route in two rows, set 1350mm apart.
- ❖ Using a pinch bar, create vertical holes at all the marked positions for knocking in the posts.
- ❖ Put the posts in the holes and set them vertically upright (check with a spirit level), with the 200mm sides facing forwards along the line of the route. Give them a light tap with a hammer.
- ❖ Support the posts with a steel „turning bar“. Knock the posts into the ground to a height of 450mm above the ground level. The height of all posts should roughly be the same so that the decking is level along and across the boardwalk. Before you drive the posts into the ground, check the area for underground pipes and cables.
- ❖ Make sure the posts go in straight and square. Check them all with a spirit level.
- ❖ Drill the holes, and bolt cross bearers to support the posts with two coach bolts and washers per post.
- ❖ Butt the ends of the outer stringers together, and fix to the support posts on the outside face and above the cross bearers with countersunk screws.
- ❖ Overlap the ends of the central stringers by 100mm, and fix to the cross bearers with countersunk screws, along the centre of the bearers.
- ❖ Fix the decking boards onto the stringers with countersunk screws. Use four screws per board. Leave a maximum gap of 12mm between boards.
- ❖ Fix the deck level edge rails onto the decking boards with countersunk screws, at intervals of 300mm. The rails should be set 50mm in from the edge, to prevent the ends of the boards from splitting.



8 Steps, ramps and mounting blocks

Steps and ramps, alone or used together, can make it easier for people to negotiate slopes along paths. Well-designed and constructed steps and ramps with handrails can offer improved access for everyone, of all ages and abilities. Mounting blocks help riders to get on their horses more easily and safely.

This section summarises the key design considerations for steps, ramps and handrails and mounting blocks.

Key design considerations

Steps

If the location and drainage have not been taken in to account, building steps can be more difficult. If the choice of route is not suitable and there is not sufficient drainage, the steps can fail.

Consider these key design points for your steps (taken from *Footpaths – A Practical Guide*, TCV).

- ❖ **Choose materials with the location in mind.** Steps made of sawn timber, sleepers or stone with aggregate treads can fit in better in woodland and lowland sites, where an informal 'feel' is more appropriate.

- ❖ **Avoid long, straight lines.** Break up long, straight flights of steps with bends, landings or ramps. The steps will fit in with the landscape better and look easier to climb. Water will also drain off at the side more easily.
- ❖ **Avoid creating short cuts or ‘desire lines’.** Choose the best line possible so that path users cannot take short cuts or desire lines across corners or bends in the path when going down the steps. Where it could happen, block off with carefully placed boulders, logs or brash.
- ❖ **Avoid building steps across a slope.** They are difficult to build, and the slope above and below can be unstable. A path can be a more appropriate solution across a slope.
- ❖ **Choose wide steps to provide two-way use and a less steep look.** Timber and stone steps should be a minimum of 1200mm wide. This width provides two-way use and looks less steep. For stone block steps, where one stone is not large enough to provide the overall step width, several stones can be joined together to make the riser. For ramped sleeper steps, the risers can be built 2600mm wide.
- ❖ **Avoid steps with a height of rise less than 150mm and more than 200mm.** The height of rise (or lift) from the lower tread to the upper tread should be no more than 200mm, and no less than 150mm. If it is less or more, the steps will be difficult and uncomfortable to walk up and down. The preferred height of rise is 170mm, which is the most accessible for path users with disabilities or mobility difficulties.
- ❖ **Avoid steps with a tread depth of less than 300mm.** The depth of the treads depends on the gradient of the slope, but it should not be less than 300mm. 300mm is the minimum depth used on steep flights of steps, and, if possible, the steps should be broken up with landings. The preferred tread depths are 500mm and 1000mm. For ramped sleeper steps, the tread depths can be 2000mm and 4000mm.
- ❖ **Keep the same tread depth in any one single flight of steps.** All steps in a flight should have the same depth of tread and height of rise. Where it is not possible to maintain the same depth of tread – e.g. on a slope with different gradients – try to keep the same depth in any one single flight.
- ❖ **Install landings at least every 2000mm.** The total rise of any single flight of steps should not exceed 2000mm. Where it will exceed 2000mm, provide a 1500mm long by 1200mm wide landing, so path users can pass easily or take a rest.
- ❖ **Install a maximum of 14 steps between each landing.** We recommend that the number of steps between landings should not exceed 14. However, in more remote and more inaccessible locations where path users can cope with steeper climbs, this guideline can be relaxed.
- ❖ **Avoid round timber risers.** The top surface of round timber risers can be slippery when wet, causing a slip hazard. Use sawn timber instead.
- ❖ **Use square or half round pointed timber stakes to support the risers.** Either square or half round pointed stakes are suitable for supporting the risers. Half round stakes are easier to keep square when hammering in. They also provide a far better surface contact with the front face of the riser, which keeps the riser more securely in the ground.

- ❖ **Use quality aggregate sub-base to create the treads.** A quality sub-base, such as Type 1, consists of different stone sizes with a high proportion of fines. If well compacted, Type 1 provides a firm, even surface for walking up and down.
- ❖ **Use timber boards to support the treads.** If the loss of aggregate from the treads might be a problem, fix timber boards to the side of the steps.
- ❖ **Bend the steps around a slope to help the treads drain more easily.** Steps that curve around a slope are easier to drain than steps that go straight up, as water can drain off at the side.
- ❖ **Drain water off treads at the side.** Build the treads with a rise from the front to the back, and a 2% (1:50) cross fall to the lower side. This will help shed water off the treads at the side.
- ❖ **Keep surface water away.** Install a side ditch if there is any need to remove surface water and stop it running back onto the steps lower down the slope.

The step designs in this Guide are more commonly used to build steps in woodland or lowland sites. You will also find a design for stone block steps, which are suitable for use in a range of sites, including coastal and upland.

If you are to build steps made entirely of natural weathered stone, take a look at an upland path technique called „stone pitching“ in the Upland Path Advisory Group’s „Upland Pathwork: Construction Standards for Scotland“ manual (<http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=518>).

Stone pitching is made entirely of stone and is more in keeping with the character and appearance of upland landscapes. It is also suitable for steps at coastal sites (i.e. cliffs and other rocky areas).

Ramps

When designing a path, where appropriate and practical, you should consider providing ramps for path users who are physically unable to use steps.

Ramps are also more accessible than steps for cyclists, and families with pushchairs and prams.

Ramps can be built into long flights of steps to give people a break from the steps.

If you find you have to make a choice between steps or a ramp, it is best to provide a ramp as it is easier to build and more accessible to everyone.

A slope less than 5% (1:20) along a path is not considered to be a ramp. Where the slope is 5% (1:20) or steeper, it is a ramp.

Consider the following key design points for your ramps (taken from Countryside for All Good Practice Guide, Fieldfare Trust – www.fieldfare.org.uk/countryside-for-all/countryside-for-all-good-practice-guide/).

- ❖ **Use firm, even, and non-slip material to surface a ramp.** The surface of ramps should be firm, even, and non-slip, with no stone larger than 5mm in size. The ramp should also have a minimum width of 1200mm.

- ❖ **Build landings on ramps to help path users pass each other and rest.** Landings on the ramp and at the top and bottom should be a minimum of 1500mm long by a minimum of 1200mm wide.
- ❖ **Location and gradient determine the length of the ramp between landings.** The maximum ramp length between landings will range from 9000mm to 19000m, depending on the location and gradient of the slope.
- ❖ **Use a maximum of 2% (1:50) camber in preference to a cross fall to drain surface water off a ramp.** This will make it easier and safer for all path users to use. If you have to use a cross fall, it should be no steeper than 2% (1:50). A cross fall in excess of 2% (1:50), combined with a ramped incline, can make it difficult for some path users to balance.

Handrails

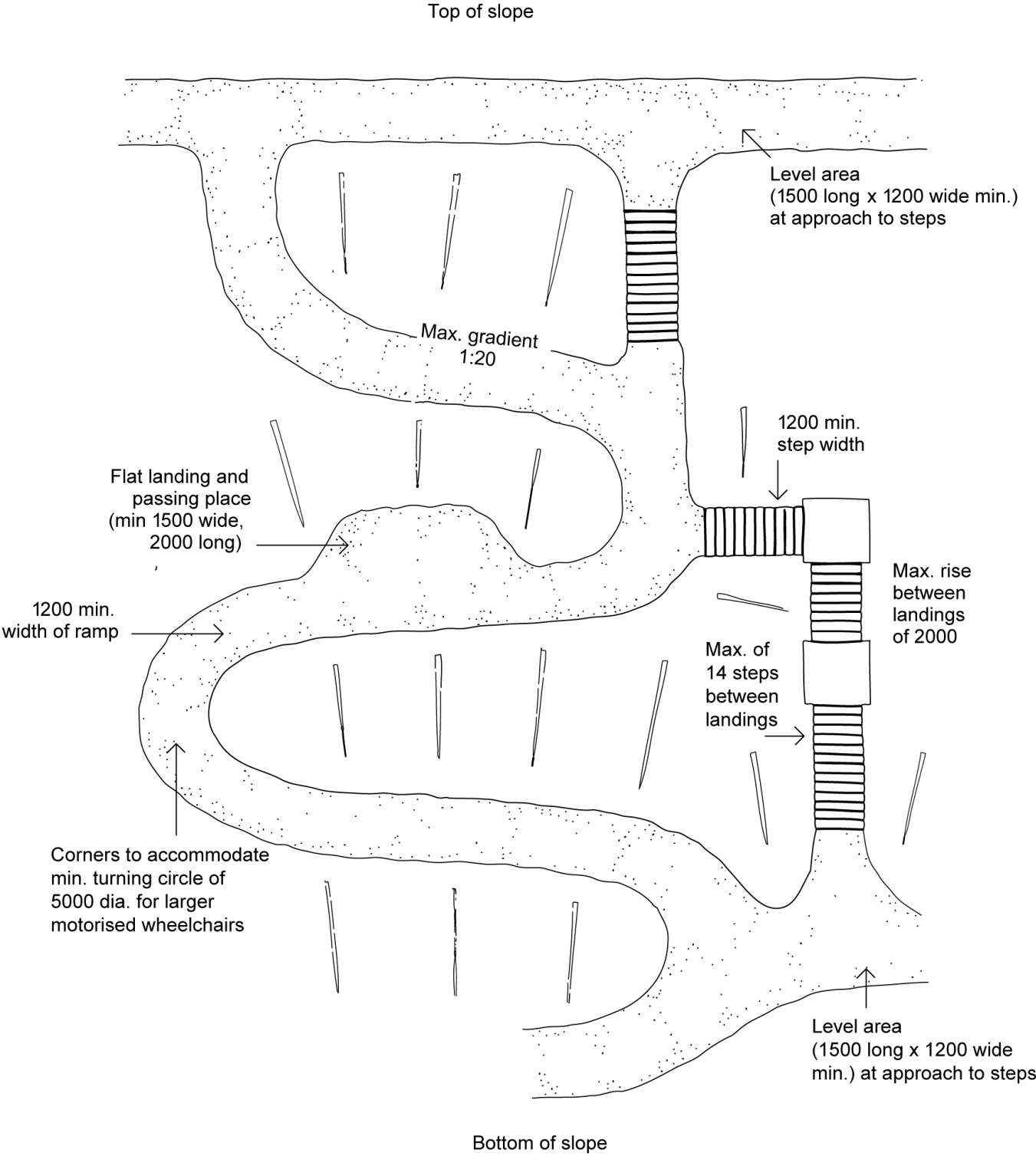
Handrails installed with steps and ramps can provide assistance for most users. They can provide a fixed rail to pull against, to help maintain balance, or to lean against for a rest. They can also provide security and protection against hazards such as a steep drop, particularly for path users who are unsteady on their feet.

The purpose of a handrail will influence its design and installation. For example, handrails providing security and safety from hazards beside a path will often need to be more robust than those that just provide a balancing aid alongside a short flight of steps.

Consider the following key design points for your handrails (taken from Countryside for All Good Practice Guide, Fieldfare Trust – www.fieldfare.org.uk/countryside-for-all/countryside-for-all-good-practice-guide/).

- ❖ Install handrails on either side of ramps and steps.
- ❖ The height of the top handrail should be 1000mm.
- ❖ The height of the middle handrail should be 750mm, to assist children and wheelchair users.
- ❖ The grip of the top handrail should be between 40mm and 50mm in diameter.
- ❖ The grip of the middle handrail should be between 25mm and 32mm in diameter, to make it suitable for children.
- ❖ The minimum unobstructed width between handrails should be 1000mm.

Design of steps and ramps to accommodate cyclists, pushchairs, prams, people with disabilities and mobility difficulties, and wheelchair users



Mounting blocks

Mounting blocks help riders to get on their horses more easily and safely. They also help to prevent injury to a horse's back and reduce the chance of the saddle slipping. Where riders are politely asked to dismount and lead their horse, e.g. across a bridge with low handrails, a mounting block will help riders to get back in their saddles once across the bridge.

Consider these key design points for your mounting block (taken from Specifications and Standards of Mounting Blocks, The British Horse Society – <http://www.bhs.org.uk/access-and-bridleways/free-leaflets-and-advice>).

- ❖ **Location** – Position the mounting block on the near side of the direction of travel, where the horse and rider can access the mounting block, and after an obstruction. The recommended distances for positioning a mounting block are at least five metres after an obstruction that is likely to disturb horses, or three metres where the obstruction is less disturbing to horses.
- ❖ **Firm and level ground** – Install a mounting block on firm and level ground so that the horse can stand close to the block.
- ❖ **Manoeuvring space** – To the right of the mounting block, provide a space at least 1.8 metres wide, extending to at least 1.5 metres beside and in front of the block. You also need to have a clear height of 3.7 metres above the mounting block, so riders have room for positioning, mounting, and sitting on the horse.
- ❖ **Strong materials** – A mounting block can be made of stone or external marine plywood. The block needs to be strong enough to take the weight of the riders when climbing the steps and mounting the horse.
- ❖ **Non-slip surface** – The surface of the mounting block and steps should be non-slip so that riders do not slip when going up the steps or mounting the horse.
- ❖ **Double steps** – Ideally, the mounting block should have steps at both ends, in case a horse starts to walk forward before the rider mounts. The rider can walk down the steps, rather than fall forwards.

Design sheets

The following design sheets are contained in this section:

[8.1 Timber board and aggregate steps](#)

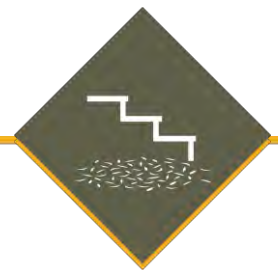
[8.2 Ramped sleeper and aggregate steps](#)

[8.3 Stone block and aggregate steps](#)

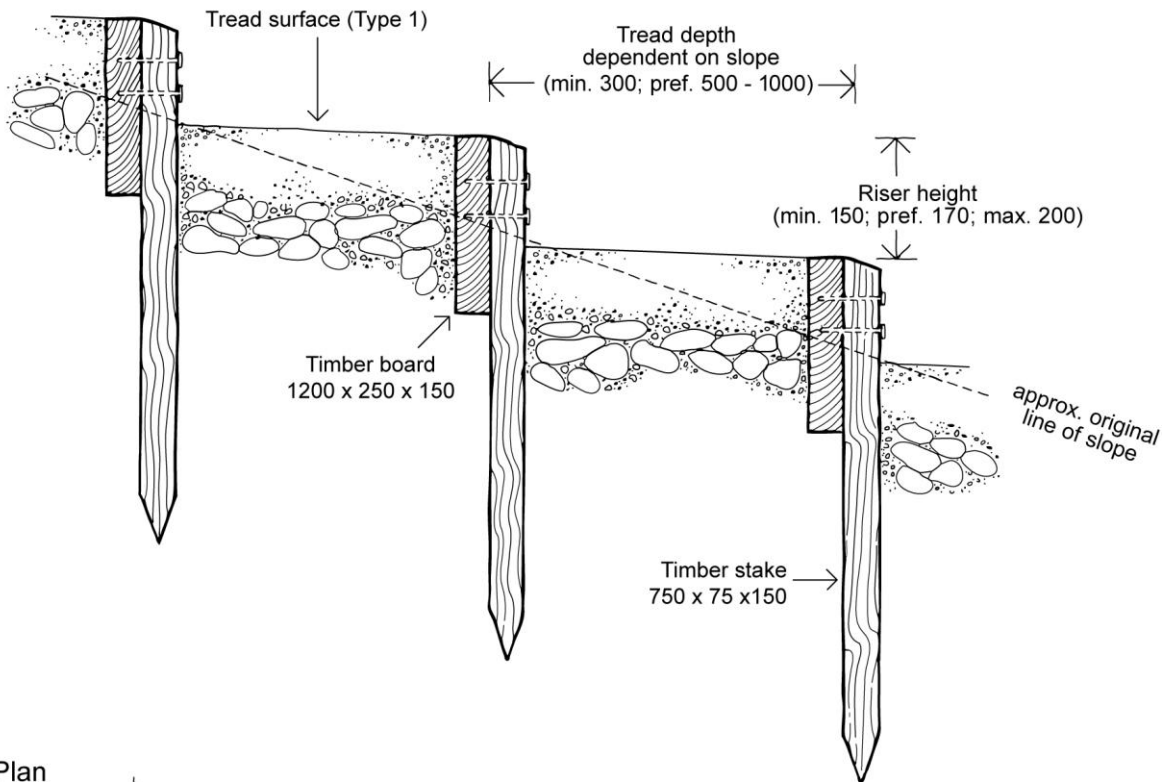
[8.4 Mounting blocks](#)



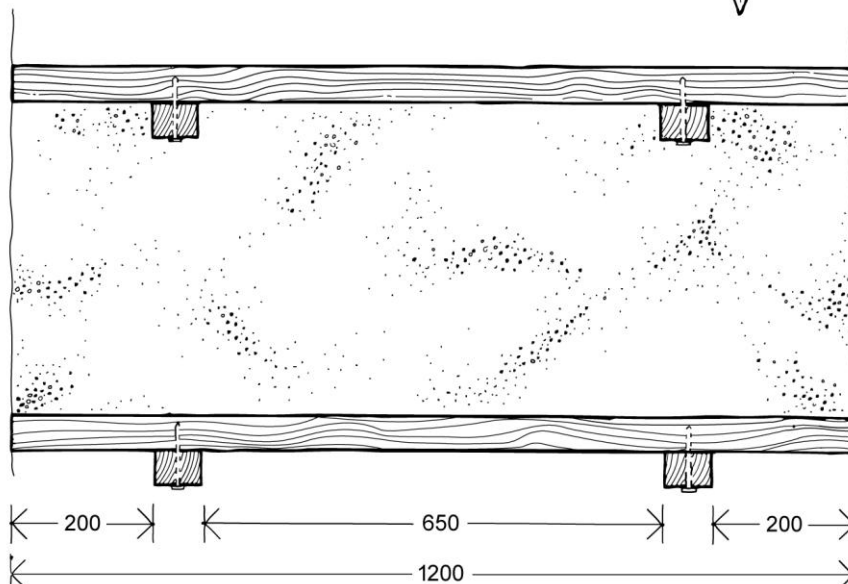
8.1 Timber board and aggregate steps



Section



Plan



These basic steps are fit for use on most lowland paths. Timber stakes are fixed to the timber risers with nails, and treads are backfilled with a crushed stone sub-base. You can adjust the height of the riser and depth of the tread to suit the angle of the slope.



Materials List

For each step:

- ❖ 1 x treated sawn timber board, 1200 x 250 x 50mm
- ❖ 2 x treated sawn timber stakes, 750 x 75 x 50mm, or treated half round timber stakes, 750 x 100mm diameter
- ❖ 4 x galvanised round wire nails, 100mm
- ❖ 0.12 tonnes of Type 1 sub-base will backfill a 1200 x 500 x 100mm tread area.



Installation

- ❖ Build the steps up the slope, starting at the bottom.
- ❖ Remove any vegetation from the slope to create a path width of the required riser width. Place the turfs by the side, for re-use.
- ❖ Dig a trench in the slope, across the prepared path width, at an angle of 90°. Place dug spoil by the side, for re-use.
- ❖ Place the riser in the trench with the board or sleeper set at the required height above ground level, leaving at least 50mm in the slope below ground level.
- ❖ Set the riser vertically and horizontally in the trench and check with a spirit level.
- ❖ Measure and mark positions of the timber stakes on the riser – 200mm inwards from either end. Use this measurement for all of the risers.
- ❖ Using a pinch bar, create two vertical, wide holes at marked positions on the riser, for hammering in the stakes.
- ❖ Put the first stake in one of the holes with the wide side against the riser.
- ❖ Set the stake vertically in the hole and check with a spirit level. Give it a light tap with a hammer.
- ❖ Support the stake with a steel „turning bar“. Hammer it into the ground until the top of the stake is about an inch away from the riser. When hammering the stake in, make sure it goes in straight and square to the riser.
- ❖ Fix the stake to the timber board riser with two round wire nails. Avoid nailing twice into the same grain line – the stake could split.
- ❖ Knock in and fix the second stake to the timber board riser in the same manner.
- ❖ Cut the tops of the stakes off at an angle of 45° away from the riser.
- ❖ Treat the cut stakes with wood preservative.
- ❖ Install the other timber board risers along the line of the path, at the required tread depth interval.

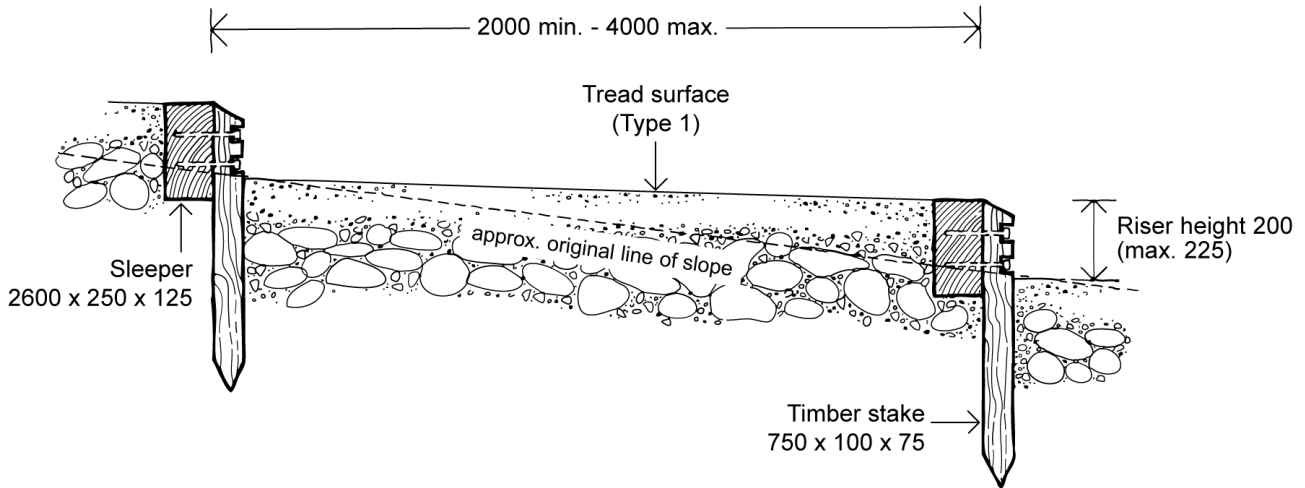
- ❖ Using dug spoil (stone and soil), partially infill the treads, and compact well with a tamper.
- ❖ Lay and compact a 100mm depth of Type 1 sub-base to form a firm and even tread, with the rise from the front to the back, and a 2% (1:50) cross fall towards the lower side.
- ❖ Using soil and turfs, landscape up to or over the ends of the risers and along the sides of the treads. Make sure the turfs are finished level with the tread surfaces so that water will run off at the sides.



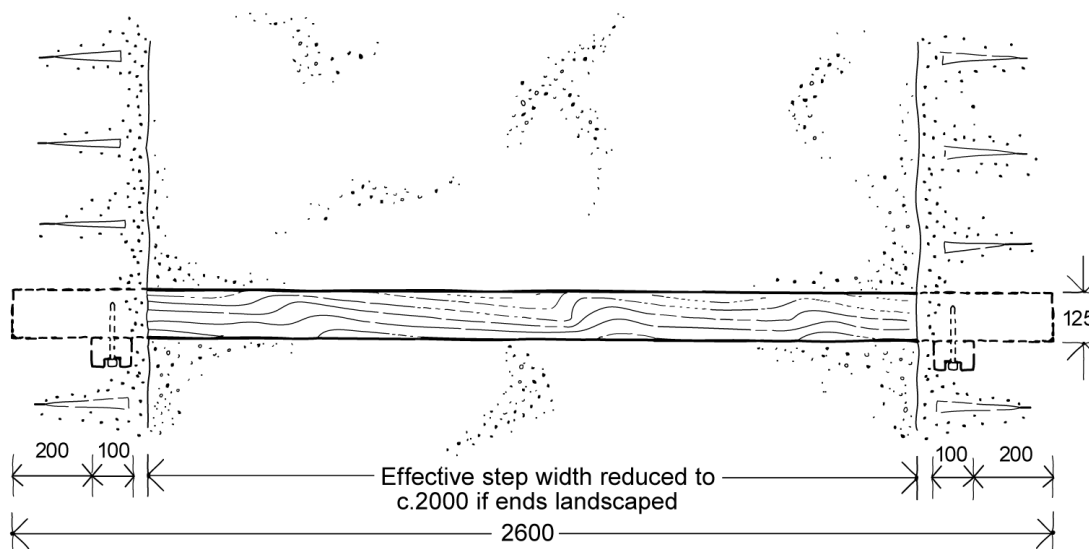
8.2 Ramped sleeper and aggregate steps



Section



Plan



Widely spaced steps between ramps are suitable for reducing the gradient on paths used by everyone. Timber stakes are fixed to risers made of railway sleepers, and the treads are backfilled with a crushed stone sub-base. You can adjust the depth of the tread, and width and height of the riser, to suit the angle of the slope, as well as the type of path users.



Materials List

For each step:

- ❖ 1 x used or new railway sleeper, 2600 x 250 x 125mm
- ❖ 2 x treated sawn timber stakes, 750 x 100 x 75mm
- ❖ 4 x coach screws, 150mm (e.g. TimberLok railway sleeper screws)
- ❖ 0.8 tonnes of Type 1 sub-base will back fill a 2000 x 2000 x 100mm tread area.



Installation

- ❖ Build the steps up the slope, starting at the bottom.
- ❖ Remove any vegetation from the slope to create a path width of the required riser width. Place the turfs by the side, for re-use.
- ❖ Dig a trench in the slope, across the prepared path width, at an angle of 90°. Place dug spoil by the side, for re-use.
- ❖ Place the riser in the trench with the board or sleeper set at the required height above ground level, leaving at least 50mm in the slope below ground level.
- ❖ Set the riser vertically and horizontally in the trench and check with a spirit level.
- ❖ Measure and mark positions of the timber stakes on the riser – 200mm inwards from either end. Use this measurement for all of the risers.
- ❖ Using a pinch bar, create two vertical, wide holes at marked positions on the riser, for hammering in the stakes.
- ❖ Put the first stake in one of the holes with the wide side against the riser.
- ❖ Set the stake vertically in the hole and check with a spirit level. Give it a light tap with a hammer.
- ❖ Support the stake with a steel „turning bar“. Hammer it into the ground until the top of the stake is about an inch away from the riser. When hammering the stake in, make sure it goes in straight and square to the riser.
- ❖ Fix the stake to the railway sleeper riser with two coach screws. Countersink the heads of the screws into the stakes.
- ❖ Knock in and fix the second stake to the railway sleeper riser in the same manner.
- ❖ Cut the tops of the stakes off at an angle of 45° away from the riser.
- ❖ Treat the cut stakes with wood preservative.
- ❖ Install the other railway sleeper risers along the line of the path, at the required tread depth interval.
- ❖ Using dug spoil (stone and soil), partially infill the treads, and compact well with a tamper.

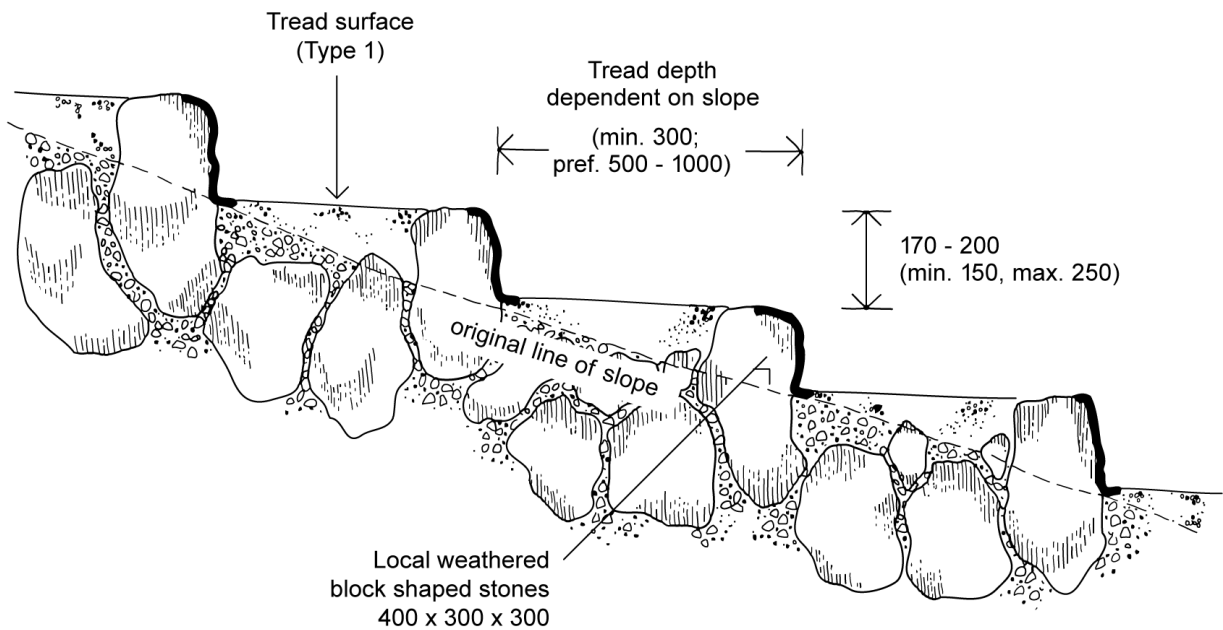
- ❖ Lay and compact a 100mm depth of Type 1 sub-base to form a firm and even tread, with the rise from the front to the back, and a 2% (1:50) cross fall towards the lower side.
- ❖ Using soil and turfs, landscape up to or over the ends of the risers and along the sides of the treads. Make sure the turfs are finished level with the tread surfaces so that water will run off at the sides.



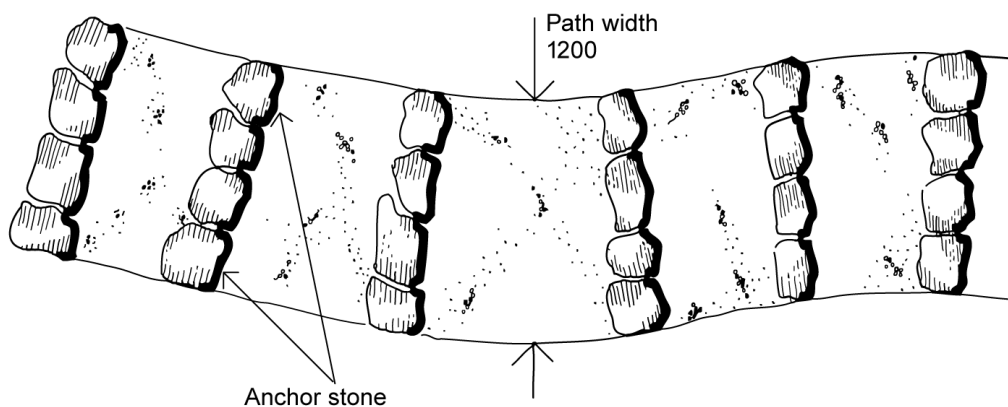
8.3 Stone block and aggregate steps



Section



Plan



These simple stone steps are suitable for use on paths in the lowlands or more formal upland sites. Regular „block“ shaped stone is used to build the risers, and treads are backfilled with a crushed stone sub-base. These stone steps are appropriate in locations where a local source of weathered stone is available, or access is reasonable for bringing stone onto the site.



Materials List

For each step:

- ❖ 4 x local weathered block shaped stones, 400 x 300 x 300mm minimum
- ❖ 0.17 tonnes of Type 1 sub-base will backfill a 1200 x 700 x 100mm tread area.

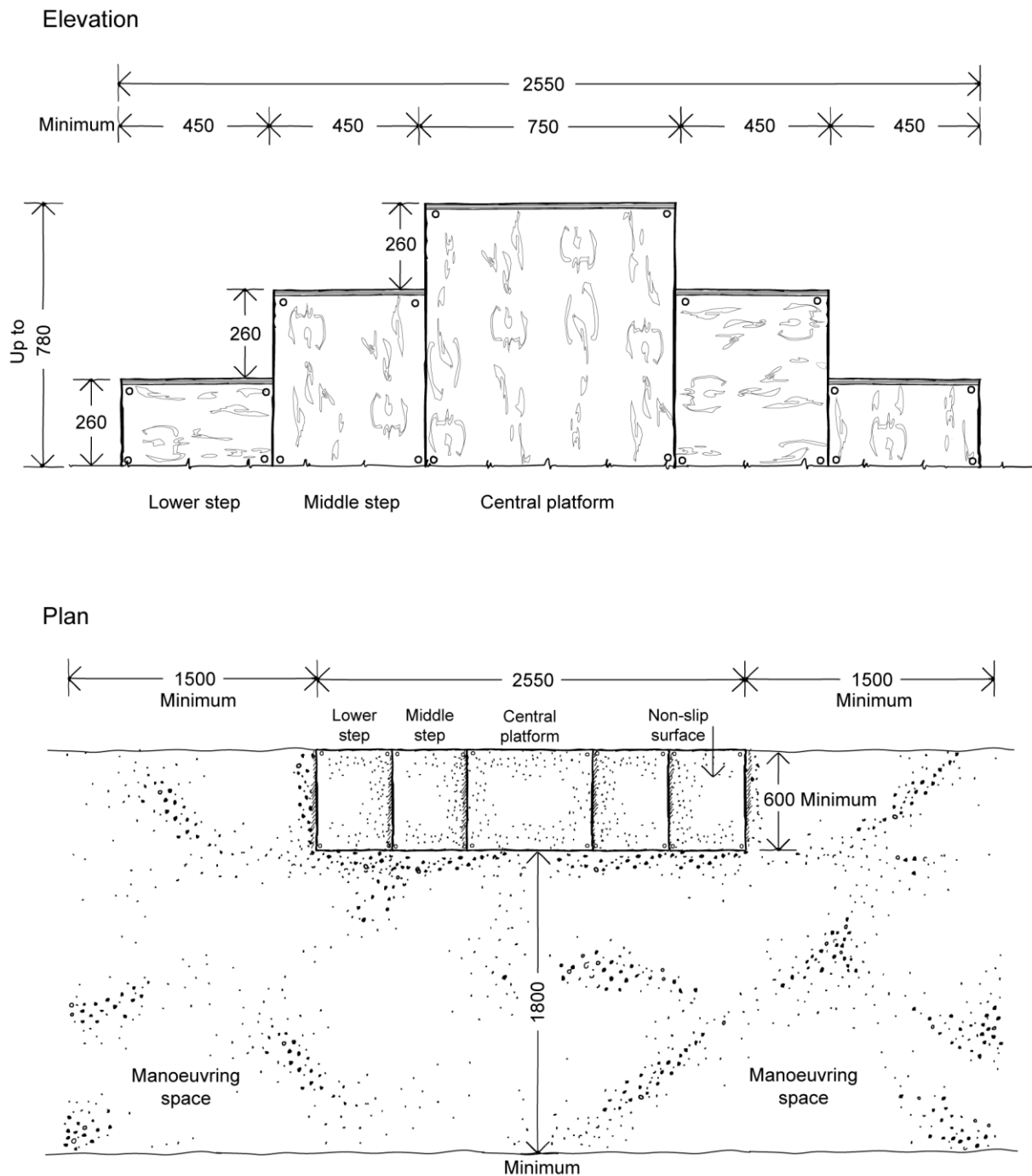
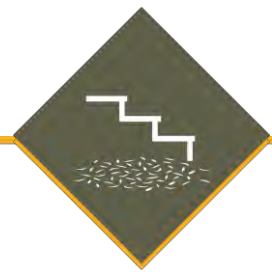


Installation

- ❖ Build the steps up the slope, starting at the bottom.
- ❖ Remove vegetation from the slope to create a path width of 1200mm. Place turfs by the side, for re-use.
- ❖ Dig a 400mm deep x 300mm wide trench in the slope across the prepared path width, at an angle of 90°. The depth of the trench should accommodate the stones lengthways, and finish the riser at ground level. Place dug spoil by the side, for re-use.
- ❖ Place two „anchor” stones at the ends of the trench by the path edges, with two other stones installed between them.
- ❖ Set each stone vertically in the trench, at a minimum of 50% of their height, to form a riser height of 150mm (minimum), 170mm (preferred), or 200mm (maximum), with the flattest surface upwards, and at an angle of no more than 5° from the horizontal.
- ❖ Set all stones tightly together, with all gaps wedged and packed with well-rammed, smaller stones to form an immovable structure.
- ❖ Install the other stone block risers along the line of the path at the required tread depth interval – 500mm or 1000mm.
- ❖ Using dug spoil (stone and soil), partially infill the treads and compact well with a tamper.
- ❖ Lay and compact a 100mm depth of Type 1 sub-base to form firm and even treads with a rise from the front to the back, and a 2% (1:50) cross fall towards the lower side.
- ❖ Using soil and turfs, landscape up to the ends of the risers and along the sides of the treads. Make sure the turfs are finished level with the tread surfaces so that water will run off at the sides.



8.4 Mounting blocks



This is a mounting block with steps at both ends, designed so that a rider can mount a horse on the off side of the block. The rider walks up the steps with their horse on the right side and mounts the horse on the left side. If the horse walks forward before the rider has mounted, the rider can walk down additional steps. The space for moving the horse is also on the off side of the mounting block.



Materials List

For one mounting block (central platform):

- ❖ 1 x external marine plywood top, 750 x 600 x 18mm
- ❖ 2 x external marine plywood sides, 780 x 750 x 18mm
- ❖ 2 x external marine plywood sides, 780 x 600 x 18mm
- ❖ 2 x treated sawn timber frame, 47 x 47 x 3000mm
- ❖ 1 x non-slip flat sheet surface, 750 x 600 x 6mm
- ❖ Plywood screws, 50 x 4mm.

For one middle step:

- ❖ 2 x external marine plywood tops, 450 x 600 x 18mm
- ❖ 2 external marine plywood sides, 450 x 520 x 18mm
- ❖ 2 x external marine plywood sides, 600 x 520 x 18mm
- ❖ 3 x treated sawn timber frame, 47 x 47 x 3000mm
- ❖ 2 x non-slip flat sheet surface, 450 x 600 x 6mm
- ❖ Plywood screws, 50 x 4mm.

For one lower step:

- ❖ 2 x external marine plywood tops, 450 x 600 x 18mm
- ❖ 2 x external marine plywood sides, 450 x 260 x 18mm
- ❖ 2 x external marine plywood sides, 600 x 260 x 18mm
- ❖ 1 x treated sawn timber frame, 47 x 47 x 3000mm
- ❖ 2 x non-slip flat sheets, 450 x 600 x 6mm
- ❖ Plywood screws, 50 x 4mm.

To make additional steps, double the quantities for middle and lower steps.



Installation

- ❖ Cut the sawn timber and external marine plywood to size for the frames and the top and side panels, as per the drawings and materials list.
- ❖ Fix the lengths of timber together with butt joints and screws to form square frames.
- ❖ Fix four side frames together with screws to make square boxes.
- ❖ Fix four side panels to the outside of the frames with screws, making sure the edges butt tightly together and overlap.

- ❖ Fix top panels on top of the boxes with screws, making sure they overlap the frames and side panels.
- ❖ Fix non-slip flat sheet surfaces on top of the boxes with screws.
- ❖ Paint the side panels with wood preservative of a colour suitable to the location.
- ❖ Install the central mounting block on firm and level ground, with the middle steps up against the sides of the mounting block, and the lower steps up against the sides of the middle steps.



9 Fences

Fences are used as physical barriers along paths to:

- ❖ define a boundary;
- ❖ control livestock;
- ❖ exclude wildlife;
- ❖ protect sensitive sites; and
- ❖ guide people away from any potential hazards.

This Guide covers the three main types of fences that are most commonly used:

- ❖ post and wire fences;
- ❖ post and netting fences; and
- ❖ post and rail fences.

Key design considerations

- ❖ **Ground conditions and terrain** – The conditions on the ground and the terrain will determine the line of your fence, the distance between the strainer posts, and how easy it will be to install them into the ground.

Long runs of fencing on flat or gently sloping ground with well-drained soils are easier to install than short runs on undulating ground with shallow, rocky or soft wet soils. Here, you will need to change the direction of the fence line, install turning posts, and infill the gaps between the bottom of the fence and the ground level.

Where the soil is shallow and rocky, installing posts into the ground is difficult, while on soft, wet soils it is the opposite case – the problem is how to get them firm. To overcome the problem, choose a fence design that uses as few posts as possible. A fence with high tensile wire uses about a fifth of the posts which are used by a fence with mild steel wire, with strainer posts installed further apart.

- ❖ **Visual Impact** – Long straight lengths of fencing will have a stronger visual impact than a fence that follows bends, slopes, and the natural line of a boundary. Using the same shape of strainer posts and intermediate posts together in a fence line will always look better than a mix of different sized round and square posts.
- ❖ **Wires and netting** – A wide range of sizes, strengths and finishes of wire and netting are manufactured for fencing. The main difference between the types of wire or netting available is their tensile strength.

Mild steel and high tensile steel wire are the most commonly used types of wire for post and wire fences, and for post and stock netting fences.

Mild steel wire is easier to repair than high tensile steel wire if the wire becomes broken, but it does tend to become slack with age. High tensile steel wire holds its shape better when tensioned, which can allow wider spacing of intermediate posts between the strainer posts. It is able to retain its tension under impact, and under changing outside conditions. In cold weather, it contracts, with the tension increasing; in hot weather, it expands, thus decreasing the tension.

Netting for stock and rabbit fences comes in various heights. The most common heights are 800mm and 900mm. Netting used for deer fencing varies from 1200mm to 1900mm in height.

Netting is specified by a four-part code base, determined by the:

- grade of netting (first letters);
- number of horizontal wires (first number);
- height of the netting (second number); and
- spacing of the vertical wires (third number).

For example, HT15/1550/15 breaks down as follows.

- HT: High tensile
- 15: Horizontal wires
- 1550: Height of netting in centimetres
- 15: Spacing of vertical wires in centimetres

Netting remains stock-proof, even if the wire loses its tension over time. It will still effectively control movement of livestock.

Wire and netting should conform to BS and European Norms (EN) standards such as:

- BS EN 10218-2:2012 – Steel wire and wire products. General. Wire dimensions and tolerances
- BS EN 10223-5:2012 – Steel wire and wire products for fencing and netting. Steel wire woven hinged joint and knotted mesh fencing
- BS EN 10244-2:2009 – Steel wire and wire products. Non-ferrous metallic coatings on steel wire. Zinc or zinc alloy coatings.

❖ **Barbed wire** – Do not use barbed wire on fences next to paths. It is a hazard that may affect those using the path.

If you have to use barbed wire on a fence, always fix it to the inside of the fence line, away from the path, or install a separate single or double barbed wire fence a few metres back from the fence line.

Mild steel twin-strand barbed wire is recommended, rather than high tensile twin-strand barbed wire, which tends to untwist and lose its tension. Single-strand high tensile barbed wire can become brittle.

❖ **Livestock** – The type of livestock you are trying to control will determine the number of wires, rails, and grade of wire or netting that you need to use.

- A post and wire fence is stock-proof, providing the wires are kept taut.
- A post and stock netting fence is stock-proof against cattle, sheep and lambs. Stock netting with smaller spacing between the vertical wires will not be suitable for horses – a horse may get its hoof caught in the wire and break the netting. Instead, use netting designed specifically for horse fences.
- Post and rabbit netting may be stock-proof but is not suitable where cattle or horses are present, as they may damage the netting.
- A post and three-rail fence will not be stock-proof for sheep and lambs, as the spaces between the rails are wide. It will be stock-proof for cattle, but there is a risk that cattle may put their heads through the fence and pull off the rails.
- A post and four-rail fence will be suitable for cattle, horses and sheep, but not for lambs.
- A post and five-rail fence is stock-proof for cattle, horses, and sheep and lambs.

❖ **Fence life** – How long you expect a fence to last will determine the design of the fence and the materials you use. A temporary fence used to protect newly planted trees may only need to last five years, whereas a permanent stock netting fence will need to last longer, between five and fifteen years. There is no point using good quality materials for a temporary fence when it is only needed for a few years. In contrast, a stock fence needs to be made of good quality materials and be designed to stand up to the many years of wear and tear it will face.

- ❖ **Wildlife** – You need to be clear about what you are trying to fence in or keep out. Survey the area where you are going to install the fence line. Look out for well-established wildlife pathways and avoid fencing them off. Forcing animals to change their patterns and range may result in damage to your fence.

Wildlife species will react differently to fences by climbing, jumping, pushing through, or pushing under a fence. Putting in mitigation measures, such as badger gates and deer leaps, may help resolve this problem.

Do not install barbed wire or a single line of top wire where fallow and roe deer are present. Deer can easily get caught in the wire when trying to jump the fence, causing injury and damage to the fence.

Fences can be hazardous to flying birds, especially grouse or capercaillie. You can make the fence safer and more visible to birds by attaching plastic mesh or chestnut paling to it.

You must consult with Scottish Natural Heritage (SNH) before installing any fencing on any sites designated for nature conservation interest, such as Sites of Special Scientific Interest (www.snh.gov.uk/about-snh/snh-in-your-area/).

- ❖ **Access points** – You need to provide access points either in the fence line, or at the start or end of a fenced path corridor.

You should always try to choose the least restrictive option to manage access to these fenced path corridors, while keeping livestock out.

Avoid creating narrow fenced path corridors. Being hemmed into a long straight corridor with fences either side is an uncomfortable experience for people.

- ❖ **Flooding** – In areas prone to flooding, always use a post and wire fence with fewer line wires, rather than post and netting fencing. The debris carried by floodwater will wash through between the wires, rather than being trapped in the netting. Netting covered with debris will be pulled over by fast moving water.
- ❖ **Electric fencing** – Live electric fencing should never be used alongside narrow paths or immediately next to any gate, or to any other outdoor access furniture or structure where there is a risk of anyone receiving an electric shock. For more information about electric fencing, refer to these publications:

- Forest Fencing – Forestry Commission. Available at: [http://www.forestry.gov.uk/pdf/fctg002.pdf/\\$FILE/fctg002.pdf](http://www.forestry.gov.uk/pdf/fctg002.pdf/$FILE/fctg002.pdf)
- Electric Fencing – British Horse Society. Available at: <http://www.bhs.org.uk/access-and-bridleways/free-leaflets-and-advice>.

Post and wire fences

Post and wire fences were historically common throughout Scotland, particularly where there were more cattle than sheep.

The effectiveness of post and wire fences depends on the wires remaining taught. If it does not, lambs can easily climb through.

The standard design of post and wire fences comprises seven strands of 10 or 12 gauge (3.15 - 2.50mm diameter) high tensile steel wire.

Mild steel wire can be used. This is easier to repair than high tensile steel wire if the wire breaks, but tends to slacken with age.

Post and netting fences

Post and netting fences are a mainstay of agricultural and forestry boundaries. They are easier to erect than line wire fences, and are cheaper and more durable.

Stock netting is also referred to as sheep netting, pig netting, or by the trade name „Rylock“.

The standard specification is C8/80/15, which is made from medium grade mild steel wire. It is suitable for cattle, sheep and lambs. It is usually available with a green plastic or galvanised finish.

Alternative specifications are B8/80/15 and HT8/80/15.

Both specifications are suitable for cattle, sheep, lambs and pigs.

Pig netting made from high tensile wire is also available, but is used less often than the mild steel versions.

For deer fences, the height of the fence and size of netting you need depends on the species of deer you are trying to keep out.

The minimum fence height for roe deer is 1500mm. For red, sika or fallow deer, the minimum height is 1900mm.

The maximum netting size for roe deer is 150 - 200mm, and 200 - 300mm for red, sika and fallow deer.

1500mm high deer fences will normally use single width netting. A 2000mm high fence may have either two sections of netting one above the other, or one single width of netting. Two sections of netting give the option of different netting sizes on the top and bottom of the fence.

Post and rail fences

Post and rail fences are constructed of either timber or recycled plastic, with between three and five rails. Square posts should be used, as round posts do not give sufficient surface for nailing the rails onto the posts.

Most types of post and rail fence use posts that are set into dug holes and backfilled with well-rammed stones and soil. This method is best, as it is necessary to line up the faces of the posts for nailing and butting together the rails on the posts. It is difficult to knock in square posts accurately without them twisting in the ground, especially in soil with stones.

A three-rail fence will guide people along a path, but the gaps between the rails will be too wide to contain small livestock, such as lambs and calves. Cattle and horses are also inclined to stick their heads through and pull the rails off.

A four-rail fence is sufficient for cattle and most breeds of lowland sheep. A line wire along the base of the fence will help contain sheep.

A five-rail fence provides a stock-proof fence for sheep, including hill lambs. This type of fence is also used where a robust boundary is required, such as along a railway line, where there is a steep drop to the side, or where there is some other need to keep people on a specific path.

Design sheets

The following design sheets are contained in this section:

[9.1 Post and wire fence](#)

[9.2 Stock fence with top wire](#)

[9.3 Deer fence](#)

[9.4 Rabbit fence with top wire](#)

[9.5 Post and three-rail timber fence](#)

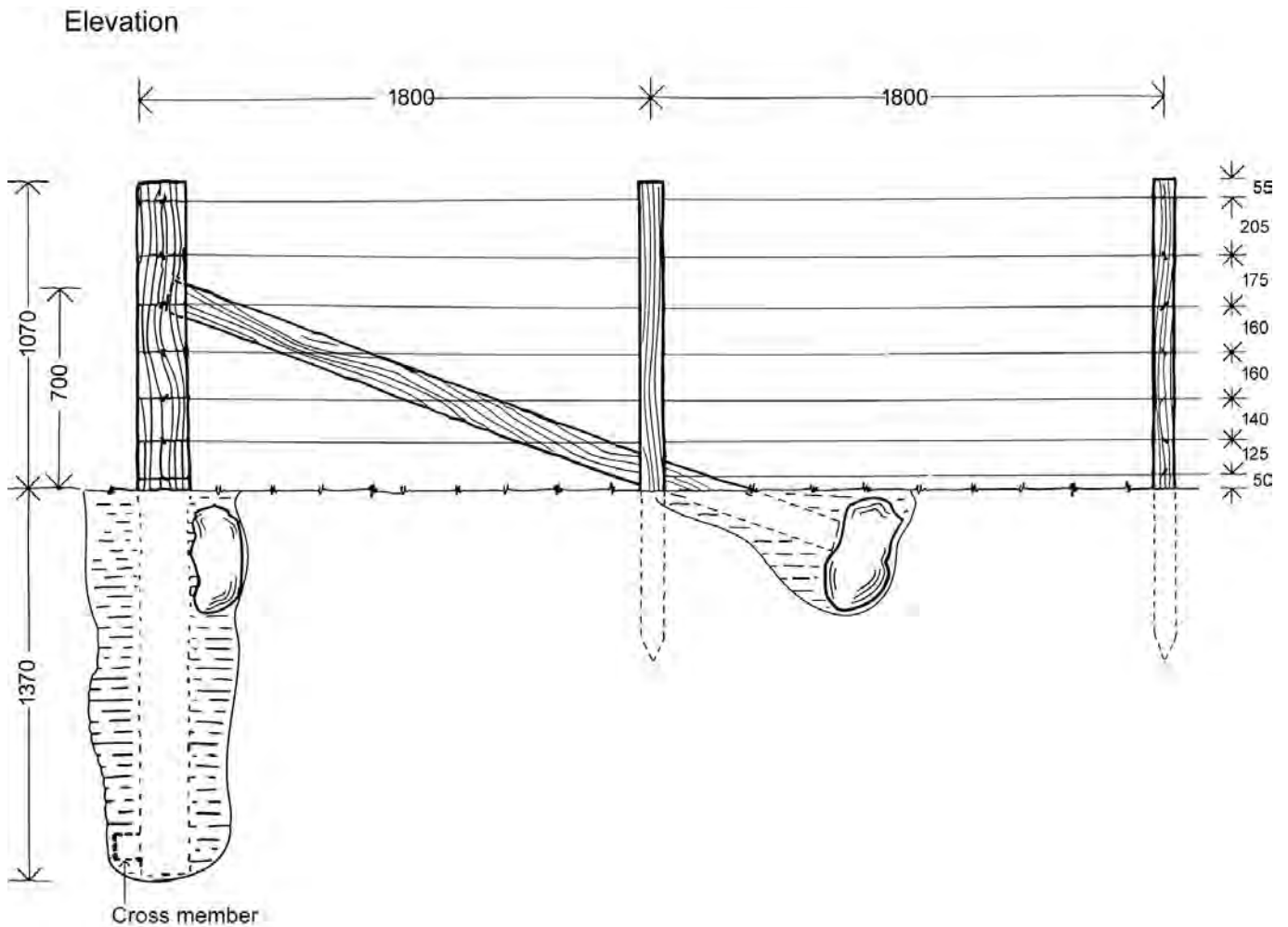
[9.6 Post and four-rail timber fence](#)

[9.7 Post and five-rail timber fence](#)

[9.8 Birdsmouth timber fence](#)



9.1 Post and wire fence



This design is better suited to undulating ground than strained line wire fences with droppers, as the posts are spaced closer together. The seven parallel lines of wire make it stock-proof against lambs, sheep, cattle and calves.



Materials List

For a 3600mm section of fencing:

- ❖ 1 x treated timber strainer post, 2440 x 175mm diameter
- ❖ 1 x treated timber strut, 2440 x 100mm diameter, pointed at one end
- ❖ 2 x treated timber intermediate posts, 1800 x 100mm diameter
- ❖ 7 x galvanised high tensile steel line wires, plain wire, 12 gauge (2.50mm)
- ❖ 7 x galvanised wire connectors (lashing rods), 12 gauge (2.50mm)
- ❖ 30 x galvanised staples, 40 x 4mm
- ❖ 2 x large stones for thrust plate and breast plate
- ❖ 1 x treated timber cross member, 500 x 75 x 75mm
- ❖ 2 x galvanised round wire nails, 100 x 4mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines. The Forest Industry Safety Accord (FISA) has produced Safety Guide 104, 'Fencing'. This sets out safe working practices to follow when erecting and dismantling fencing in the outdoors. Available at: <http://www.ukfisa.com/safety-information/safety-library/fisa-safety-guides.html>.

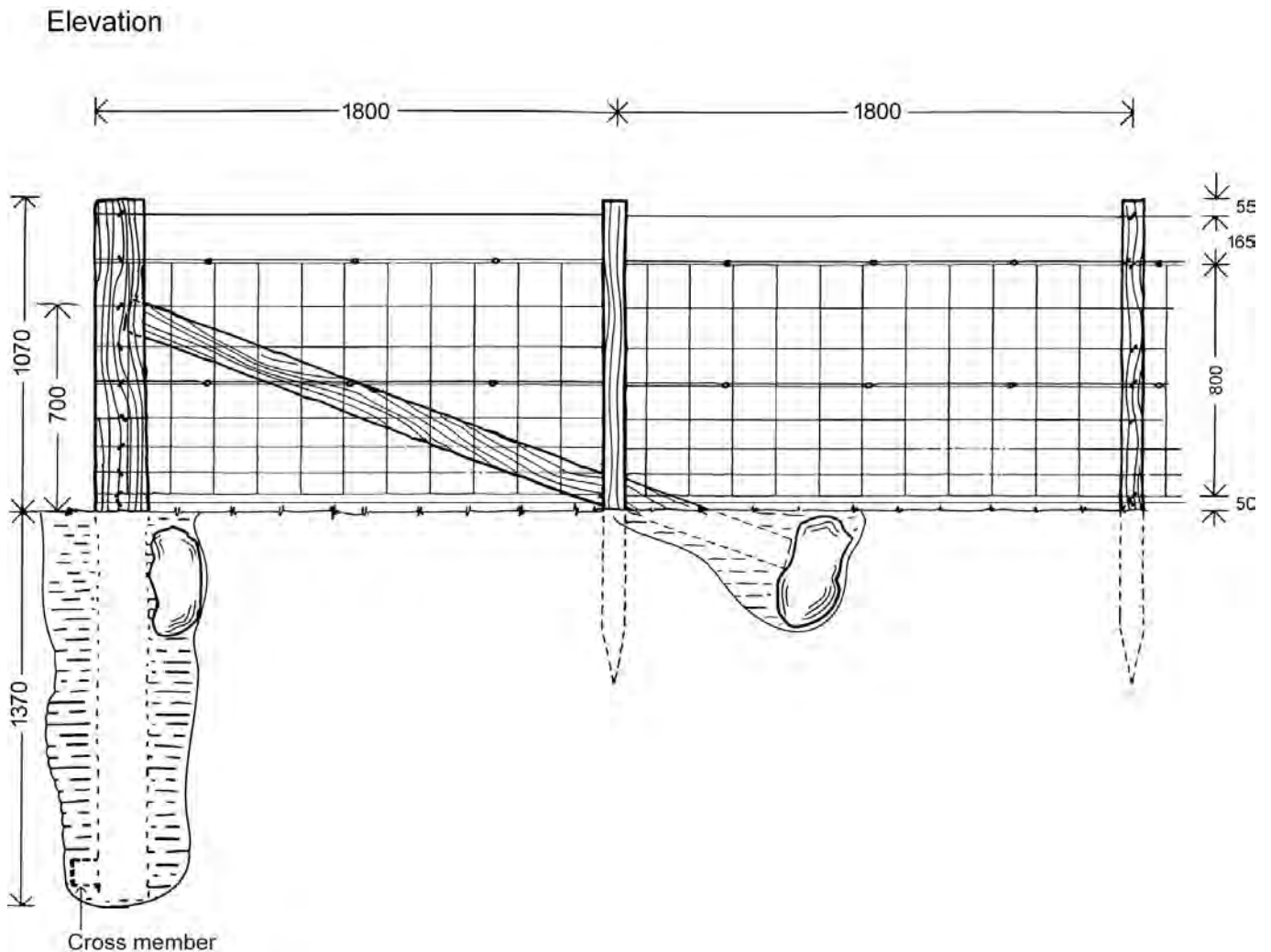
Concrete is only necessary where difficult ground conditions prevent the installation of the strainer posts to the specified depth.

- ❖ Dig narrow holes for the strainer posts at the start and end of the fence line. The depth of the holes should be about 1370mm. You may need to install turning posts at any corners or changes of direction.
- ❖ Cut a 75 x 75mm slot in the back of the posts, about 50mm up from the bottom. Fix a foot (cross member) into the slot using two nails.
- ❖ Place the posts in the holes and check their height above the ground. It should be 1070mm.
- ❖ Carefully ram stones or rubble around the bottom of the posts.
- ❖ Place large stones in front of each post, just below ground level, to form a breast plate to strain the posts against.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.
- ❖ Using a wire dispenser, pull out the bottom line wire along the fence line, ensuring there are no kinks or twists in it.

- ❖ Fix one end of the bottom line wire securely to the strainer post, at a height of 50mm up from the ground, by passing the wire around the post and fastening the end off on the same line wire with a wire connector.
- ❖ Strain up the bottom line wire from the strainer post at the other end of the fence line. Leave the wire held in place with the wire strainer – do not fasten it off. It acts as a guide for the positioning of all the struts and the intermediate posts.
- ❖ One third of the way down from the top of each strainer post, chisel out 25mm deep mortices into the posts on the side facing the direction of the fence line.
- ❖ Fit the pointed ends of the struts into the mortices, with the other ends in line with the bottom line wire.
- ❖ Secure the struts in place with large stones (thrust plate). If no large stones are available, you could use pointed half round timber stakes driven into the ground at the ends of the struts.
- ❖ Using a mell, post driver, or tractor mounted post driver, knock the first intermediate post into the ground, on the „wrong“ side of the fence line to avoid the strut, 1800mm out from the strainer post. Complete this task at the other end of the fence line. Check that the height of the posts is 1070mm above the ground. Use a spirit level to ensure they are upright.
- ❖ Using a mell, post driver, or tractor mounted post driver, knock in the other posts at a spacing of 1800mm on the right side of the fence line, using the bottom line wire as a guide. Check their height and ensure they are upright.
- ❖ Fix one end of the top line wire securely to the strainer post, at a height of 55mm down from the top, by passing the wire around the post and fastening the end off on the same line wire with a wire connector.
- ❖ Strain up the top line wire from the strainer post at the other end of the fence line. Leave the wire held in place with another wire strainer – do not fasten it off.
- ❖ Staple the top and bottom line wires to the high and low intermediate posts at a height of 55mm down from the top, and 50mm up from the ground. Angle the staples, leaving enough room between the posts so that the wire is still free to move.
- ❖ Readjust the wire tensions and fasten the ends of the wire off on the same line wires with wire connectors. Staple them to the strainer posts with a couple of staples and remove the wire strainers.
- ❖ Strain the remaining five line wires around the strainer posts and connect them to same wires with wire connectors. Staple each line wire to the intermediate posts at spaces shown on the drawing. Staple them to the strainer posts after a final strain with the wire strainers.
- ❖ Finally, cut and fasten off any loose ends of wire.



9.2 Stock fence with top wire



The netting makes this fence stock-proof against lambs, sheep, cattle and calves, and it remains stock-proof even if the wire slackens over time.

Stock netting fencing can easily accommodate changes in direction.

On undulating ground, you may need to add short sections of rail underneath the fence line to prevent sheep or lambs getting under any gaps.

On hard ground, where it is difficult to install posts, post and wire fencing may be more practical because the posts are much more widely spaced.



Materials List

For a 3600mm section of fencing:

- ❖ 1 x treated timber strainer post, 2440 x 175mm diameter
- ❖ 1 x treated timber strut, 2440 x 100mm diameter, pointed at one end
- ❖ 2 x treated timber intermediate posts, 1800 x 100mm diameter
- ❖ 4 x galvanised high tensile steel line wires, plain wire, 12 gauge (2.50mm)
- ❖ 1 x galvanised high tensile steel stock netting, HT8/80/15, 100 metre roll
- ❖ 12 x galvanised wire connectors (lashing rods), 12 gauge (2.50mm)
- ❖ 20 x galvanised ring clips, type CL22
- ❖ 30 x galvanised staples, 40 x 4mm
- ❖ 2 x large stones for thrust plate and breast plate
- ❖ 1 x treated timber cross member, 500 x 75 x 75mm
- ❖ 2 x galvanised round wire nails, 100 x 4mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines. The Forest Industry Safety Accord (FISA) has produced Safety Guide 104, 'Fencing'. This sets out safe working practices to follow when erecting and dismantling fencing in the outdoors. Available at: <http://www.ukfisa.com/safety-information/safety-library/fisa-safety-guides.html>.

Concrete is only necessary where difficult ground conditions prevent the installation of the strainer posts to the specified depth.

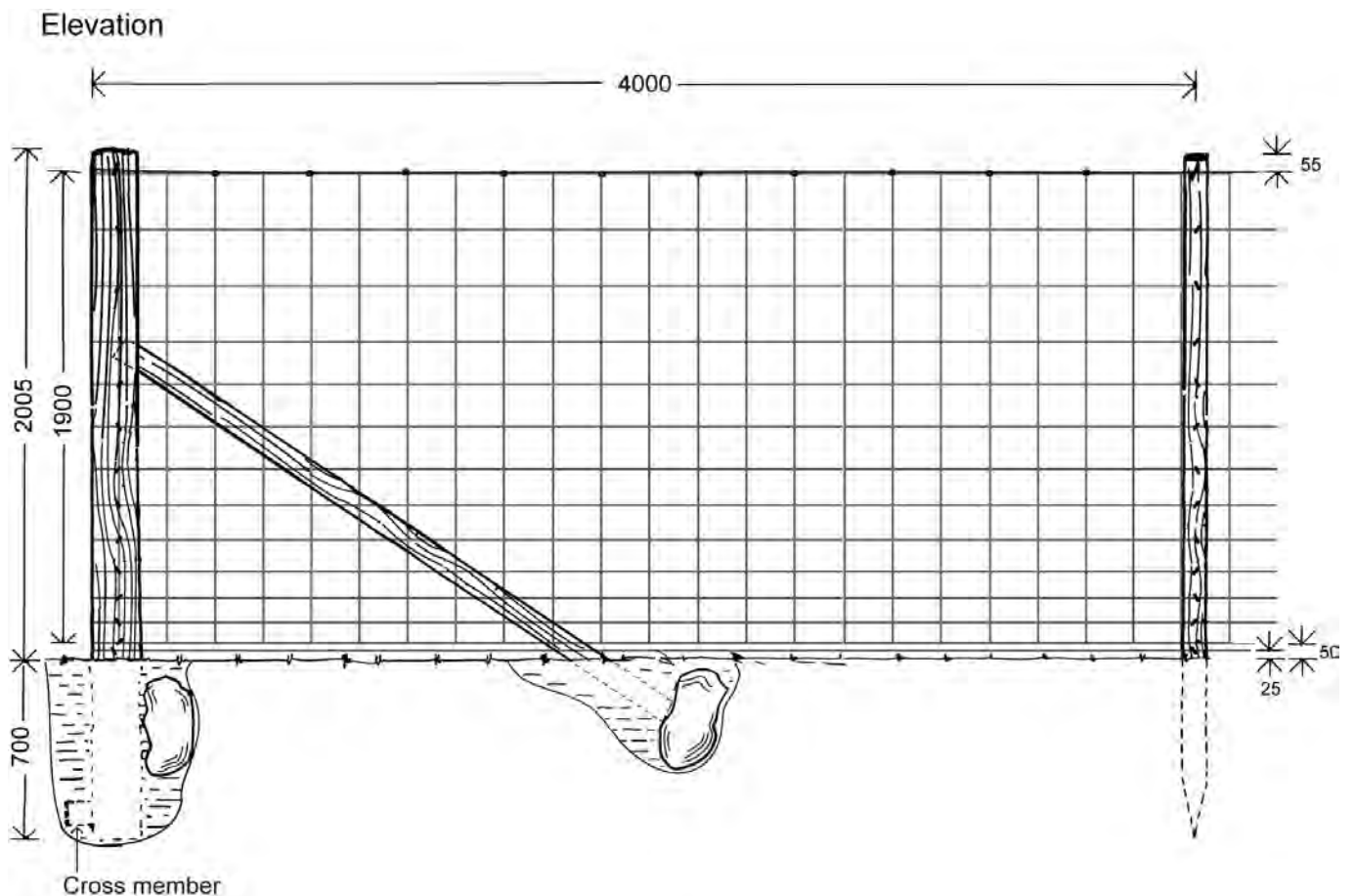
- ❖ Dig narrow holes for the strainer posts at the start and end of the fence line. The depth of the holes should be about 1370mm. You may need to install turning posts at any corners or changes of direction.
- ❖ Cut a 75 x 75mm slot in the back of the posts, about 50mm up from the bottom. Fix a foot (cross member) into the slot using two nails.
- ❖ Place the posts in the holes and check their height above the ground. It should be 1070mm.
- ❖ Carefully ram stones or rubble around the bottom of the posts.
- ❖ Place large stones in front of each post, just below ground level, to form a breast plate to strain the posts against.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.

- ❖ Using a wire dispenser, pull out the bottom line wire along the fence line, ensuring there are no kinks or twists in it.
- ❖ Fix one end of the bottom line wire securely to the strainer post, at a height of 25mm up from the ground, by passing the wire around the post and fastening the end off on the same line wire with a wire connector.
- ❖ Strain up the bottom line wire from the strainer post at the other end of the fence line. Leave the wire held in place with the wire strainer – do not fasten it off. It acts as a guide for the positioning of all the struts and the intermediate posts. One third of the way down from the top of each strainer post, chisel out 25mm deep mortices into the posts on the side facing the direction of the fence line.
- ❖ Fit the pointed ends of the struts into the mortices, with the other ends in line with the bottom line wire.
- ❖ Secure the struts in place with large stones (thrust plate). If no large stones are available, you could use pointed half round timber stakes driven into the ground at the ends of the struts.
- ❖ Using a mell, post driver, or tractor mounted post driver, knock the first intermediate post into the ground, on the „wrong“ side of the fence line to avoid the strut, 1800mm out from the strainer post. Complete this task at the other end of the fence line. Check that the height of the posts is 1070mm above the ground. Use a spirit level to ensure they are upright.
- ❖ Using a mell, post driver, or tractor mounted post driver, knock in the other posts at a spacing of 1800mm on the right side of the fence line, using the bottom line wire as a guide. Check their height and ensure they are upright.
- ❖ Fix one end of the top line wire securely to the strainer post, at a height of 55mm down from the top, by passing the wire around the post and fastening the end off on the same line wire with a wire connector.
- ❖ Strain up the top line wire from the strainer post at the other end of the fence line. Leave the wire held in place with another wire strainer – do not fasten it off.
- ❖ Staple the top and bottom line wires to the high and low intermediate posts at a height of 55mm down from the top, and 25mm up from the ground. Angle the staples, leaving enough room between the posts so that the wire is still free to move.
- ❖ Readjust the wire tensions and fasten the ends of the wire off on the same line wires with wire connectors. Staple them to the strainer posts with a couple of staples and remove the wire strainers.
- ❖ Strain the remaining two line wires around the strainer posts and connect them to same wires with wire connectors. Staple each line wire to the intermediate posts at spaces shown on the drawing. Staple them to the strainer posts after a final strain with the wire strainers.
- ❖ Roll the stock netting out along the fence line on the side of the fence where the line wires are fixed, ensuring there are no kinks or twists in it. Place the netting round the first strainer post and fasten the ends of the wires to the netting with wire connectors.

- ❖ Using a straining bar, strain the netting until tensioned from the strainer post at the other end of the fence line.
- ❖ Fix the netting onto the two middle line wires using ring clips.
- ❖ Staple the netting to each intermediate post. Angle the staples, leaving enough room between the posts so the wires of the netting are still free to move.
- ❖ Give the netting a final strain and fasten it off at the strainer posts with staples.
- ❖ Finally, cut and fasten off any loose ends of wire.



9.3 Deer fence



A deer fence is usually erected to protect young trees from grazing by deer.

You need to think carefully about the design and siting of a deer fence to avoid any negative impact on wildlife and the landscape.

This deer fence design is suitable for larger species of deer – red, sika and fallow deer. It is a 1900mm high single width netting fence with intermediate posts, placed every 4000mm, between strainer posts which are placed every 50 metres. The netting is supported by the top line wire. There is a bottom line wire to prevent livestock such as lambs getting under the fence.



Materials List

For a 4000mm section of fencing:

- ❖ 1 x treated timber strainer post, 2705 x 175mm diameter
- ❖ 1 x treated timber strut, 2440 x 100mm diameter, pointed at one end
- ❖ 1 x treated timber intermediate posts, 2440 x 100mm diameter
- ❖ 2 x galvanised high tensile steel line wires, plain wire, 12 gauge (2.50mm)
- ❖ 1 x galvanised high tensile steel deer netting, HT13/190/15, 100 metre roll
- ❖ 15 x galvanised wire connectors (lashing rods), 12 gauge (2.50mm)
- ❖ 20 x galvanised ring clips, type CL22
- ❖ 40 x galvanised staples, 40 x 4mm
- ❖ 2 x large stones for thrust plate and breast plate
- ❖ 1 x treated timber cross member, 500 x 75 x 75mm
- ❖ 2 x galvanised round wire nails, 100 x 4mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines. The Forest Industry Safety Accord (FISA) has produced Safety Guide 104, 'Fencing'. This sets out safe working practices to follow when erecting and dismantling fencing in the outdoors. Available at: <http://www.ukfisa.com/safety-information/safety-library/fisa-safety-guides.html>.

Concrete is only necessary where difficult ground conditions prevent the installation of the strainer posts to the specified depth.

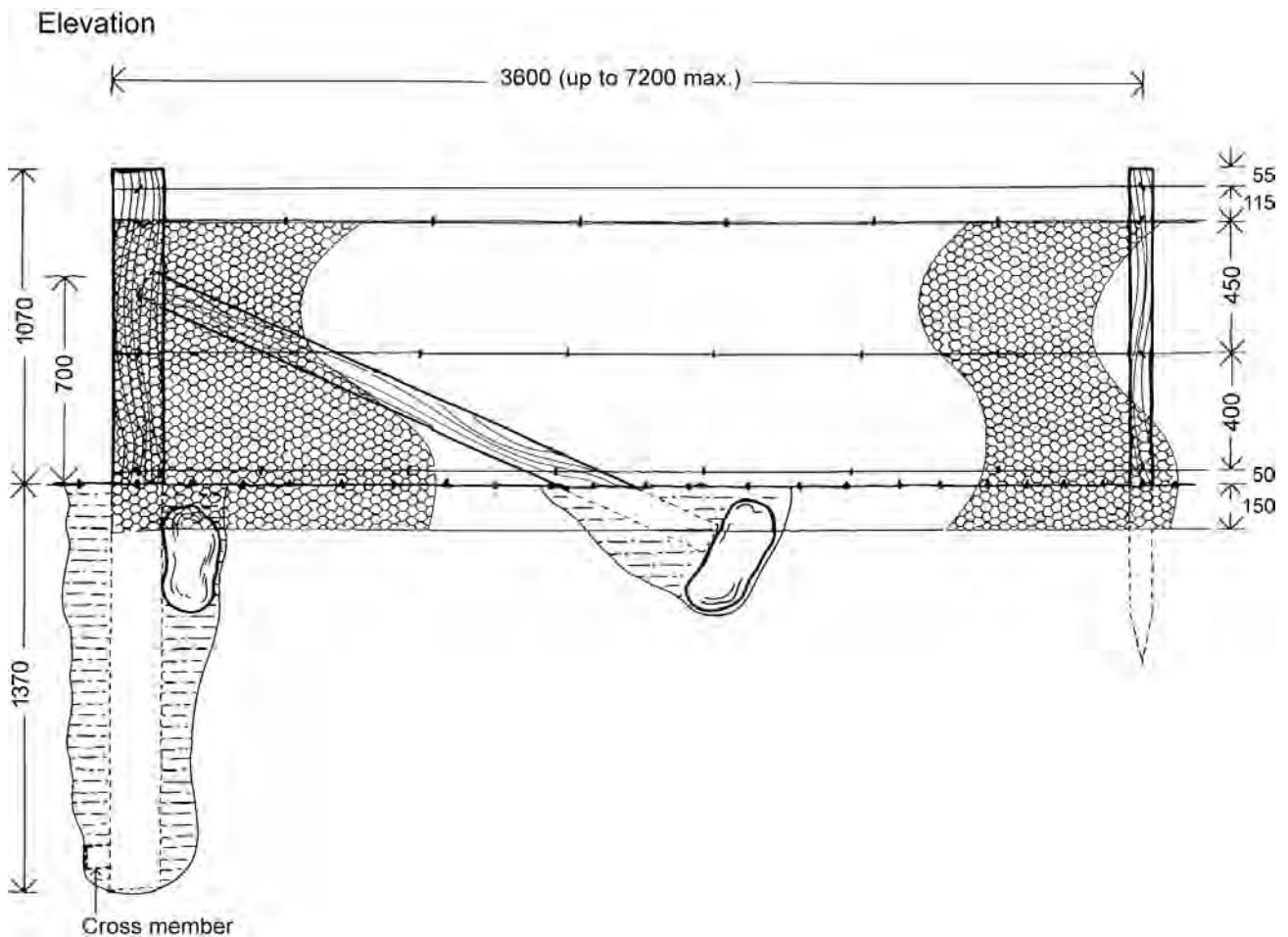
- ❖ Dig narrow holes for the strainer posts at the start and end of the fence line. The depth of the holes should be about 700mm. You may need to install turning posts at any corners or changes of direction.
- ❖ Cut a 75 x 75mm slot in the back of the posts, about 50mm up from the bottom. Fix a foot (cross member) into the slot using two nails.
- ❖ Place the posts in the holes and check their height above the ground. It should be 2005mm.
- ❖ Carefully ram stones or rubble around the bottom of the posts.
- ❖ Place large stones in front of each post, just below ground level, to form a breast plate to strain the posts against.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.

- ❖ Using a wire dispenser, pull out the bottom line wire along the fence line, ensuring there are no kinks or twists in it.
- ❖ Fix one end of the bottom line wire securely to the strainer post, at a height of 25mm up from the ground, by passing the wire around the post and fastening the end off on the same line wire with a wire connector. Strain up the bottom line wire from the strainer post at the other end of the fence line. Leave the wire held in place with the wire strainer – do not fasten it off. It acts as a guide for the positioning of all the struts and the intermediate posts.
- ❖ One third of the way down from the top of each strainer post, chisel out 25mm deep mortices into the posts on the side facing the direction of the fence line.
- ❖ Fit the pointed ends of the struts into the mortices, with the other ends in line with the bottom line wire.
- ❖ Secure the struts in place with large stones (thrust plate). If no large stones are available, you could use pointed half round timber stakes driven into the ground at the ends of the struts.
- ❖ Using a mallet, post driver, or tractor mounted post driver, knock the first intermediate post into the ground, on the „wrong“ side of the fence line to avoid the strut, 4000mm out from the strainer post. Complete this task at the other end of the fence line. Check that the height of the posts is 1900mm above the ground. Use a spirit level to ensure they are upright.
- ❖ Using a mallet, post driver, or tractor mounted post driver, knock in the other posts at a spacing of 4000mm on the right side of the fence line, using the bottom line wire as a guide. Check their height and ensure they are upright.
- ❖ Fix one end of the top line wire securely to the strainer post, at a height of 55mm down from the top, by passing the wire around the post and fastening the end off on the same line wire with a wire connector.
- ❖ Strain up the top line wire from the strainer post at the other end of the fence line. Leave the wire held in place with another wire strainer – do not fasten it off.
- ❖ Staple the top and bottom line wires to the high and low intermediate posts at a height of 55mm down from the top, and 25mm up from the ground. Angle the staples, leaving enough room between the posts so that the wire is still free to move.
- ❖ Readjust the wire tensions and fasten the ends of the wire off on the same line wires with wire connectors. Staple them to the strainer posts with a couple of staples and remove the wire strainers.
- ❖ Roll the deer netting out along the fence line on the side of the fence where the line wires are fixed, ensuring there are no kinks or twists in it.
- ❖ Place the netting round the first strainer post and fasten the ends of the wires to the netting with wire connectors.
- ❖ Using a straining bar, strain the netting until tensioned from the strainer post at the other end of the fence line.
- ❖ Fix the netting onto the top line wire using ring clips. The bottom of the netting should be 50mm off the ground.

- ❖ Staple the netting to each intermediate post. Angle the staples, leaving enough room between the posts so the wires of the netting are still free to move.
- ❖ Give the netting a final strain and fasten it off at the strainer posts with staples.
- ❖ Finally, cut and fasten off any loose ends of wire.



9.4 Rabbit fence with top wire



This design can be used to protect young trees and shrubs from rabbit and hare damage. It has a lifespan of only five to ten years, which is sufficient for its purpose. Specifications vary according to the overall height, mesh size, and wire gauge. The most commonly used netting to protect areas against rabbits is 1050/31/19. You can use rabbit netting on its own, or add it to either strained steel line wire fence or stock netting fence.



Materials List

For a 3600mm section of fencing:

- ❖ 1 x treated timber strainer post, 2440 x 175mm diameter
- ❖ 1 x treated timber strut, 2440 x 100mm diameter, pointed at one end
- ❖ 2 x treated timber intermediate posts, 1800 x 100mm diameter
- ❖ 4 x galvanised high tensile steel line wires, plain wire, 12 gauge (2.50mm)
- ❖ 1 x galvanised rabbit netting, 1050/31/19, 50 metre roll
- ❖ 4 x galvanised wire connectors (lashing rods), 12 gauge (2.50mm)
- ❖ 25 x galvanised ring clips, type CL22
- ❖ 15 x galvanised staples, 30 x 3.15mm
- ❖ 2 x large stones for thrust plate and breast plate
- ❖ 1 x treated timber cross member, 500 x 75 x 75mm
- ❖ 2 x galvanised round wire nails, 100 x 4mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines. The Forest Industry Safety Accord (FISA) has produced Safety Guide 104, 'Fencing'. This sets out safe working practices to follow when erecting and dismantling fencing in the outdoors. Available at: <http://www.ukfisa.com/safety-information/safety-library/fisa-safety-guides.html>.

Concrete is only necessary where difficult ground conditions prevent the installation of the strainer posts to the specified depth.

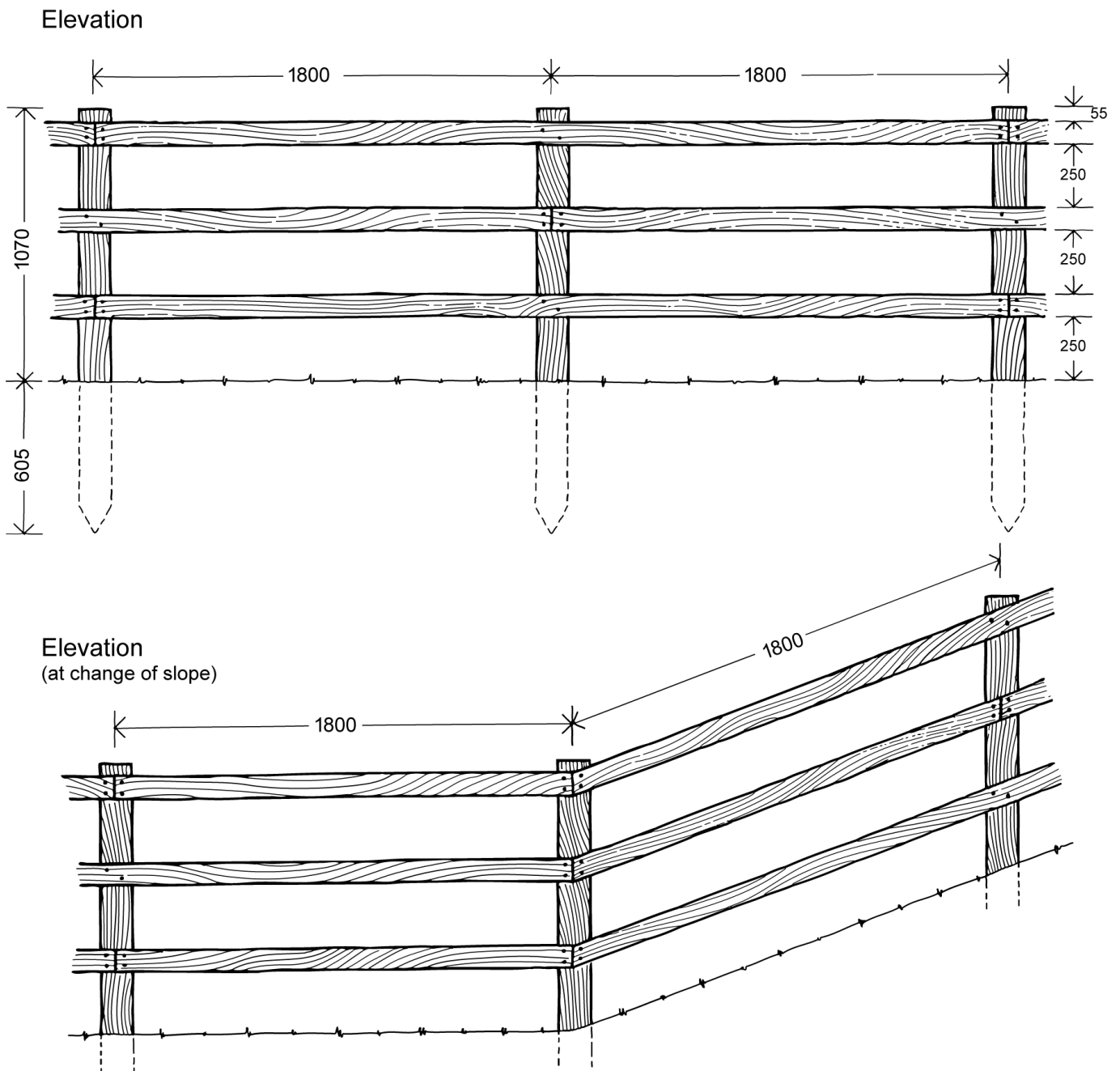
- ❖ Dig narrow holes for the strainer posts at the start and end of the fence line. The depth of the holes should be about 1370mm. You may need to install turning posts at any corners or changes of direction.
- ❖ Cut a 75 x 75mm slot in the back of the posts, about 50mm up from the bottom. Fix a foot (cross member) into the slot using two nails.
- ❖ Place the posts in the holes and check their height above the ground. It should be 1070mm.
- ❖ Carefully ram stones or rubble around the bottom of the posts.
- ❖ Place large stones in front of each post, just below ground level, to form a breast plate to strain the posts against.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.

- ❖ Using a wire dispenser, pull out the bottom line wire along the fence line, ensuring there are no kinks or twists in it.
- ❖ Fix one end of the bottom line wire securely to the strainer post, at a height of 25mm up from the ground, by passing the wire around the post and fastening the end off on the same line wire with a wire connector.
- ❖ Strain up the bottom line wire from the strainer post at the other end of the fence line. Leave the wire held in place with the wire strainer – do not fasten it off. It acts as a guide for the positioning of all the struts and the intermediate posts.
- ❖ One third of the way down from the top of each strainer post, chisel out 25mm deep mortices into the posts on the side facing the direction of the fence line.
- ❖ Fit the pointed ends of the struts into the mortices, with the other ends in line with the bottom line wire.
- ❖ Secure the struts in place with large stones (thrust plate). If no large stones are available, you could use pointed half round timber stakes driven into the ground at the ends of the struts.
- ❖ Using a mallet, post driver, or tractor mounted post driver, knock the first intermediate post into the ground, on the „wrong“ side of the fence line to avoid the strut, 3600mm out from the strainer post. Complete this task at the other end of the fence line. Check that the height of the posts is 1070mm above the ground. Use a spirit level to ensure they are upright.
- ❖ Using a mallet, post driver, or tractor mounted post driver, knock in the other posts at a spacing of 3600mm on the right side of the fence line, using the bottom line wire as a guide. Check their height and ensure they are upright.
- ❖ Fix one end of the top line wire securely to the strainer post, at a height of 55mm down from the top, by passing the wire around the post and fastening the end off on the same line wire with a wire connector.
- ❖ Strain up the top line wire from the strainer post at the other end of the fence line. Leave the wire held in place with another wire strainer – do not fasten it off.
- ❖ Staple the top and bottom line wires to the high and low intermediate posts at a height of 55mm down from the top, and 50mm up from the ground. Angle the staples, leaving enough room between the posts so that the wire is still free to move.
- ❖ Readjust the wire tensions and fasten the ends of the wire off on the same line wires with wire connectors. Staple them to the strainer posts with a couple of staples and remove the wire strainers.
- ❖ Strain the remaining two line wires around the strainer posts and connect them to the same wires with wire connectors. Staple each line wire to the intermediate posts at spaces shown on the drawing. Staple them to the strainer posts after a final strain with the wire strainers.
- ❖ Place the netting round the first strainer post and fasten the ends of the wires to the netting with wire connectors.
- ❖ Dig a shallow trench along the fence line on the side of the fence where the line wires are fixed.

- ❖ Roll the rabbit netting out along the fence line and the trench, ensuring there are no kinks or twists in it.
- ❖ Place the netting round the first strainer post and fasten it to the post with staples.
- ❖ Fold the bottom 150mm of the netting out and place it in the trench.
- ❖ Using a straining bar, strain the netting until tensioned from the strainer post at the other end of the fence line.
- ❖ Fix the netting onto the two middle and bottom line wires using ring clips.
- ❖ Staple the netting to each intermediate post. Angle the staples, leaving enough room between the posts so the wires of the netting are still free to move.
- ❖ Give the netting a final strain and fasten it off at the strainer posts with staples.
- ❖ Pin the netting down in the trench and backfill with available soil.
- ❖ Finally, cut and fasten off any loose ends of wire.



9.5 Post and three-rail timber fence



A three-rail fence is usually used to guide or control public access, or to provide a visual boundary. The gaps between the rails are too wide to contain sheep and lambs. It is suitable for cattle, but there is a risk cattle may put their heads through the fence and pull off the rails.



Materials List

For a 3600mm section of fencing:

- ❖ 3 x treated sawn timber posts, 1675 x 127 x 64mm
- ❖ 4 x treated sawn timber rails, 3600 x 88 x 38mm
- ❖ 28 x galvanised round wire nails, 100 x 4mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines. The Forest Industry Safety Accord (FISA) has produced Safety Guide 104, 'Fencing'. This sets out safe working practices to follow when erecting and dismantling fencing in the outdoors. Available at: <http://www.ukfisa.com/safety-information/safety-library/fisa-safety-guides.html>.

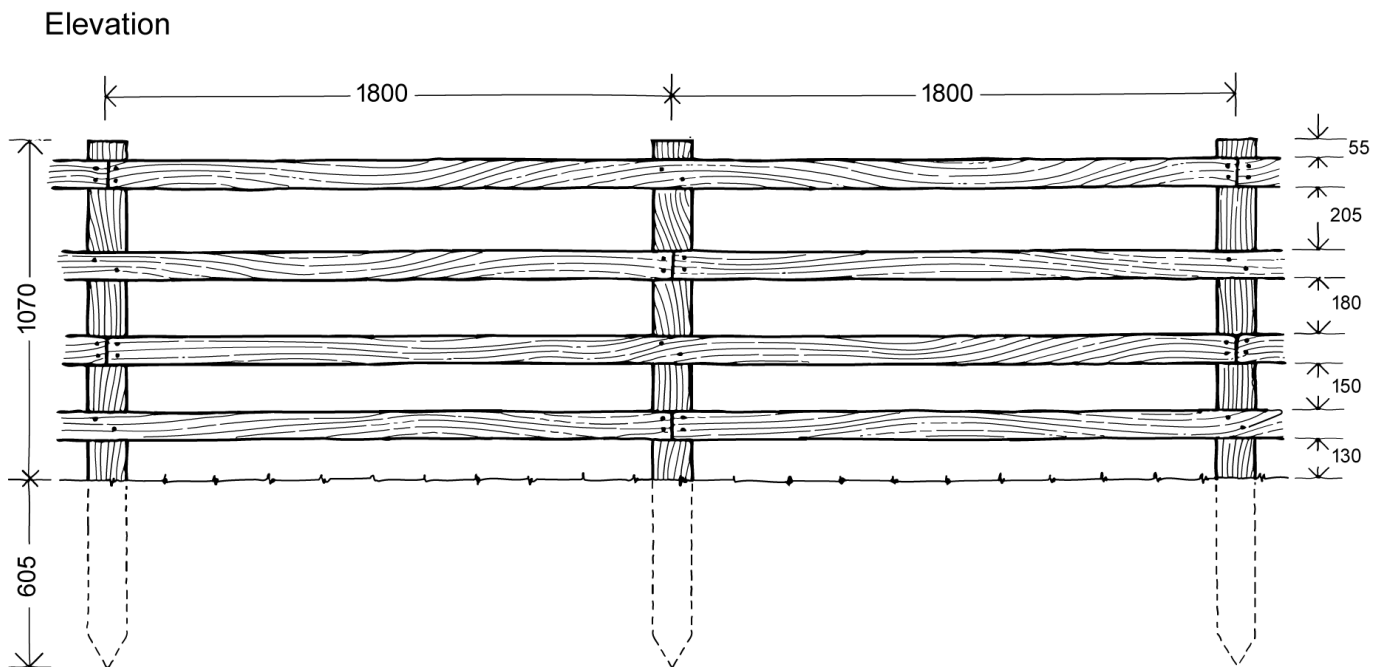
Concrete is only necessary where difficult ground conditions prevent the installation of the strainer posts to the specified depth.

- ❖ Mark out the line of fence with a line of strong string, securely attached to temporary stakes.
- ❖ Lay out a double row of rails along the line of fence, starting with a half-length rail, butting all the ends of the rails together to give a double overlapping row.
- ❖ Carefully mark the position of the post, using a pinch bar held against the line of string where the rails join.
- ❖ Dig narrow holes for the posts along the line of fence. The depth of the holes should be about 605mm.
- ❖ Place the posts in the centre of the holes and check each post for the following.
 - Post spacing – use a tape measure to check the spacing between each hole, which should be 1800mm apart. The post centres need to be exact to ensure the rails can be butt-jointed tightly together.
 - Straight line – check that the posts are up against the line of the string so the line of the fence will be straight.
 - Upright – use a spirit level to check that the posts are standing upright on two adjacent sides.
 - Post height – check the height of the posts above the ground with a tape measure. Their height should be 1070mm.
- ❖ Carefully ram stones or rubble around the bottom of the posts.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.

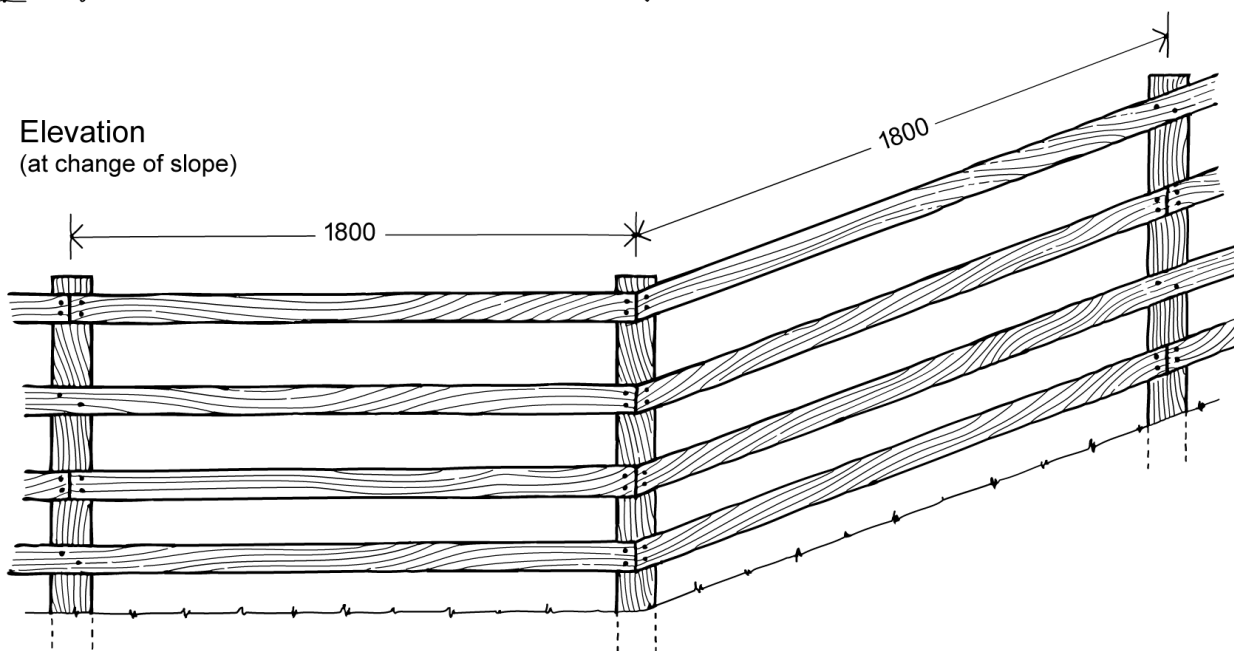
- ❖ Mark the position of the rails on the posts using a measuring stick, marked with the heights of the rail top edges.
- ❖ Working as a pair, hold the rail to the mark on the post, nail the rail on at one end and then the other end, using 100mm wire nails driven in skewed at each end (two nails per rail end). Blunt the pointed ends of all the nails by tapping a hammer on them, to prevent the nail splitting the ends of a rail.
- ❖ Check each rail is butt-jointed on the centre line of the post. The joints should be staggered with alternate joints on each post.
- ❖ Check each rail is level and correctly spaced before nailing them to the posts.
- ❖ Finally, nail the centre of the rails to the overlapping post with 100mm wire nails (use two nails per rail).



9.6 Post and four-rail timber fence



Elevation
(at change of slope)



This four-rail fence will contain sheep, horses, cattle and calves, but not small lambs, as they will be able to squeeze through lower gaps.



Materials List

For a 3600mm section of fencing:

- ❖ 3 x treated sawn timber posts, 1675 x 127 x 64mm
- ❖ 6 x treated sawn timber rails, 3600 x 88 x 38mm
- ❖ 38 x galvanised round wire nails, 100 x 4mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines. The Forest Industry Safety Accord (FISA) has produced Safety Guide 104, 'Fencing'. This sets out safe working practices to follow when erecting and dismantling fencing in the outdoors. Available at: <http://www.ukfisa.com/safety-information/safety-library/fisa-safety-guides.html>.

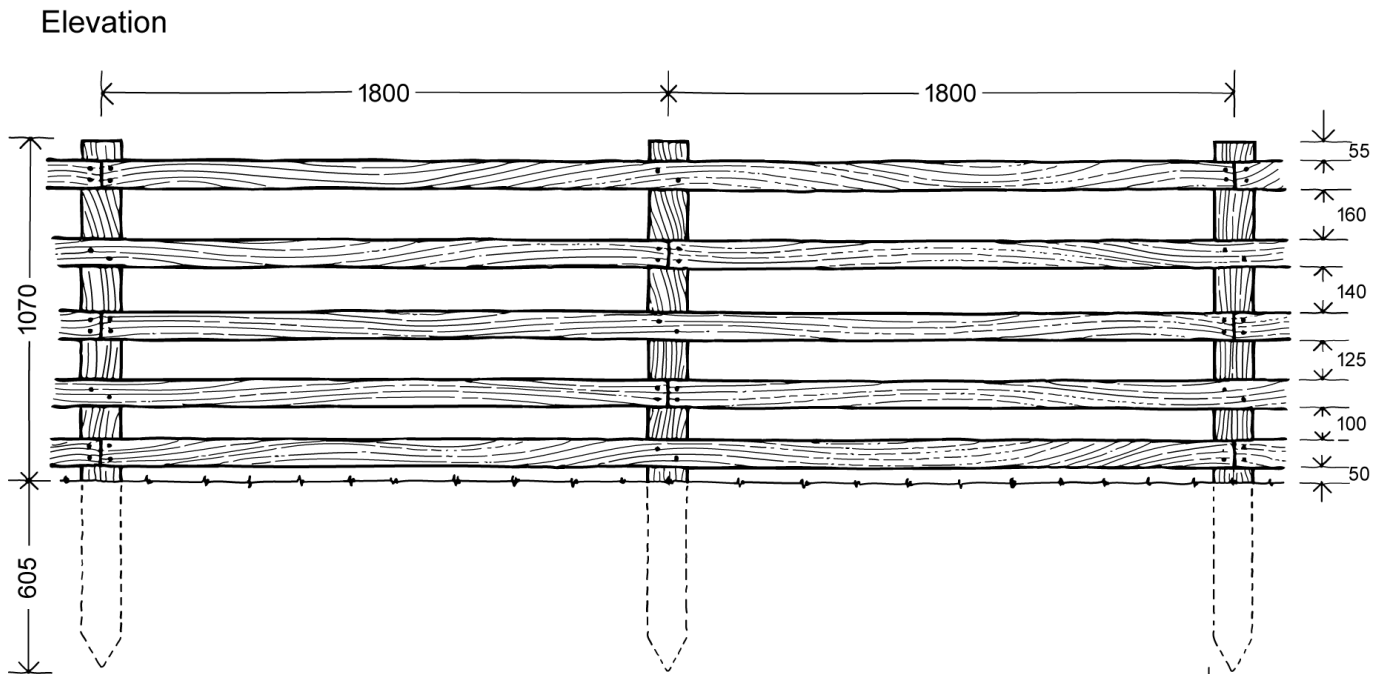
Concrete is only necessary where difficult ground conditions prevent the installation of the strainer posts to the specified depth.

- ❖ Mark out the line of fence with a line of strong string, securely attached to temporary stakes.
- ❖ Lay out a double row of rails along the line of fence, starting with a half-length rail, butting all the ends of the rails together to give a double overlapping row.
- ❖ Carefully mark the position of the post, using a pinch bar held against the line of string where the rails join.
- ❖ Dig narrow holes for the posts along the line of fence. The depth of the holes should be about 605mm.
- ❖ Place the posts in the centre of the holes and check each post for the following.
 - Post spacing – use a tape measure to check the spacing between each hole, which should be 1800mm apart. The post centres need to be exact to ensure the rails can be butt-jointed tightly together.
 - Straight line – check that the posts are up against the line of the string so the line of the fence will be straight.
 - Upright – use a spirit level to check that the posts are standing upright on two adjacent sides.
 - Post height – check the height of the posts above the ground with a tape measure. Their height should be 1070mm.
- ❖ Carefully ram stones or rubble around the bottom of the posts.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.

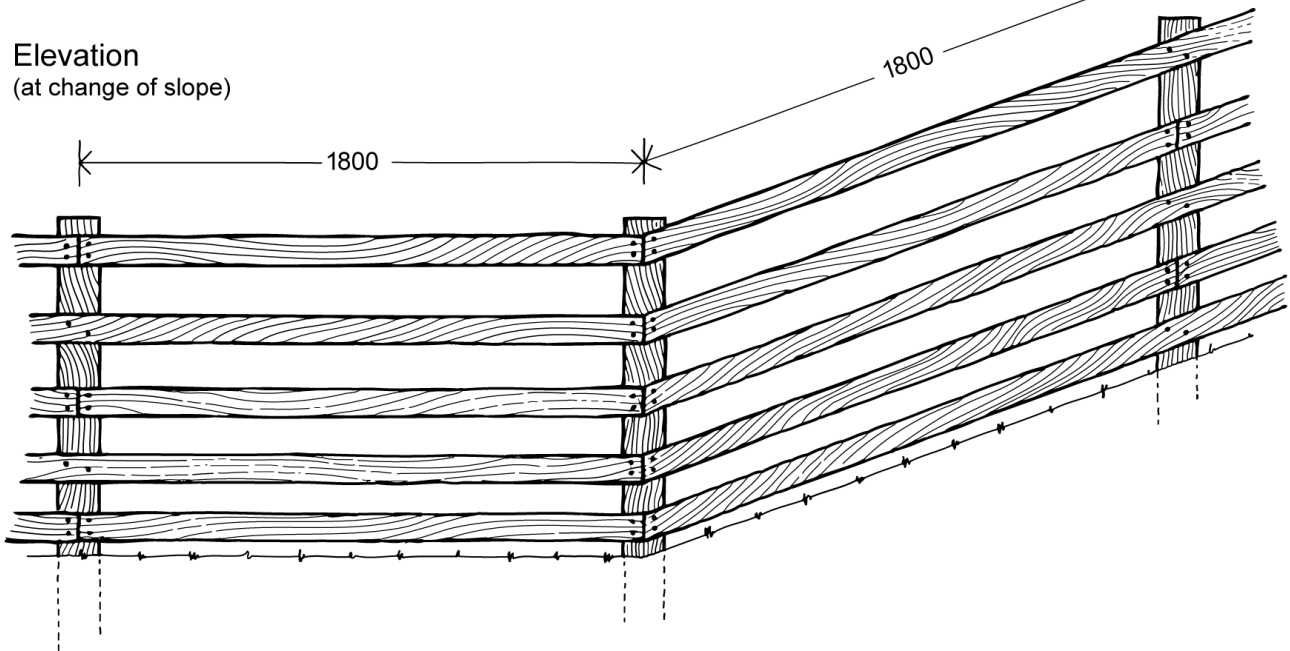
- ❖ Mark the position of the rails on the posts using a measuring stick, marked with the heights of the rail top edges.
- ❖ Working as a pair, hold the rail to the mark on the post, nail the rail on at one end and then the other end, using 100mm wire nails driven in skewed at each end (two nails per rail end). Blunt the pointed ends of all the nails by tapping a hammer on them, to prevent the nail splitting the ends of a rail.
- ❖ Check each rail is butt-jointed on the centre line of the post. The joints should be staggered with alternate joints on each post.
- ❖ Check each rail is level and correctly spaced before nailing them to the posts.
- ❖ Finally, nail the centre of the rails to the overlapping post with 100mm wire nails (use two nails per rail).



9.7 Post and five-rail timber fence



Elevation
(at change of slope)



This five-rail fence is fully stock-proof. It is suitable for cattle, horses, sheep and lambs.



Materials List

For a 3600mm section of fencing:

- ❖ 3 x treated sawn timber posts, 1675 x 127 x 64mm
- ❖ 7 x treated sawn timber rails, 3600 x 88 x 38mm
- ❖ 50 x galvanised round wire nails, 100 x 4mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines. The Forest Industry Safety Accord (FISA) has produced Safety Guide 104, 'Fencing'. This sets out safe working practices to follow when erecting and dismantling fencing in the outdoors. Available at: <http://www.ukfisa.com/safety-information/safety-library/fisa-safety-guides.html>.

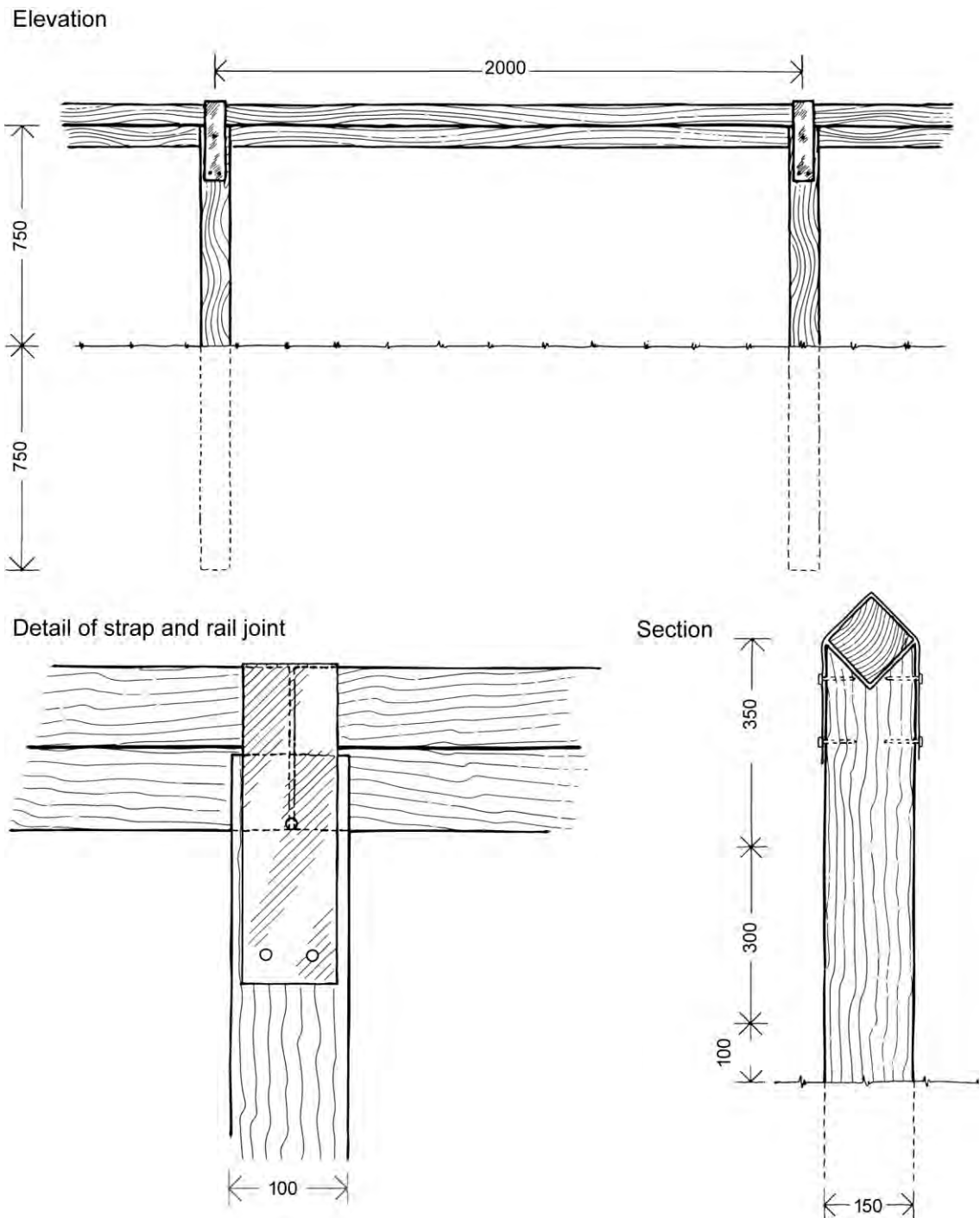
Concrete is only necessary where difficult ground conditions prevent the installation of the strainer posts to the specified depth.

- ❖ Mark out the line of fence with a line of strong string, securely attached to temporary stakes.
- ❖ Lay out a double row of rails along the line of fence, starting with a half-length rail, butting all the ends of the rails together to give a double overlapping row.
- ❖ Carefully mark the position of the post, using a pinch bar held against the line of string where the rails join.
- ❖ Dig narrow holes for the posts along the line of fence. The depth of the holes should be about 605mm.
- ❖ Place the posts in the centre of the holes and check each post for the following.
 - Post spacing – use a tape measure to check the spacing between each hole, which should be 1800mm apart. The post centres need to be exact to ensure the rails can be butt-jointed tightly together.
 - Straight line – check that the posts are up against the line of the string so the line of the fence will be straight.
 - Upright – use a spirit level to check that the posts are standing upright on two adjacent sides.
 - Post height – check the height of the posts above the ground with a tape measure. Their height should be 1070mm.
- ❖ Carefully ram stones or rubble around the bottom of the posts.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.

- ❖ Mark the position of the rails on the posts using a measuring stick, marked with the heights of the rail top edges.
- ❖ Working as a pair, hold the rail to the mark on the post, nail the rail on at one end and then the other end, using 100mm wire nails driven in skewed at each end (two nails per rail end). Blunt the pointed ends of all the nails by tapping a hammer on them, to prevent the nail splitting the ends of a rail.
- ❖ Check each rail is butt-jointed on the centre line of the post. The joints should be staggered with alternate joints on each post.
- ❖ Check each rail is level and correctly spaced before nailing them to the posts.
- ❖ Finally, nail the centre of the rails to the overlapping post with 100mm wire nails (use two nails per rail).



9.8 Birdsmouth timber fence



This type of simple, low level fence is used mainly to control and guide vehicles or people, or to define space, in car parks and greenspaces. It is not suitable for use on slopes because of problems with making satisfactory joints between the rails and the steel plate straps.



Materials List

For a 2000mm section of fencing:

- ❖ 2 x treated sawn timber posts, 1500 x 150 x 100mm
- ❖ 1 x treated sawn timber rail, 2000 x 100 x 100mm
- ❖ 2 x galvanised steel plate straps, 600 x 75 x 2mm
- ❖ 24 x galvanised round wire nails, 40 x 2mm.



Installation

Try to choose a fence line that requires the minimum of vegetation clearance.

Before you start to dig holes, check the fence line for underground pipes and cables or overhead power lines.

Concrete is only necessary where difficult ground conditions prevent the installation of posts to the specified depth.

- ❖ Mark out the line of fence with a line of strong string, securely attached to temporary stakes.
- ❖ Lay out a row of rails along the line of fence, with all the ends together.
- ❖ Carefully mark the position of the post, using a pinch bar held against the line of string where the rails join.
- ❖ Dig 2 x 300mm square holes to a depth of 750mm.
- ❖ Place the posts in the holes and carefully ram stones or rubble around the bottom of the posts. Check the height of the posts above the ground with a tape measure. Their height should be 750mm. With a spirit level, check that the posts are square and standing upright.
- ❖ Fill the rest of the holes with layers of well-rammed soil to the level of the surrounding surface.
- ❖ Place the rails in the V slot on top of the posts on the centre line, making sure each rail is butted up against the other.
- ❖ Position steel plate straps across the joined up rails for pre-drilling six offset angled nail holes, to prevent the rail ends splitting.
- ❖ Nail steel plate straps to the sides of the posts with six 40mm wire nails, to hold the rail tightly down in the V slot on top of the posts.



10 Perches, seats and picnic tables

Perches and seats at regular intervals along paths can offer people welcome stops to rest or enjoy the view. They are particularly important for elderly people and those with disabilities or mobility difficulties to rest during a walk. Picnic tables provide somewhere to stop for lunch. Consider these key design points for your seats, perches and picnic tables (taken from Countryside for All Good Practice Guide, Fieldfare Trust – www.fieldfare.org.uk/countryside-for-all/countryside-for-all-good-practice-guide/).

Key design considerations

- ❖ **Materials** – Common materials used to make seats, perches and picnic tables are timber, metal or recycled plastic.
- ❖ **Location** – Where there is something to look at, some natural shade, and shelter.

At the top and bottom of, and some point along, steps and ramps, in sight of each other – people will then have something to aim for.

Install seats and perches at least 1500mm back from the path, so other users can pass freely.

- ❖ **Surface** – The surface around and under seats, perches and picnic tables should be firm, level, and even with the surrounding path surface.

For resting places by the side of a path, provide 900mm square spaces next to seats or perches for wheelchair users to sit.

- ❖ **Distance** – Install seats and perches along paths at no more than 100 metres apart in urban locations, 200 metres apart in urban fringe locations, and 300 metres apart in rural locations.

- ❖ **Height** – Install perches which are between 550mm and 750mm high from the surface to the seat top.

Install seats which are between 450mm and 520mm high from the surface to the seat top.

- ❖ **Backrest** – Seats with backrests provide more support than seats without backrests, especially for people with mobility difficulties. A backrest can also help people to get down to, or up from, a seated position. A backrest is also available to use as a perch whilst standing.

- ❖ **Heel space** – Provide at least a 100mm heel space below seats to help people to stand up more easily by getting their feet under their body's centre of gravity.

- ❖ **Tactile cue** – A tactile cue on the path surface before seats or perches will help alert visually impaired people to their presence.

- ❖ **Picnic table height, width and access:**

- A picnic table should be 750mm high so that wheelchair arm rests can fit underneath.
- Provide a width of 900mm per person, and a 600mm knee space for wheelchair access.
- Provide clear access of 1500mm around a table for wheelchairs to move freely.

Design sheets

The following design sheets are contained in this section:

[10.1 Timber perch](#)

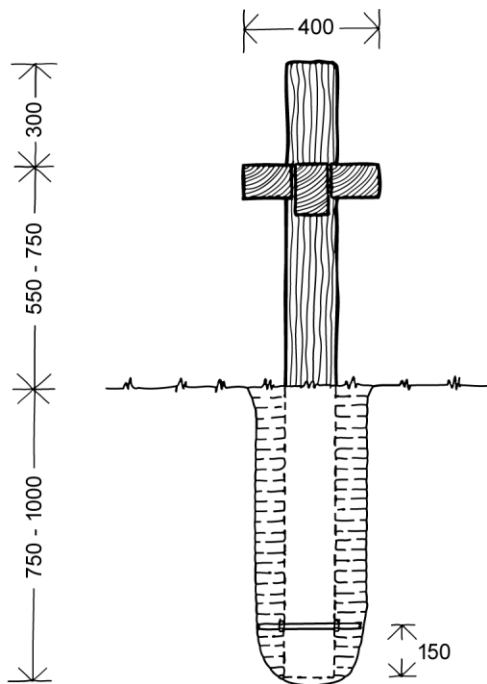
[10.2 Timber bench](#)

[10.3 Timber seat with backrest](#)

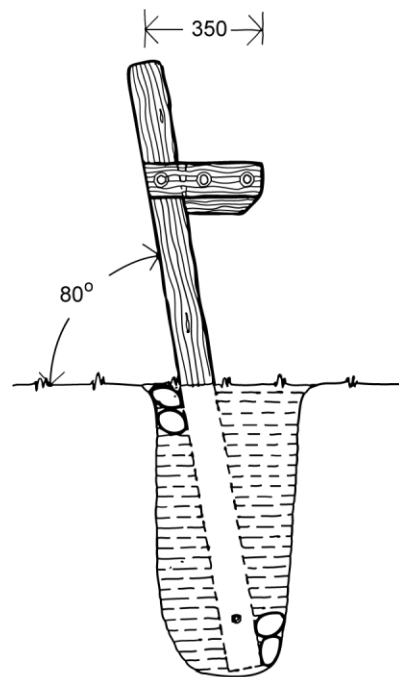
[10.4 Picnic table](#)

10.1 Timber perch

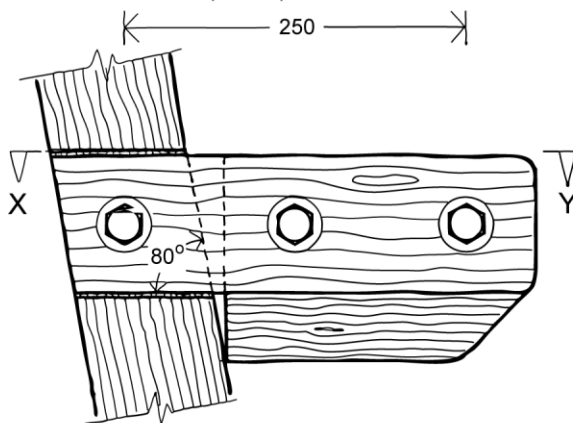
Front Elevation



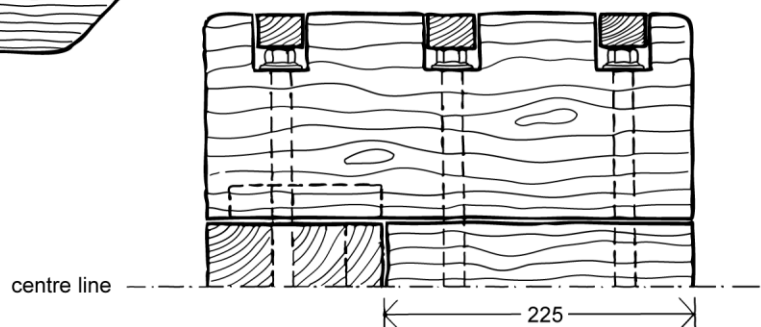
Side Elevation



Side Elevation (detail)



Section X - Y



This perch offers a resting point which people can lean against or partly sit on. By varying the depth of the main support into the ground, this perch will provide a range of different seat heights to suit the height of different people. It is ideal for people who may find getting up from a lower seat more difficult. This perch can be made off site before installation.



Materials List

For one perch:

- ❖ 1 x treated timber main support section, 150 x 100 x 1800mm
- ❖ 2 x treated timber outer seat sections, 150 x 100 x 350mm
- ❖ 1 x treated timber centre seat section, 150 x 100 x 225mm
- ❖ 4 x galvanised threaded rods, 360mm, M16 diameter
- ❖ 6 x galvanised hexagonal nuts, M16 diameter
- ❖ 6 x galvanised flat washers, M16 diameter
- ❖ 6 x treated timber plugs, 41mm diameter, and 20mm thick.



Installation

Off site:

- ❖ Cut all timber sections to the required dimensions and sizes, as per the drawings and materials list. Round off all corners and edges to a 10mm radius.
- ❖ Cut 2 x 100mm wide x 25mm deep slots in the sides of the main support, 300mm down from the top, to fix the outer seat sections at an angle of 80° onto the main support (see Side Elevation detail and Section X-Y).
- ❖ Glue and clamp the outer seat sections to the sides of the centre seat section (on the 150mm side), and then glue and fit the outer sections into the slots cut in the main support. Trim the lower corner of the centre section and the protruding lower corners of the outer sections, so they are flush against the main support (see Side Elevation detail).
- ❖ Drill 3 x 18mm holes through the centre of the seat sections and main support, at a spacing of 125mm, with the middle hole at 175mm (see Section X-Y).
- ❖ Drill 40mm diameter x 40mm deep holes in both ends of the 18mm holes for the countersunk washers and nuts (see Section X-Y).
- ❖ Fix the seat sections and main support together with three threaded rods, tightened up with nuts and washers at both ends (see Side Elevation detail and Section X-Y).
- ❖ Glue and hammer in 20mm thick x 41mm diameter timber plugs in all holes, flush with the sides, to prevent the seat being taken apart (see Section X-Y).
- ❖ Drill one 18mm hole through the centre of the main support, 150mm up from the bottom, and then fix a threaded rod through the hole, protruding 105mm either side, to prevent the perch being pulled out of the ground (see Front Elevation).

On site:

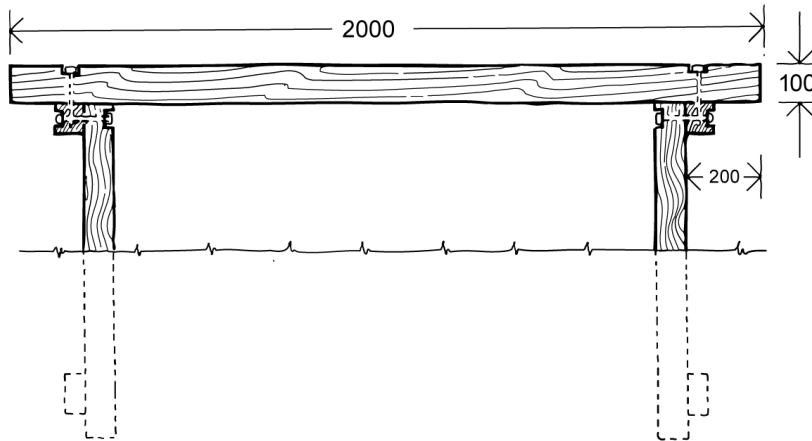
- ❖ Dig a hole to the required depth for the desired height of the perch. The perch should be set higher than a seat, preferably at between 550mm and 750mm above the surface (see Front Elevation). Before you start to dig holes, check the area for underground pipes and cables.
- ❖ Place the main support in the hole and use large rocks to wedge it into place at the „toe“ (i.e. at the front, in the bottom of the hole) and at the „heel“ (i.e. at the back, just below surface level), to prevent movement when the perch is in use (see Side Elevation).
- ❖ Check that the seat is horizontal and use a spirit level to check that the main support is vertical and set back at an angle of 80° (see Side Elevation).
- ❖ Backfill the hole in layers with well-rammed earth and stones. Check that the seat is still horizontal before filling in the holes. Use concrete in softer soils, or if the depth of the main support is less than 750mm below the surface.



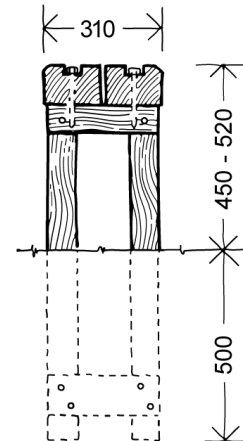
10.2 Timber bench



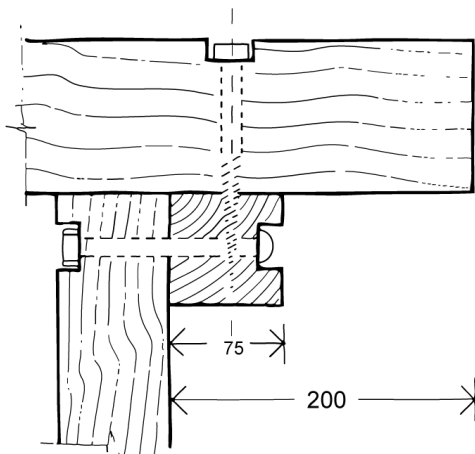
Front Elevation



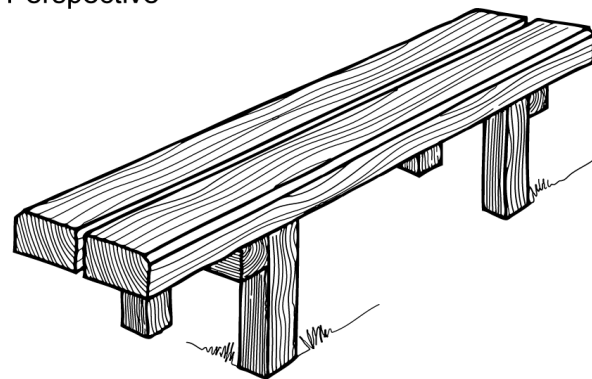
Side Elevation



Detail of fixings



Perspective



This backless bench is easy to make, and the sizes of timber required are readily available. It is also easy to repair if damaged, and can be made off site before installation. The cross pieces, fixed at the lower end of the legs, keep the bench rigid during transportation and installation. They also make it more difficult to remove the bench from the ground after installation. The height of the seat, at 450 - 520mm, makes it easier for people to sit down and get back up.



Materials List

For one seat:

- ❖ 4 x treated timber leg sections, 75 x 75 x 950 - 1020mm (depending on the seat height)
- ❖ 2 x treated timber seat top sections, 150 x 100 x 2000mm
- ❖ 2 x treated timber seat support sections, 75 x 75 x 300mm
- ❖ 2 x treated timber cross piece sections, 100 x 50 x 300mm
- ❖ 4 x galvanised coach bolts, 150mm long, M12 diameter
- ❖ 4 x galvanised hexagonal nuts, M12 diameter
- ❖ 8 x galvanised flat washers, M12 diameter
- ❖ 4 x galvanised coach screws, 150mm, M12 diameter
- ❖ 8 x galvanised wood screws, 100mm long.



Installation

Off site:

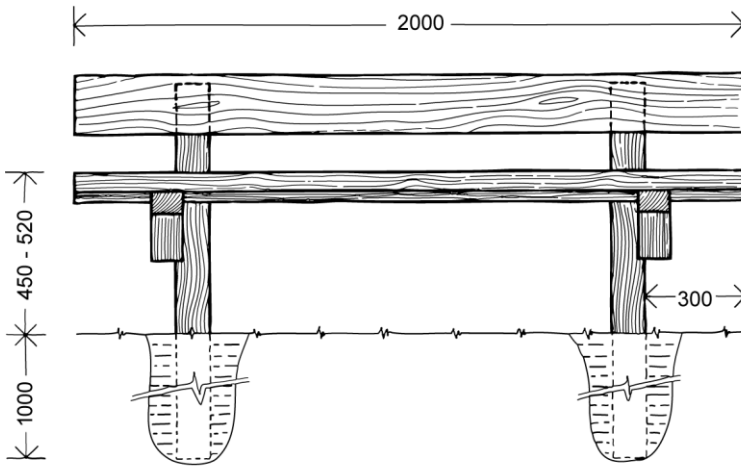
- ❖ Cut all timber sections to required dimensions and sizes as per the drawings and materials list. Round off all corners and edges to a 10mm radius.
- ❖ Drill and squarely fix the seat supports to the top of the legs with countersunk 150mm coach bolts (one per leg), nuts and washers (see Side Elevation).
- ❖ Drill and squarely fix the cross pieces to the bottom of the legs with 100mm wood screws (two per leg), 50mm up from the bottom (see drawing Side Elevation).
- ❖ Drill and squarely fix the seat tops to the seat supports with countersunk 150mm coach screws (two per seat top), with a 10mm gap between seat top sections. The outside edge of the legs should be 200mm inwards from the ends of the seat tops (see Front Elevation and Detail of fixings).

On site:

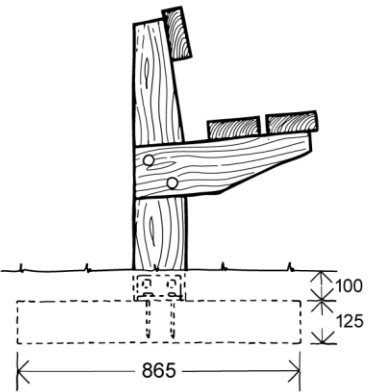
- ❖ Dig holes at approximately 1450mm apart and to the required depth for the desired height of the seat top. Before you start to dig holes, check the area for underground pipes and cables.
- ❖ Place the legs and cross pieces in two holes. Check that the legs are vertical and that the seat top is horizontal with a spirit level.
- ❖ Backfill the holes in layers with well-rammed earth and stones. Check that the bench is still horizontal before filling in the holes.

10.3 Timber seat with backrest

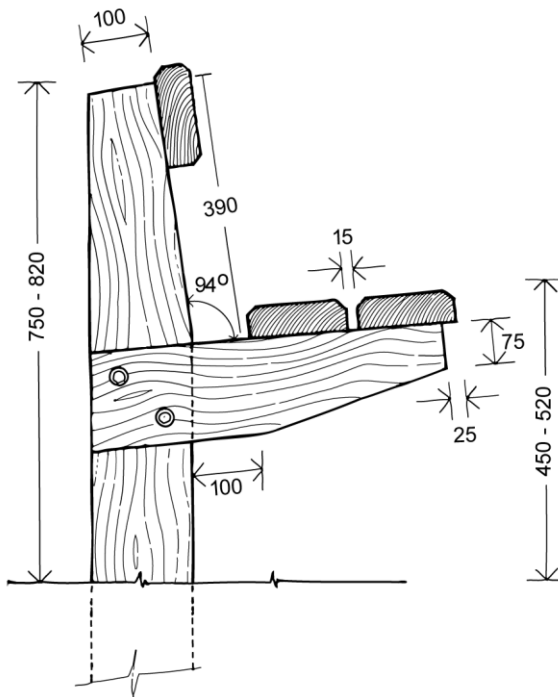
Front Elevation



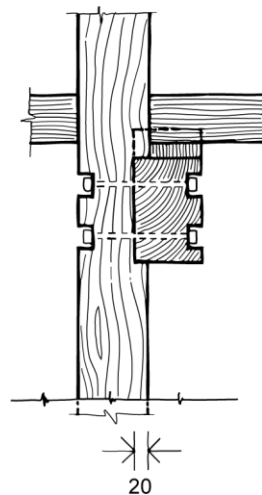
Side Elevation
(alternative fixing)



Side Elevation



Rear Elevation
(detail of seat support)



This is a seat with a backrest. It is easy to make off site before installation. The height of the seat, at 450 - 520mm, makes it more convenient for people with mobility difficulties and elderly people. For cases where it is not possible to excavate to the required 1000mm depth to fix the legs fully in the ground, an alternative installation method for fixing the legs to railway sleepers is available.



Materials List

For one seat with backrest (installation method 1, see Side Elevation drawing):

- ❖ 2 x treated timber leg sections, 150 x 100 x 1750 - 1820mm (depending on the seat height)
- ❖ 2 x treated timber seat top sections, 150 x 50 x 2000mm
- ❖ 2 x treated timber seat support sections, 150 x 100 x 550mm
- ❖ 1 x treated timber backrest section, 150 x 50 x 2000mm
- ❖ 4 x galvanised coach bolts, 165mm, M12 diameter
- ❖ 4 x galvanised hexagonal nuts, M12 diameter
- ❖ 4 x galvanised flat washers, M12 diameter
- ❖ 12 x galvanised wood screws, 100mm.

For one seat with backrest (installation method 2, see Side Elevation alternative fixing drawing):

- ❖ 2 x treated timber leg sections, 150 x 100 x 850 - 920mm (depending on the seat height)
- ❖ 2 x treated timber seat top sections, 150 x 50 x 2000mm
- ❖ 2 x treated timber seat support sections, 150 x 100 x 550mm
- ❖ 1 x treated timber backrest section, 150 x 50 x 2000mm
- ❖ 2 x mild steel angle iron, 100 x 75 x 5mm
- ❖ 2 x new or reclaimed railway sleeper sections, 250 x 125 x 865mm
- ❖ 4 x galvanised coach bolts, 165mm, M12 diameter
- ❖ 4 x galvanised coach bolts, 125mm, M12 diameter
- ❖ 8 x galvanised hexagonal nuts, M12 diameter
- ❖ 8 x galvanised flat washers, M12 diameter
- ❖ 12 x galvanised wood screws, 100mm
- ❖ 4 x galvanised coach screws, 75mm.



Installation

Off site:

- ❖ Cut all timber sections to the required dimensions and sizes indicated in the drawings and materials list. Round off all corners and edges to a 10mm radius.
- ❖ Cut 150mm wide x 20mm deep slots into the sides of the legs (see Rear Elevation drawing).

- ❖ Drill and fix the seat supports squarely into the slots of the legs with countersunk 165mm coach bolts (two per leg), nuts and washers (see Rear Elevation drawing).
- ❖ Drill and fix the seat top squarely to the seat supports, and the backrest to the top part of the legs, with countersunk 100mm wood screws (four per seat top and backrest), with a 15mm gap between the seat top sections (see Side Elevation drawing).

On site:

Installation method 1, where it is possible to excavate to the required depth (see Front Elevation drawing)

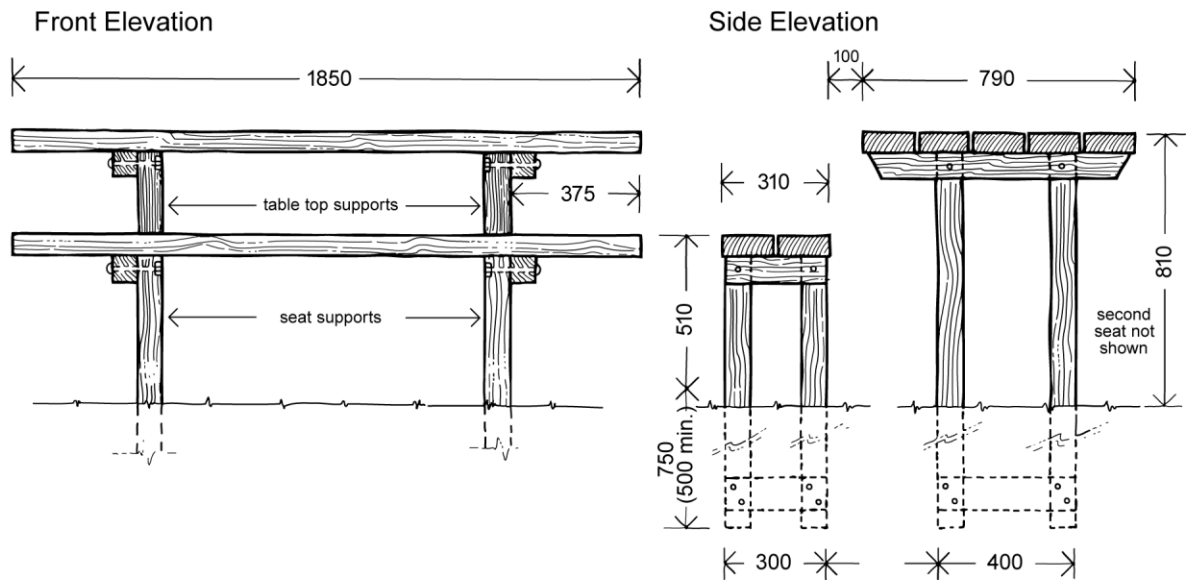
- ❖ Dig holes approximately 1200mm apart and to the required depth for the desired height of the seat top. Before you start to dig holes, check the area for underground pipes and cables.
- ❖ Place the legs in two holes. With a spirit level, check that the legs are vertical and that the seat top is horizontal.
- ❖ Backfill the holes in layers with well-rammed earth and stones. Check that the seat is still horizontal before filling in the whole hole.

Installation method 2, where it is not possible to excavate to the required depth (see Side Elevation alternative fixing drawing)

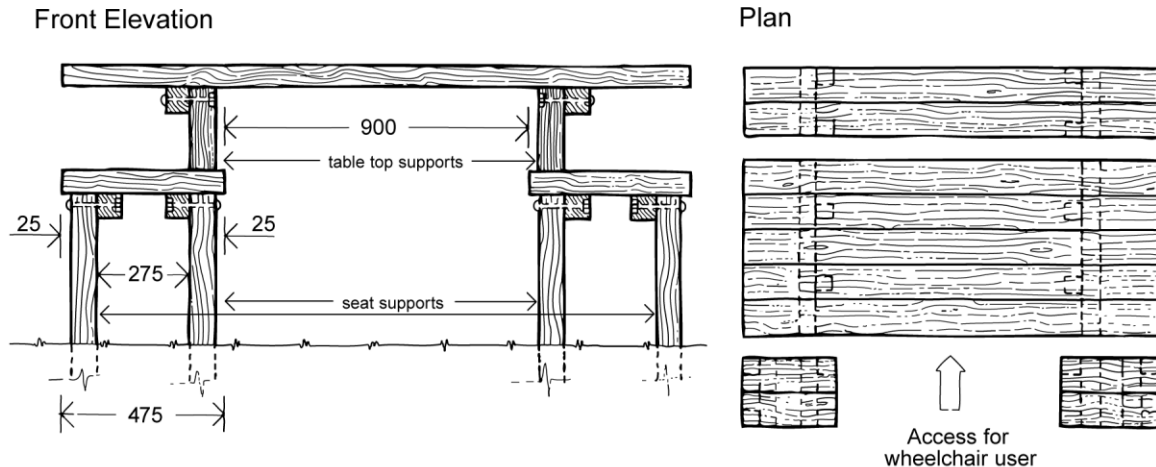
- ❖ Dig holes approximately 1400mm apart. Before you start to dig holes, check the area for underground pipes and cables.
- ❖ Place the railway sleeper sections into the dug holes to a depth of 225mm (i.e. so the top of the sleeper is 100mm below the surface level), making sure each sleeper is stable and level with the other.
- ❖ Drill and squarely fix the 100mm x 75mm angle irons to the outer sides of the legs with countersunk 125mm coach bolts (two per leg), nuts and washers.
- ❖ Place the seat centrally on top of the sleepers, so that the alignment of the sleepers is perpendicular to the alignment of the seat.
- ❖ Drill and fix the angle irons squarely to the top of the railway sleepers with 75mm coach screws.
- ❖ Backfill the holes in layers with well-rammed earth and stones. Check that the seat is still horizontal before filling in the holes.

10.4 Picnic table

Full length seat



Alternative length seat for wheelchair access



This picnic table is free standing, which makes it more easily accessible to people with disabilities or mobility difficulties. The table and seats can also be adapted to provide space for a person in a wheelchair on one or both sides. It can be made off site before installation, which makes it much easier to install. The cross pieces, fixed at the lower end of the table and seat legs, keep the furniture rigid during transportation and installation. They also make it more difficult to remove the table or seats from the ground after installation. The ground below the table and seats, and the surrounding area to a distance of 1500mm, needs to be firm, level, and even with the path surface.



Materials List

For one table and two long seats (see Full length seat drawings):

- ❖ 5 x treated timber table top slats, 1850 x 150 x 60mm
- ❖ 4 x treated timber table legs, 1500 x 75 x 75mm
- ❖ 2 x treated timber table top supports, 770 x 75 x 75mm
- ❖ 2 x treated timber table leg braces, 400 x 100 x 50mm
- ❖ 4 x treated timber seat top slats, 1850 x 150 x 60mm
- ❖ 8 x treated timber seat legs, 1200 x 75 x 75 mm
- ❖ 4 x treated timber seat top supports, 300 x 75 x 75mm
- ❖ 4 x treated timber seat leg braces, 300 x 100 x 50mm
- ❖ 12 x galvanised coach bolts, 150mm, M12 diameter
- ❖ 12 x galvanised hexagonal nuts, M12 diameter
- ❖ 12 x galvanised flat washers, M12 diameter
- ❖ 36 x galvanised wood screws, 100mm.

For one table, one long seat, and two short seats (with a 900mm gap for a wheelchair) (see Alternative length seat for wheelchair access drawings):

- ❖ 5 x treated timber table top slats, 1850 x 150 x 60mm
- ❖ 4 x treated timber table legs, 1500 x 75 x 75mm
- ❖ 2 x treated timber table top supports, 770 x 75 x 75mm
- ❖ 2 x treated timber table leg braces, 400 x 100 x 50mm
- ❖ 2 x treated timber seat top slats, 1850 x 150 x 60mm
- ❖ 4 x treated timber seat top slats, 475 x 150 x 60mm
- ❖ 12 x treated timber seat legs, 1200 x 75 x 75 mm
- ❖ 6 x treated timber seat top supports, 300 x 75 x 75mm
- ❖ 6 x treated timber seat leg braces, 300 x 100 x 50mm
- ❖ 16 x galvanised coach bolts, 150mm, M12 diameter
- ❖ 16 x galvanised hexagonal nuts, M12 diameter
- ❖ 16 x galvanised flat washers, M12 diameter
- ❖ 44 x galvanised wood screws, 100mm.



Installation

For the layout of a picnic table with long seats, refer to the Full length seat drawings. Refer to the Alternative length seat drawings for the layout of a picnic table with small seats that provides access for a wheelchair.

Off site:

- ❖ Cut all timber sections to the required dimensions and sizes specified in the drawings and materials list. Round off all corners and edges to a 10mm radius.
- ❖ Drill and fix the table top and seat top supports squarely to the top of the legs with countersunk 150mm coach bolts (one per leg), nuts and washers (see Side Elevation).
- ❖ Drill and fix the table leg and seat leg braces squarely to the bottom of the legs with 100mm wood screws (two per leg), 50mm up from the bottom (see Side Elevation).
- ❖ Drill and fix the table top and seat top slats squarely to the seat supports with countersunk 100mm wood screws (four per slat), with a 10mm gap between each slat. The outside edge of the table and long seat legs should be 375mm in from the ends of the slats (see Full length seat Front Elevation).

On site:

- ❖ Dig holes approximately 950mm apart and to the required depth for the desired height of 810mm for a table, and 510mm for seats (see Side Elevation). Before you start to dig holes, check the area for underground pipes and cables.
- ❖ Place the legs and cross pieces in the holes. Use a spirit level to check that the legs are vertical and that the table and seat top are horizontal.
- ❖ Backfill the holes in layers with well-rammed earth and stones. Check that the table top and seat tops are still horizontal before filling in the holes.

11 Further information

A Guide to Controlling Access on Paths, Version 1.

Sustrans (2012).

UK wide guidance on assessing the need for access and implementing appropriate access controls.

Available at:

www.sustrans.org.uk/sites/default/files/file_content_type/access_control_guide_jan_2012.pdf

Constructed Tracks in the Scottish Uplands, 2nd Edition.

Scottish Natural Heritage (updated September 2015).

Guidance on the visual, landscape, recreational, biodiversity and geological impacts of constructing, managing and using tracks in Scotland's uplands.

Available at:

www.snh.org.uk/pdfs/publications/heritagemanagement/constructedtracks.pdf

Countryside for All Good Practice Guide.

Fieldfare Trust (2005).

Guidance on access to the countryside for people with disabilities. The guide outlines the standards and guidelines that countryside service providers have to consider and meet.

Available at: www.fieldfare.org.uk/countryside-for-all/countryside-for-all-good-practice-guide/

Cycling by Design 2010 (Revision 1).

Transport Scotland (2011).

Guidance on the standards and guidelines for on and off carriageway cycling provision in Scotland.

Available at:

[www.transport.gov.scot/system/files/uploaded_content/documents/tsc_basic_pages/Environment/Cycling by Design 2010 Rev 1 June 2011 .pdf](http://www.transport.gov.scot/system/files/uploaded_content/documents/tsc_basic_pages/Environment/Cycling%20by%20Design%202010%20Rev%201%20June%202011.pdf)

Deer Stalking and Public Access – Guidance on Stalking Communication, 1st Edition.

National Access Forum Scotland (updated May 2016).

Guidance on informing people about deer stalking activity in Scotland's uplands, including key principles of signs and providing information on site and online.

Available at: www.outdooraccess-scotland.com/sites/default/files//docs/deer_stalking_and_public_access_-_guidance_on_stalking_communication.pdf

Equestrian Access Factsheets.

British Horse Society Scotland, Paths for All, Scottish Natural Heritage.

Guidance on developing and managing equestrian access in Scotland. The factsheets summarise key practical points about providing access for horses and riders.

Available at: www.outdooraccess-scotland.com/sites/default/files//docs/equestrian_access_factsheets_bhss_snh_pfap.pdf

Forest Fencing.

Forestry Commission (2006).

Guidance on planning, installing and maintaining fences in forests.

Available at: [www.forestry.gov.uk/pdf/fctg002.pdf/\\$FILE/fctg002.pdf](http://www.forestry.gov.uk/pdf/fctg002.pdf/$FILE/fctg002.pdf)

Guide to Project Development for Mountain Bike Trails and Training Facilities.

Sport Scotland, Scottish Cycling, Forestry Commission Scotland (2015).

Guidance outlining the key stages and steps required to develop and deliver mountain bike trails or training facilities.

Available at: www.dmbins.com/developing/trails-page--2/guide-to-project-development-for-mtb-trails-and-training-facilities

Handbook for Cycle-Friendly Design – Sustrans Design Manual.

Sustrans (2014).

UK wide guide about on and off road route planning and design for cycling infrastructure provision.

Available at:

http://www.sustrans.org.uk/sites/default/files/file_content_type/sustrans_handbook_for_cycle-friendly_design_11_04_14.pdf

Lowland Paths Guide – A Good Practice Guide.

Paths for All (2011).

Guidance on planning, designing, constructing and maintaining paths in the lowlands of Scotland.

Available at: www.pathsforall.org.uk/pfa/lowland-paths-guide/lowland-paths-guide.html

Path Bridges – Planning, Design, Construction and Maintenance.

Paths for All, Scottish Natural Heritage, Forestry Civil Engineering (2006).

Guidance on the planning, design, construction, and maintenance of bridges.

Available at: www.pathsforall.org.uk/pfa/lowland-paths-guide/bridges.html

Signage Guidance for Outdoor Access – A Guide to Good Practice.

Paths for All, Scottish Natural Heritage (2007).

Guidance on all aspects of signage for outdoor access, from general principles and the legislative context, to more detailed advice on directional and advisory signs.

Available at: www.outdooraccess-scotland.com/sites/default/files//docs/signage_guidance_for_outdoor_access.pdf

Signs Guidance for Farmers and Other Land Managers.

Scottish Natural Heritage (2006).

Guidance on using advisory signs to inform people about land management works in Scotland.

Available at: www.snh.org.uk/pdfs/publications/heritagemanagement/signs.pdf

Specifications and Standards of Mounting Blocks.

The British Horse Society (2015).

Guidance on the specifications and standards of mounting blocks for horse riders to remount safely.

Available at: <http://www.bhs.org.uk/access-and-bridleways/free-leaflets-and-advice>

Upland Path Management – Standards for Delivering Path Projects in Scotland's Mountains, 2nd Edition.

Upland Paths Advisory Group, Scottish Natural Heritage (2016).

Guidance on developing and implementing proposals for upland path projects in Scotland, from project delivery through to ongoing maintenance.

Available at: www.snh.org.uk/pdfs/publications/heritagemanagement/UplandPathManagement.pdf

Upland Pathwork: Construction Standards for Scotland, 3rd Edition.

Upland Paths Advisory Group, Scottish Natural Heritage (2015).

Guidance on the principles and techniques of upland pathwork and the context in which they are used in Scotland.

Available at: www.snh.org.uk/pdfs/publications/heritagemanagement/UplandPathwork.pdf

Other useful resources

Technical Information A - Z.

Scottish Access Technical Information Network.

Online alphabetical database of technical information for everyone interested or involved in development and management of active travel and outdoor access infrastructure in Scotland.

<http://www.satinonline.org/satin/technical-information/a-z.html>

Outdoor access rights and responsibilities.

Scottish Natural Heritage.

The Outdoor Access Scotland website is the main online resource of information about access rights and responsibilities in Scotland.

www.outdooraccess-scotland.com

Suppliers

Paths for All have a database of contractors, consultants and suppliers. Some of the suppliers on our database manufacture outdoor access furniture or structures, such as gates and boardwalks. The database is free to use and available for download as an Excel file from the Paths for All website.

<http://www.pathsforall.org.uk/pfa/contacts/contractors-a-consultants-list.html>

12 Glossary

Glossary of abbreviations

BS	British Standard
BSI	British Standards Institution
CDM	Construction (Design and Management) Regulations 2015
EN	European Norms
SNH	Scottish Natural Heritage
The Code	Scottish Outdoor Access Code

Glossary of terms

Adjustable bottom strap	a gate fitting attached to the bottom rail.
Aggregate	graded material such as Type 1.
Anchor stone	a large stone at the ends of a riser.
Angle iron	an L-shaped metal bar fixed to the bottom of a seat.
Backfill	filling an open void with stone and soil.
Backrest	the part of a seat that supports one's back when sitting.
Barbed wire	a type of wire with sharp pointed spikes twisted around at short intervals.
Bearer	the part of a boardwalk on the ground to support the structure.
Bitmac	a type of surfacing material for paths.
Boardwalk	a timber walkway used to cross soft ground.
Bollard	a short upright post at the ends of a path to prevent access by vehicles.
Breast plate	a large stone in the ground to support a strainer post.
Butt joint	two pieces of wood attached together at their ends.
C8/80/15	a code for the type of stock netting. C stands for medium wire grade; 8 for the number of horizontal wires; 80 for the height of netting in centimetres; and 15 for the spacing of the vertical wires in centimetres.
Camber	the surface of a path with the middle raised to shed surface water off at both sides.
Catch	a device for fastening a latch to keep a gate closed.

Chicane	an obstacle forming sharp double bends to slow people down when approaching a hazard.
Coach bolt	a type of round domed head bolt used to fasten wood to wood.
Coach screw	a type of hexagonal shaped head screw with a threaded shank used to fasten wood to wood.
Combination gate	one long gate incorporating two gates.
Control measure	a preventative measure that reduces the risk of a hazard to an acceptable level.
Countersunk	the nut of a bolt sunk into an enlarged hole in the wood below the surface.
Cross bearer	a horizontal bar of wood that supports the stringers.
Cross fall	the surface of a path sloping to one side to shed surface water off at that side.
Cross member (foot)	a small bar of wood attached to the bottom of a strainer post to stop it twisting and being pulled up when tension is put on the wire or netting.
D-loop	a piece of metal shaped as the capital letter „D“ on a gate.
Decking board	a plank of wood or recycled plastic that supports the weight of everyone who walks along a boardwalk.
Decking screw	a type of screw used to fix a decking board down without splitting the wood.
Drop bolt	a device on the bottom of a combination gate that padlocks the field gate to prevent access by vehicles.
Easy latch	a type of spring bolt latch with a handle used on self-closing gates.
Edge rail	a horizontal bar of wood or recycled plastic fixed along the ends of the decking boards.
Eyebolt	a type of bolt with a circular shaped eye at one end and screw type thread at the other end.
Fence	an upright structure installed to manage livestock and people.
Fence line	the actual position of a fence across the ground.
Fines	the smallest stone particles in an aggregate.
Flat washer	a thin, flat, circular piece of metal with a hole in the middle.
Furniture	a fixed or moveable object that assists people or provides access, such as a gate or perch.
Galvanised	a layer of zinc coating the surface of steel to reduce the rate of corrosion.
Gate	type of furniture providing access through a boundary, such as a fence, hedge or wall.

Gate stop	a device fitted on a gate to stop it opening beyond 90°.
Gauge	a measurement of wire thickness.
Gradient	the angle or slope of the ground between two levels over a certain distance.
H-frame	the frame of a metal gate shaped as the capital letter „H“.
Handrail	a horizontal rail providing support on a flight of steps or a guard at the side of a ramp.
Hanging post	the post from which a gate is hung.
Hazard	something that may cause harm to people, or damage to the environment.
Hexagonal nut	a type of fastener with six sides and internal threads that screws onto a bolt.
High tensile steel	a type of alloy metal that handles a lot of stress without breaking when pulled.
Hinge	a metal pin on which a gate swings.
Hook to bolt hinge	the top metal hinge pin bolted through the hanging post.
Hook to drive hinge	the bottom metal hinge pin driven into the hanging post.
Intermediate post	a post between the strainer posts or turning posts that the wires and netting of a fence are stapled to.
Landing	a level platform between flights of steps or ramps.
Lashing rod	a flexible spiral piece of metal used to join and fasten off wires and netting at strainer posts.
Latch	a bar sliding into a catch to hold a gate closed.
M12	the metric size of a bolt's outer thread diameter. M stands for Metric, and 12 for 12 millimetres.
Machine round post	a pole of uniform size with flat tops or one pointed end.
Manoeuvring space	the room to move and turn when passing through furniture.
Mell	a heavy hammer, with a wide round flat face used to knock fence posts into the ground
Mild steel	a type of alloy metal containing no more than 0.25% carbon.
Mortice	a strong joint used to join pieces of wood at an angle.
Mounting block	one or more steps for remounting a horse.
Passing place	a level surfaced area at the edge of a path where users can pass each other.
Perch	a small, elevated seat for people to sit on.
Pig netting	a type of stock netting for keeping pigs in a field.
Pinch bar	a long straight metal bar used to make holes in the ground for posts or stakes.

Plain wire	smooth wire used to support stock netting or wire netting.
Plywood	thin layers of wood glued together over each other at right angles to make thicker sheets of wood.
Plywood screw	a type of wood screw used to fasten plywood to plywood.
Post driver	a hand or machine operated tool for knocking posts into the ground.
Prefabricated	parts or sections of a structure made off site, ready for assembling and installing on site.
Preservative	a chemical substance used to treat and preserve wood from decaying.
Rabbit netting	a type of hexagonal wire netting for keeping rabbits out.
Rail	a horizontal bar for a handrail, barrier or fence.
Ramp	a sloping surface connecting two levels.
Rebate	a recess or groove cut into the edge of a piece of wood.
Ring clips	a wire ring used to join stock netting or wire netting to plain wire.
Rise	the difference in level of a sloping surface.
Riser	the vertical face of a step.
Risk	the chance of harm or loss occurring from a hazard.
Rubble	broken pieces of rough material such as concrete.
Rylock	a trade name for stock netting.
Sawn timber	treated or non-treated wood with a rough appearance.
Seat	furniture used to support someone in a sitting position when resting.
Self-driving screw	a type of screw that makes its own hole when driven into material.
Slamming post	the post a gate closes against.
Sleeper	a heavy long piece of timber to which furniture is attached for support.
Spirit level	a device for setting horizontal and vertical directions of a surface.
ST4 concrete	a medium strength concrete. It is equivalent to C20 strength concrete.
Stainless steel	a type of alloy metal resistant to rust and chemical corrosion.
Stake	a post pointed at one end for driving into the ground.
Staple	a U-shaped piece of wire with pointed sharp ends for driving into a wooden post to fasten wire or netting.

Steel	a hard, strong alloy containing different levels of carbon and other metal elements to make different types of steel.
Step	risers with a tread set a short distance apart to enable people to ascend and descend from two levels.
Stob	a post or stake driven into the ground to support a structure.
Stock netting	a type of jointed netting for post and stock netting fencing.
Stone block	a large block shaped stone used to build stone steps.
Stone pitching	random size, hand placed stone, forming a hardwearing surface on a steep slope.
Strainer post	a large post at the beginning and end of a fence to hold the strain of the wires and netting.
Straining bar	a tool used to hold netting evenly in place while it is being tensioned
Stringer	a long horizontal bar supporting the decking boards.
Structure	something designed and constructed of materials.
Strut (stay)	a long post supporting a strainer post.
Sub-base	a layer of aggregate forming the tread of a step.
Support post	a post driven into the ground to support the cross bearer and stringer.
Tamper	a long handle tool with a narrow or wide weighted head used to ram in stones and compact soil around a post.
Tensile strength	the maximum load that a material can support when being stretched.
Tension	the strain put on wire or netting on a post and wire fence or post and netting fence.
Threaded rod	a steel rod with threads used to join and stabilise parts of a structure.
Thrust plate	a large stone or stake driven in the ground at the end of a strut.
Tread	the horizontal surface of a step on which the foot is placed.
Turning bar	a long handle tool with a post holder to hold a post upright while it is knocked into the ground.
Turning post	a large post installed where the fence line changes direction.
Type 1	a graded aggregate used to make the tread of a step.
Weather	cutting the top of a post or stake at an angle to form a sloping surface to allow water to run off.
Well-rammed	good stone and soil compaction around a post to stop it moving.
Wire nail	a type of round nail with a flat head, used to fix wood to wood.

Wire netting	chicken wire or hexagonal wire mesh.
Wire strainer	hand operated tool used to strain wires or netting on a post and wire fence or post and netting fence.
Wood screw	a type of screw with a slotted head and a sharp point for driving into wood.

Appendix 1: British Standard 5709:2006

British Standard 5709:2006. Gaps, gates and stiles.

Introduction

The current version of British Standard (BS) 5709:2006 sets out performance based standards for gaps, gates and stiles to ensure they cause the minimum inconvenience for users, while meeting requirements to contain livestock.

This note summarises the key points of BS 5709 in relation to gaps, gates and stiles in Scotland. Consult the full BS 5709 for the actual details. You can buy it from the British Standards Institution (see:

<http://shop.bsigroup.com/ProductDetail/?pid=000000000030144013>).

The basic principle of BS 5709 is that no one structure designed to provide access through a field boundary is satisfactory in all situations. The act of choosing which structure is suitable for a given situation is itself a requirement of the Standard. Illustrations included in BS 5709 offer examples of what would meet functional specifications of the Standard. However, they are not mandatory. It is entirely acceptable to adapt materials, method of construction, size or shape to meet site-specific requirements – provided the structure still meets the specified functional requirements in the full document.

Principle of least restrictive option

The over-riding principle of BS5709 is that the least restrictive option must be chosen. BS5709 states:

“The selection of a gap, gate or stile, which permits people to use a path crossing a field boundary such as a hedge, fence or stone wall, shall result in as little restriction as possible for potential users, while meeting the actual agricultural needs of the landowners (principle of least restrictive option).” (Section 3.1.3)

The words “potential users” are important. The Standard recognises that, although some parts of some paths may not be suitable for all users (including those using wheelchairs or other mobility vehicles), or may not be suitable for all abilities, this does not justify installing stiles or other restrictive access controls elsewhere on the path. This is particularly true for structures at the start and finish of paths, for example, where the path leaves or joins a road.

In the absence of explicitly identified counter reasons, the order of preference should be gap, gate, kissing gate, stile. The word “explicitly” is important here. For example, it might be reasonable to expect an access authority (or its agents) installing a kissing gate to have publicly available explicit reasons not to choose a less restrictive option, such as a two-way opening gate (Section 3.2 of BS 5709).

The Standard also states “new structures shall not be stiles unless exceptional circumstances require them” (Sections 3.13 and 4.5.1 of BS 5709).

Where a gap is insufficient for land management or other purposes, installing a two-way opening gate is the preferred option. The exception is at road junctions, where a one-way gate may be more appropriate for safety reasons.

Reasonableness

If a gap is not chosen, there must be an „assessment of reasonableness“ about putting a structure across a path. The assessment must include whether an alternative measure would remove the need for any structure. Again, it might be reasonable to expect an access authority, or others installing gates or stiles, to have an assessment of reasonableness which is publicly available (Section 3.1.2 of BS5709).

Manoeuvring space

Ensure you provide sufficient manoeuvring space and keep it clear to enable users to get into position to open, pass through, and close a gate, or to negotiate a fixed structure (for example, one or more bollards). A one-way opening gate needs more turning space than a two-way opening gate. Some users, such as those with horses, manual wheelchairs or mobility scooters, need more space to move around either side of a gate. It is best to get it right before installing a structure, as any users who cannot move through the installed structure could prove that the structure is not compliant with the Standard (Sections 4.3.c, 4.4.3 and 4.5.d of BS 5709).

Location of structures

Structures must be set back at least 4m from the road. This distance allows sufficient space for walkers, cyclists, horse riders, manual wheelchair users and mobility scooter users to negotiate the structure away from the road (Section 4.1.6 of BS 5709).

Continuous and ongoing satisfaction

This means that, even if a structure complies with the Standard at the time of installation, it is no longer compliant with the Standard once any of the functional requirements are no longer satisfied (Section 4.1.8 of BS 5709).

Ground conditions

The ground within 2m of a structure must be kept free of surface water and provide a firm surface, other than immediately after rain (Section 4.1.5 of BS5709).

Barbed wire

There must be no barbed wire, electric fence or other similar fencing within 1m of a structure, or of the manoeuvring space to negotiate the structure safely (Section 4.1.1 of BS 5709).

Protrusions

Gaps and gates should be free of any protrusions or other parts likely to catch clothes or cause injury, for example, a moving part trapping the fingers of a user. The edges of a structure should be rounded to 2mm, or chamfered to a minimum of 3mm (Sections 4.1.2, 4.1.3 and 4.1.4 of BS 5709).



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