Bird

Wetlands, nature reserves and cultural landscapes for rural development

# BEST PRACTICE

## Advice and help when building in nature for visitors

Baltic Sea Region INTERREG III B

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# Content

# 1. Introduction

Nature is an important determinant for people's quality of life. Spending time in the nature can be both restful and relaxing. Access to nature has been demonstrated to give clear beneficial health effects on people, which urge the needs of allowing all people access to nature. Earlier, efforts in increasing the level of accessibility were mainly directed towards people already with a high capacity to access most nature areas. Today the needs and also the demands of increased accessibility within nature areas are much more directed towards groups of people with higher requirements, such as children, elderly and people with different functional disabilities. Increased accessibility of nature is also beneficial for the development of the tourism in the countryside.

Investments of increased accessibility require, from the beginning, a decision of which target groups you are aiming at. The final level of accessibility within an area can be viewed as a chain of different measures to increase this level. However, the individual measure that contributes least to this level also strongly determines the overall level of accessibility within the area. Most often, this weak link of the chain depends on some small-unforeseen detail!

It is important to view this work with an overall perspective. During the whole project from idea to the final construction several decisions needs to be taken. Decisions, which all more or less strongly influence such things as lifespan of the construction, different safety aspects and final costs. The planning process strongly influences the cost-effectiveness of the project. For example, wrong choice of material is likely to result in high maintenance cost as well as a shorter lifespan of the construction. Therefore, try not to invent the wheel a second time and do not repeat costly mistakes done by others. To avoid this you need to:

- gather available knowledge and,
- create a network of people in different countries working with these and similar problems.

In this report, we have used an international perspective. Experiences and knowledge have mainly been gathered from countries involved in the BIRD project (Sweden, Estonia, Latvia, Lithuania and Germany), but also from other countries. We have focused on bird towers, hides, trails and information stands. However, to give a more general picture, we have also included other relevant aspects on, for example parking lots and toilets.

Thus, the current report constitutes an attempt to gather available experiences and knowledge and making it accessible for anyone who finds it useful. One important part of the report, we believe, is to show several picture examples of whole constructions as well as on certain details. Hopefully this will function as a source for inspiration and new experiences as well as an opportunity to contact managers of interesting constructions and facilities. The report should not be viewed as a standard or a reference book in any way, nor as a decree of all current regulations and laws within the field. Instead, the main purpose is to function as a support and to increase awareness about different requirements. Regarding national regulations and laws, we refer to the relevant authorities within respective country.

Therefore, it is our hope that this report will contribute to that many new constructions and facilities with high levels of accessibility will be built in the future. With a positive experience from a visit follows a wish to return as well as explore new places.

Good luck!

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# 2. Accessibility for all

Everyone should have the opportunity to experience the nature. Making an area accessible for people with different kind of functional disabilities automatically result in high level of accessibility also for other groups, such as elderly people and families with children. The proportion of people with any kind of permanent or temporary functional disability is significant. The term functional disabilities are used in a wide sense here and refer not only to people bound to wheelchairs, but also for people in need for crouches or people suffering from asthma as well as different kinds of heart- and vascular-disorders. Hearing impairment, visual defects and mentally retardation are other examples of functional disabilities also included in the term within this context. Different kind of measures provided within a nature area has the capacity of significantly increase the level of accessibility for people with functional disabilities. Keywords for this work are:

- **independence**
- **safety**

Consequently, any person with functional disabilities should without the need of help, be able to experience an area without suffering any risk of accidents. A facility or construction adapted towards people with functional disabilities, also means that it possess very good prerequisites also for other people to make use of it. Trails that are easy to walk on are very much appreciated by elderly people and families with prams.

However, remember that no such demand exists of making all nature areas available for everyone! However, well thought out measures towards a higher level of accessibility should exist at several different places. At these places, it is important with information about the current level of accessibility and for whom it is directed. This creates a feeling of safety and reduces the risk of unpleasant situations. Often, small details determine if the strived level of accessibility is accomplished or not!

Special consideration has to be taken to the requirements of children. What makes the visit interesting, fun and safe? Special signs with information for children? Openings in tight rails?

# 3. Best practice

What is then Best practice? Simply, it can be summarised as how to build a well-considered and functional construction or facility. Perhaps it might sound simple but experience shows that it is not. Best practice includes how to build with considerations of the environment, economy (today and tomorrow), design, safety, accessibility as well as current laws and regulations. To satisfy all consideration included within Best practice might not be possible ever, because the surrounding nature and available budget often define the limits. However, there is no need to build with Bad practice for reasons such as ignorance and bad planning. Today's different construction and facilities all contain a part of both Best and Bad practice, but the goal should be to build with as much Best practice as possible and thereby increase the quality considerably.

*A lot of information on a low sign stand. Easy to read from a wheelchair. Text on several languages.*

*A well designed ramp that has been vandalized. Imidiate repair is required to make it usable for wheelchairs.*

It is very important to reach a high level of security following national regulations. This is to the benefit of the visitors, but also for them that are responsible for the construction. If an accident occur depending on that regulations has not been followed, someone must take the responsibility. You? The consequence can be expensive economique compensations and a prosecution.

A long tradition to build different constructions and facilities within nature areas exist. Bird towers, trails and sign stands have been built in many years and as a result, many both bad and good experiences from these exist. Constructions and facilities for "new" target groups involve new demands on accessibility, security and design and these kinds of experiences are limited! In addition, a more complete perspective is necessary, since the whole chain from signs, parking lots, toilets and available information has to function properly and as a unity to achieve the desired level of accessibility. A toilet that does not fulfil the requirements of a high level of accessibility is not acceptable! These aspects are crucial in determining how many people that will be able to make use of our investments.

However, during the course of the project, many potential pitfalls exist and most of these are best avoided during the planning process early in the project. Less then optimal solutions can result in reduced accessibility and lifespan of the construction as well as increased future costs. Examples of such less then optimal solutions could be:

- a steep stair, which creates unnecessary risks of danger
- a doorstep that reduces accessibility
- a unnecessary high bird tower is also unnecessary expensive to build
- what initially appears to be a cheap solutions often results in unnecessary high maintenance costs
- neglected maintenance creates both higher costs and risks

Again, the small details often determine the final level of accessibility!

## 3.1 Accessibility

Often it can be difficult to find detailed information about all requirements in order to create accessibility also for people with different functional disabilities. What are the formal requirements on the width of a parking place for handicapped? Quite often, these formal requirements differ between countries. Another aspect of this is that most of these formal requirements are formulated for settled areas and the situation in nature areas might not allow these formal requirements to be fulfilled. In these cases, a more reasonable level of accessibility might be the only solution possible. Guidance within this area is available from:

- a manual from the National Board of forestry in Sweden – ***Access to the forest for disabled people***. This manual is developed as a part in a European Union financed Life-project. The manual is available as a PDF-file on the address: http://www.svo.se/forlag/rapporter/1678.pdf. The manual contains both text and illustrations on several things that needs to be taken into consideration when creating high level of accessibility in nature areas.
- a standard developed by Västra Götalandsregionen and the county board of Västra Götalands län – ***Outlines and standards. Accessibility for persons with disabilities to nature reserves***. This manual also contains a lot of information about many details concerning accessibility. Furthermore, each detail presented in the manual is classified and colour coded according to the level of accessibility they provide (green: high accessibility; yellow: acceptable accessibility; red poor accessibility). Parts of this manual are being translated within the BIRD-project. The content of the manual are based on the formal requirements that exist in Sweden, that we experience as very high, which they also ought to be. However, although national formal requirements might differ between countries, the needs and demands of all functionally disabled are the same. By using the recommendations given by this manual, you ensure a construction or facility with a high level of accessibility.

## 3.2 Planning

When working with the mission of creating high level of accessibility, some aspects that are important to considered are:

- purpose
- target groups
- safety
- cost-effectiveness
- design
- lifespan
- budget
- choice of material
- laws and regulations
- maintenance cost

Thus, careful and thoroughly planning of the project is required to deal with all the important aspects. Any negligence at this stage can later turn out to be costly. Allowing the planning process to take its time is therefore crucial and will most likely be rewarded in the end. During this process, most of the decisions will be made that influence if the construction will fulfil its purposes, final costs and the extent of required maintenance in the future. A checklist with different important aspects during all project phases has been developed and attached in this report.

## 3.3 Design

Many different factors need to be considered during the design phase. The most important is that the planned construction or facility will fulfil its desired purposes. It is very important to find a suitable location for the planned construction and this will form much of the basis for the remaining parts of the project. Then height and size of planned buildings should be dimensioned to adapt in the surrounding nature. At the same time different aspects of safety and accessibility also needs to be considered. The design and choice of material determine the lifespan of constructions and it is important to strive for constructions with long lifespan as well as a minimum of future maintenance required. Often it is very helpful to listen to people's experiences gained from other similar constructions. Knowledge from both good and bad examples is helpful for anyone faced with the challenge to design and build a visitor facility. *An open mind is therefore important to avoid repeating others mistakes.* In this report, we have tried to gather some of these experiences of design for different constructions, which are presented in chapter 5-9. However, we do not claim this report to be comprehensive in any way since new experiences are being done constantly.

## 3.4 Maintenance

Successful investments in high levels of accessibility require regular maintenance and supervision to be long lasting. Damages needs to be detected and attended immediately before any accidents occur. Heavy rain that flushes away gravel from a trail or a broken board on a ramp needs to be attended immediately! Larger maintenance work often requires a plan to ensure a high and even standard.

## 3.5 Gathering of experiences

Knowledge and experience from different facilities and constructions dealt with in this report have been gathered from many different persons. It is impossible to include all aspects and experiences in this report since it would become infinite extensive. A questionnaire has been sent out to a selection of managers of different constructions. Besides receiving information of technical and administrative characters, the most important aim has been to gather good and bad experiences from users or managers of different constructions. Collection of picture examples of different constructions has also been important. Pictures from other constructions and facilities not included in the questionnaire have also been submitted, which contributes to the amount of collected knowledge and experience. It shows that it is possible to find both good and bad experiences from all constructions!

Within this project, a group of experts has been formed with participants from all involved countries. Experience from these persons, as well as other peoples experience supplied through these persons, has widened the range of experiences presented in this report. Furthermore, an inquiry to a great number of birdwatchers in Sweden also contributed with pictures of different bird towers.

# 4 From idea to activity

## 4.1 Idea

The idea to build a visitors facility in a certain area often come from people with some kind of connection to the area, such as visitors, local voluntary associations or management people of the area. It is among these people that discussion and approval for the project should be found, before developing the project too far. It is also important to be open-minded and evaluate as many ***alternative solutions*** to the initial idea as possible. This minimizes the risk of developing the project too far with a less then an optimal solution. Brainstorming with participants from different interest groups can give valuable insights and ideas to alternative solutions. Studies of other existing similar facilities and contacts with people involved in similar projects, can give lots of valuable information applicable in the current project. Good planning and research early are very important prerequisites for a successful project. To many facilities are not able to fulfill all their initial planned purposes due to not allocating enough time and resources into the planning process. Biased interests into a particular solution also a risk of getting to involved with a less then an optimal solution.

The first step in the projects planning process is to find our about all possible needs one expect the facility to fulfil. These needs then form the basis for defining the ***purposes*** and ***goals*** for the project. Most likely, there will be several purposes and goals and these could further be ranked in order of importance.

*Example:* *Purpose 1: to give a good overview of a water area that contains many birds*
*Goal 1: create a facility for this purpose for a larger group of people and with accessibility also for people with a certain level of functional disabilities.*

***Advice:***
- Evaluate all possible solutions of the original idea.
- Formulate purposes and goals for the facility.

## 4.2 The planning process, contacts with different groups of interests and time schedule

Another prerequisite for a successful project where all includes persons have well defined and clear responsibilities for those task needed to be carried out.

If the primary target group for utilizing the planned facility are birdwatchers, representatives from these groups should be included in the project organisation. However, it is most likely that there are other people from other groups of interest that will utilize and benefit from the planned facility. Identifying and involving representatives from these groups early in the planning process is most likely to benefit the whole project. Besides contribution to a higher utilization of the final facility, it could also mean in finding new ways to finance the project. Examples groups beside birdwatchers that are likely to benefit could be people with different functional disabilities, elderly, children, immigrants, and people from different local and cultural associations, botanists and so on.

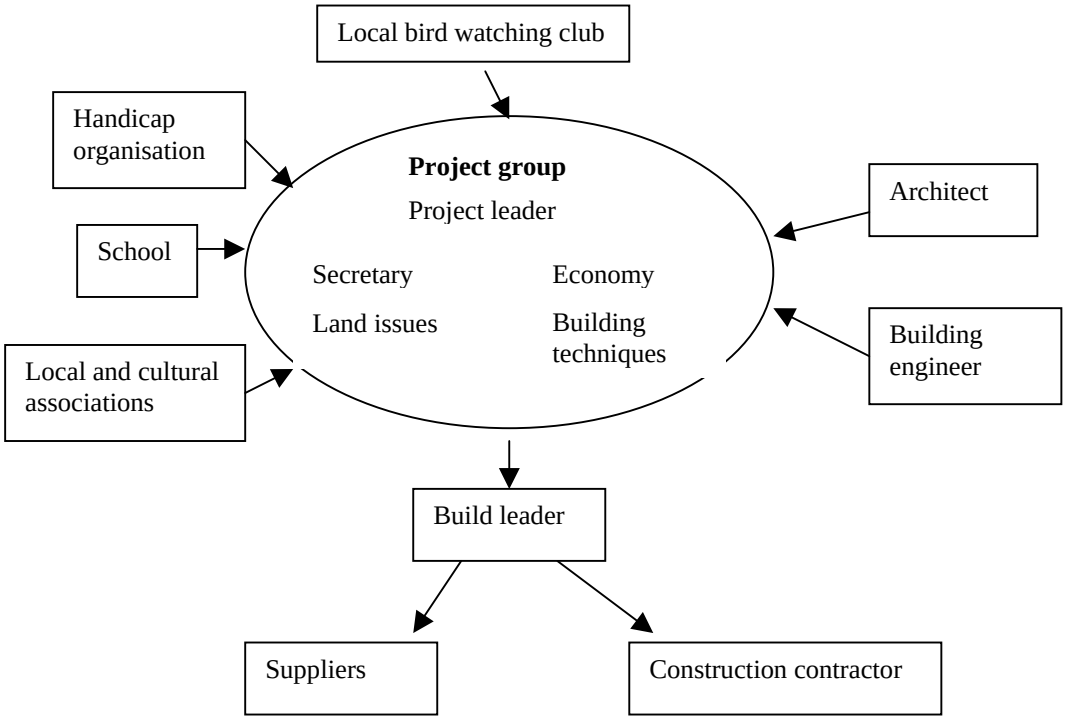
When all thinkable groups of interests have been identified, the composition of the project group needs to be sorted out. The project group's responsibilities are to be in charge for the project and to ensure that it progress. Although not necessary already at this stage, some thoughts of the organization of the future management group might be needed. This group should be different from the project group. More about the future management will follow in chapter 4.7.

Besides including people from different interest groups, care should also be taken to include as many different competences as possible in the ***project group***. A wide range of competences allows for a distribution of different responsibilities to members best-suited dealing with these. Economic questions, contacts with authorities, building techniques, different kind of land questions, permits etc. all require different kind of competences. If the project group mainly consists of idealistic members, the division of labour is important to avoid to heavy

workload an a few people. A project leader should be appointed with responsibility to run the project, and for his/her help a secretary should be appointed to make all the necessary documentation in the project.

Depending on the complexity and the extent of the project, available competences within the project group might not be sufficient for some responsibilities. In those cases such competences needs to be hired from outside the project group.

A person responsible for the contacts between the project group and construction workers during the building stages also needs to be appointed. This person could also function as the building leader if he/she has enough competence. This person could be one already included in the project group.




*Examples of project organisation.*

When the organization of the project group is set and different responsibilities appointed, it is time to put together the document that describes the outlines of the project. This ***program document*** should include, among others, localization of the facility, goals and purposes and ambition level. The primary use of this document will be as a presentation material in contacts with landowners, authorities, possible financiers. It will also start as a starting point for a more detailed planning of the project.

The next step is to make a rough ***time schedule*** of the project. All activities associated within the project should be listed and a time budget and a final date for the completion are estimated for each activity. Of course, this time schedule will not be perfect to be continually updated during the course of the project. The main purposes with this rough time schedule are to get an overview of the different activities included in the project and their relative timing to each other. The time schedule also gives an estimate of the total time budget of the project.

**Activities that the time schedule should contain,**

- Organisation
- Program document
- Budget and financing
- Permits from landowners
- Other necessary permits
- Planning
- Quotation inquiry
- Entrepreneur agreement
- Construction
- Final inspection
- Warranty inspection

**Time schedule of erecting a bird watching tower by the Birdlake**

| | I | **year 1** | I | **year 2** | I | **year 3** | I | **year 4** | I |
|---|---|---|---|---|---|---|---|---|---|
| Appoint of organisation | | x | | | | | | | |
| Program document | | ---------- | | | | | | | |
| Budget | | ---------- | | | | | | | |
| Financing | | ---------- | | | | | | | |
| Permits from landowners | | ---------- | | | | | | | |
| Other permits | | x | | | | | | | |
| Planning | | --------- | | | | | | | |
| Building permit | | | x | | | | | | |
| Quotation inquiry | | | --- | | | | | | |
| Choose of entrepreneur | | | | | x | | | | |
| Land work | | | ---------- | | ------- | | | | |
| Construction work | | | ---------- | | ---------- | | | | |
| Final inspection | | | | | | x | | | |
| Warranty inspection | | | | | | | | x | |

*Example of a time schedule*

***Advice:***

- Find out viewpoints of the project from different groups of interests.
- Appoint a organisation with well defined divisions of responsibilities between the participants.
- Put together the project outline in a program document.
- Make a preliminary time schedule for the completion of the whole project.

## 4.3 Group of target and accessibility

Earlier in the project, formulation of purposes and goals expected to be fulfilled with the planned facility needs to be done. To be able to do this, a definition of possible target groups for the project needs to be done. For example, should it be a facility for very fit people with massive outdoor experience or perhaps an easy accessible facility with capacity to receive large quantities of visitors? These kinds of questions are crucial when making further decisions of localization and design of the planned facility.

Below is an attempt to ***group people*** based on requirements on the facility in order to be able to access it. An attempt is also made to designate each group's ability to a colour, which signals the difficulty they can handle, much in the same way as a downhill skier chooses piste according to level of difficulty.

**Degree of difficulty 1 (green piste/degree of) – Wheelchairs and Visually handicapped**

Accessibility for people bound to wheelchairs put special requirements on the construction. Manoeuvring of the wheelchair is often done by the person itself or by an accompanying person, while some wheelchairs can be

motor driven. The design of the facility towards this group needs be considered all the way from the starting point to the end of the facility. The paths need to broad with an even and firm surface to allow manoeuvring of wheelchairs. Ramps and trails need to be relatively flat with only small inclinations. In addition, clear and precise way directions followed with indications of travelling distance are also appreciated within this group.

To give access for visually impaired people (both with reduced and no vision), the design of paths need to be smooth, flat and well delimited in order to indicate way directions without being dependent on sight. Rails are necessary at stairs and other difficult passages. Way directions should be designed with large letters and possible as protruding text. Along the trail, stopping points on quiet places give people in this group the opportunity to experience the prevailing sounds of nature.

*Trail of level 1 in degree of difficulty.*

*A platform of level 1 in degree of difficulty.*

**Degree of difficulty 2 (blue piste/degree of) - People with physical handicap**

People with functional disabilities often involve reduced mobility. Sticks, crutches or zimmer frames are common walking aid devices within this group. In order to access the facility, they require firm and wide walking paths with no risk of slipping. Railings and similar support constructions are desired to ensure safety when walking. They have limited capacity to walk long distances without resting, and resting facilities at relatively close intervals are needed. Stairs needs to be as short as possible and with weak inclination. Way directions should be accompanied with indications of travelling distance to the facility.

*Trail of level 2 in degree of difficulty.*

*A platform of level 2 in degree of difficulty.*

**Degree of difficulty 3 (red piste/degree of) - Elderly/unaccustomed and Children**

This group contain of elderly and middle-aged people who might not be so well accustomed with outdoor activities and/or not very well fit. They therefore appreciate firm, flat and well-defined paths combined with clear way directions. If there are long walking distances to reach the facility, the presence of resting places at strategic places are appreciated by this group. Stairs in building should be constructed to ensure a safe feeling without any risks to trip or slide.

With the guidance from adults, most children are likely to access most facilities without any problems. However, children's unpredictability and innate lust of explorations sometimes require extra precautions to minimize the risk of accidents. Therefore, when designing different facilities, care should be taken with respect to these aspects

*Trail of level 3 in degree of difficulty.*

*A platform of level 3 in degree of difficulty.*

**Degree of difficulty 4 (black piste) - Fit**
In this group, we have very fit people with high level of outdoor experience. They only require simple way directions to find their way and they easily access most constructions by using ordinary ladders and stairs.

*Trail of level 4 in degree of difficulty.*

*A tower of level 4 in degree of difficulty.*

The above example of groups divisions indicates different levels of ambitions with the planned facility. Of course, the level of ambitions could be the same for all parts of the facility, but it is also possible to have to design the facility with different ambition levels for different parts. Platforms close to the parking place could give groups with difficulty of one and two an overview of the area, while parts that are more distant allow people from group four to explore areas more difficult to access. As clearly evident from this, defining which target groups the project aiming for and the desired function and needs the facility are expected to fulfill strongly

influence the ambition level of the project. Careful examination to define desired functions and needs from the target groups makes it evident what is the appropriate ambition level of the project. This approach avoids ending up with a facility, such as a bird tower with superior overview of the area but with circumstances that only allows super athletes with waders to get there.

The ***number of expected visitors*** to the facility also influences the ambition level. Distances to nearest densely populated areas combined with the attraction level of the area are main factors influencing this number. A potential to attract many visitors might require a survey how this affect the different values in the area. A high number of visiting people could cause disturbance to the nature values as well as negatively influence the attraction level of the area. If this is the case, one purpose with the facility could be to canalize visitors away from areas especially prone to disturbances and/or to distribute people within the area to avoid aggregations of visitors.

A high number of visitors might also put high requirements on the service facilities offered, such as parking lots, toilets and other service facilities. Such demands of course require a higher level of ambition of the project.

Another factor influencing the level of ambition is the desired life expectancy of the facility. Factors influencing this are local climate variables, such as humidity, wind exposure and temperatures. High quality materials and designs that are more sophisticated are means to increase the life expectancy, but this certainly involves higher costs. Therefore, trade off between life span and choice of material/design exist. A higher initial cost might allow the choice of more durable materials and better design and seen over the whole lifespan of the facility, it might reduce the total cost due to lower maintenance costs.

As clear from above, available finances in most cases puts the upper limit of what ambition level is possible for the planned facility. The normal scenario is a trade off between ambitions and available finances.

***Advice:***

- Decide which target groups the facility is aiming for.
- Make sure the desired functions with the facility are fulfilled.
- Dimension the facility towards the estimated number of visitors.
- Define the desired life expectancy of the facility.

## 4.4 Localisation

When deciding the final localization of the planned facility, evaluation of several different alternatives makes it more likely to find the most optimal one.
For ***bird towers*** and ***hides,*** the primary function is to give an overview of bird rich areas, without causing too much disturbance to the wildlife. Therefore, the localization should be carefully chosen with regard to this respect. Another aspect when deciding localization for such a facility is to consider the surrounding vegetation. Vegetation that at first glance seems not to be of any problems might obstruct the overview of the area just in a few years. To reduce maintenance cost, avoid localizations where regularly clearings from vegetation are needed in order to keep the desired view.

The position of the sun in relation to the over view area is another aspect important to consider when choosing localization. At our latitudes, a positioning of the facility south of the area of interest is desirable because then the sun will never face directly towards the observing visitors.

Similarly, the comfort for the visitors to the facility also needs to be considered. Sheltering from the main wind directions greatly increases the comfort and can be achieved by utilizing available trees, bushes and terrain formations. Allowing for direct sunshine radiation (preferably from behind then), especially during winter, also has a comfort increasing effect. A second advantage by allowing incoming sun radiation is to decrease dampness and thus minimize the problems with rot damages to the construction.

Finally, what also strongly influences the choice of final localization is what is considered as an acceptable walking distance to reach the facility.

*A bird tower located in a nice and strategic correct place offers visitors a nice experience with a lot of interesting observations.*

*Trails give visitors the opportunity to visit remote and sometimes inaccessible places in a controlled way without causing too much disturbance on the wildlife in the area.*

When deciding localization of ***hiking trails,*** care should be taken to follow the natural occurring elevation as much as possible and thereby avoiding steep slopes as much as possible. Allowing the trails to pass as many interesting spots as possible to give overviews greatly increase the attractiveness of the trails.

As mentioned above, when deciding localization it is important also to consider the possible stress induced by the facility area of interest. The localization of a bird tower in close vicinity to areas sensitive to disturbance, such as moult- and breeding-areas for birds, might not be wise if a risk of disturbance exist.

Transport possibilities during the building stages also need to be considered when choosing localization. Inaccessible terrain and long distances to nearest road might cause heavy disturbance and infringement during transportations of materials and machines. Despite of being of a one-time occasion, the damages and disturbances caused by this might be so large that an alternative localization might need to be considered. Alternatively, if the localization chosen is the only possible, the choice of a simpler construction with less demanding transports might be a solution.

***Advice:***

- Ensure that towers and hides are localized to fulfill the desired function.
- Allow hiking trails to follow the natural occurring elevation in the terrain.
- Choose localisation for the facility to minimise the disturbance caused.
- Make sure that transports of necessary machines and materials are possible to the chosen localisation.

## 4.5 Economy

When different alternative designs of the facility exist, ***economic estimations*** of these alternatives needs to be done. Often these estimates by necessity are rough and based on previous experiences from similar projects. These economic estimates gives the economic basis in the evaluation process of the different alternatives. One critical factor influencing the accuracy on these estimates is the amount of available non-profit labour in the project. To avoid too much optimism, it is advisable to base the estimates mainly on professional labour.

After a decision of a particular design and localization has been settled, it is time to put together a more precise ***budget*** for the project. The budget is the economic means of control of the project. It defines the outer cost limits and thereby influences the ambition level of the project. The budget also functions as the economic presentation of the project to possible financiers.

If external ***funds*** are required to the project, it is important to investigate and find out what possible sources are available for the actual project. Often these kind of economic sources have application deadlines and the time

required from application to decision can be quit long. A second way to financing the project is to find sponsors willing to support the project. The reasons for sponsors to support a project varies but could be pure idealistic or with the requirement of some kind of counter benefit. Collection of funding from the general public and visitors is a third way to finance the project. As mentioned earlier, available finances are the most crucial requirement for the projects and therefore it is very important to initialize this work as early as possible. The importance of this work often requires that a specific person is appointed to work with this task only. Preferably, this person is already a member of the project group.

In most projects, economic resource are limited and a cost-effective approach is therefore important. If not enough resources are available, less costly alternatives has to be considered. Consideration and discarding functions that do not significantly contribute to the value of the planned facility is one way to reduce costs. Careful consideration and planning of what can be the most favorable time of the year to carry out the different activities within the projects is one strategy to cut costs. If not enough funding can be raised immediately, a possible solution is to build the facility at different stages whenever available financing allows.

Trade offs between cost for building and costs of future ***management- and maintaining costs*** will always exist. What appear to economically initially, could later turn out to be expensive when maintenance cost has to be included. Allowing a higher initial cost and thus a more durable facility has repeatedly proven to be the best economical decision in the end.

***Advice:***

- Perform calculations of cost for all suggested alternatives.
- Put together a budget for the whole project
- Initiate as early as possible the work to find economical resources for the project.
- Consider the cost of future operation and maintenance when deciding material and design of the facility.

## 4.6 Necessary permits

A positive attitude towards the project from landowners is an absolute necessity for the success of the project. A thorough presentation of the project early to inform involved landowners about the project and to give them the opportunity to express their point of view and opinions are recommendable. Care should also be taken to avoid and minimize any disturbance caused by the project on activities carried out by landowners in the area. To get the permission of using the land and possible economical compensations towards landowners, require some kind of ***agreements***. These agreements should be stated with a long-term perspective and documented. It is important to include all agreed restrictions and undertakings from both parts in the agreements

All legal restrictions and regulations influencing the project need to be identified in order to obtain all necessary permits. These permits can be both time consuming and costly to obtain. Therefore, it is important to initiate this work early by contacting necessary authorities and to include possible costs associated with permit applications in the budget.

Approval and building permits from the local municipality are also required and it is a good idea to contact them as early as possible. Other authorities that might need to be contacted could be the one in charge of the national road system (in Sweden: Vägverket). Inquires of necessary permits for construction of parking lots, regulations about putting up road signs etcetera are questions that needs to be clarified.

***Advice:***

- Establish an agreement of rights to use the land area in question.
- Investigate if any regulations and/or restrictions are associated with the area in question.
- Investigate which kind of permits from different authorities that are needed in order to carry out the project.

## 4.7 Operation and management

It is important that early in the project define who will be the owner of the final construction. With the ownership follows a number of responsibilities, such as keeping the facility in a functional condition and as responsible for possible injuries caused by shortages of the construction.

Consideration of how the ***operation of the construction*** should be organised. What needs for future supervision and maintenance of the construction can be expected? Often costs for operation can be considerably and therefore it is important that already early in the project define who will be responsible for this and also how it should be ***financed***. If one can't find any solutions on these two questions, it might be better not to build the construction at all.

***Advice:***

- Define who is the owner and in charge of the final construction.
- Settle how the operation is going to be managed and financed.

# 5 Towers and platforms

In this chapter, you will read about how to plan buildings that are meant to give a better view of the area, such as towers and platforms. Paths to the viewpoints are mentioned in chapter 7 Trails and devices for information in chapter 8 – Sign stands and information. A tower is a building higher than 3 metres with a small area for a few people to stand on. A platform is a building lower than 3 meters and the area to make use of is often larger than in a tower. In this text, the general term tower will be used for both types. The purpose with this chapter is to mention aspects to have in mind when designing a structure and to give support in the planning stage. Some both good and examples will be presented for both inspiration and avoiding already made mistakes to be repeated.

## 5.1 Design

**Height**

The purpose with a tower is to offer the visitor a better view of the area than when standing on the ground. How high the tower should be is a balance between the obtained view-area and the increased difficulty when making the tower higher. Investigate what **height** is needed to give enough view over a certain area without to high construction-costs. Decide what areas you have in interest. Sometimes it is enough just to get up a few meters above the ground to get a good view, further height only gives a marginal improvement. Avoid to build unnecessary high towers, since they are often more expensive to build and have lower stability and increased safety-risk. Steep stairs involves a big safety-risk and the accessibility is also reduced. A low platform can easily be made stable and gives room to more people.

*A high tower to get a view over a lake normally concealed behind large reed beds.*

*This tower is built in the forest to create opportunities for observations in the tree canopy.*

*A low platform can be enough to get an overview over a flat marsh area.*

*The platform gives you an opportunity to see through the reed and to get a view over the lake.*

**Placement in the terrain**

You can gain a lot by adapting the height and placement of the tower to the terrain. Height-differences in the terrain can be used to simplify the construction. When using the ***natural elevations*** in the terrain you can get a good view but still avoid a high and expensive construction. A slope can be used for making a ramp instead of a stair, to the tower.

*Example of using the elevations in the terrain to gain height. Because of elevations differences, this tower does not need to be very high to give a good view.*

*This tower is located in a slope of an embankment, which facilitates the connection of the ramp.*

To increase the comfort for visitors, try to find a place to build the tower with limited wind exposure. Bushes and trees often give a good wind-protection, but make sure they do not interfere with the view. This also gives an opportunity to study the birdlife in the branches. Therefore, to avoid unnecessary loss of valuable wind-protection, do not cut down trees and shrubs until the tower is built.

*Available trees around the towers are used as a wind protection. Find out about which is the predominant wind direction.*

*A tower located in open terrain can be a cold and windy experience for visitors.*

It is important to have in mind where the tower is placed according to the **sunlight**. Avoid a localization of the tower against the light to the areas you want to observe. Therefore, it is preferred to place the tower south of the study-area in question, which will provide for good light conditions the most of the day. Another solution is to put a two towers east and west of the area to utilize the best light conditions during mornings and evening respectively, which coincide with the periods during the day when birds in general are most active.

**Size**

The size of the tower is dimensioned upon the **estimated maximum number of people that can visit** the tower simultaneously. There ought to be room for 10-12 visitors in the tower. Avoid making it larger because of the increased risk of vibrations that makes it difficult to use telescopes. In addition, if too many people visit the tower at the same time, it can get a bit crowded and the feeling of being out in the wild is lost. If the place is very popular, an alternative can be either to put up several towers or a bigger platform with a stable construction.
In exceptional cases, it can be good to build a small tower for only a few visitors. Such cases could be a remote tower built for a special purpose, or in areas where a limited number of visitors normally come. Therefore, think trough how many visitors you estimate will use the facility at one time.

*Popular places require a spacious and stable construction.*

*In some cases a small tower is enough.*

**Adapting to nature**

Since we consider the nature in question to be very valuable, it is important to let the tower blend into the environment. It is also important that the visitor in the tower do not disturb the wildlife. Therefore, avoid placing the tower in an exposed area, especially if it means uncovering to the horizon and interrupting the scenery.

A tower placed in the border of the woods, will blend in among the trees. To achieve the same in an open area, bushes can be planted around the tower that soon will cover the construction. This can be made if the surroundings allow it, in some areas, for example a sea meadow with open pastures it is not an alternative.

Another way of making the tower blend into the nature is to use the same material and colour as in the surroundings. A tower among the reeds will blend in nicely if the roof or the walls are made out of reed. Grey boards with an irregular upper edge can be suitable in an alder wood by the shore. These are only a few examples of making the construction to blend into the nature. Every environment needs its own solution and it is up to the creators to use their creativity. In general, avoid strong colours, unnatural material such as tin roof and straight and angular constructions.

It can be of great help to make a model, a sketch or a photomontage when planning a new construction. This gives the possibility to se how it blends into the environment and try alternative solutions.

*A tower placed at the edge of a wood makes it blend in well. Design, colour and material also contribute.*

*This tower has been placed by a lake among the trees. Only a small part is visible from the lake. Trees close to the tower have been cut at the height of the tower to restore the view.*

**Weather protection**

Towers are most often used in dry weather but sometimes it can be nice with a roof that serves as shelter from an unexpected rain. In dry countries, the roof serves as protection from the sun. A roof will however limit the view and the possibility to observe birds flying over the tower or circling will be limited. Therefore, it is unsuitable to build a tower with a roof where mainly observations of migrating birds are the main purpose. Different traditions within this matter exist in different countries, for example in the Baltic countries most towers are built with a roof.

A general recommendation is therefore to make the upper most level of the tower without a roof to provide the best view possible. If there is a need for sun- and rain protection, a roof over only a part of the upper most level or a roof on the level below can be put up. An alternative is to arrange a sun- and rain protection separately on the ground next to the tower.

The wind can also cause problems by its chilling effect and it makes it harder to use binoculars. It is therefore eligible to build a wind protection, at least on the most exposed sides. A windshield can be created by making the sides compact and a little bit higher in the most exposed directions. If the tower is placed in a very wind exposed area, do some extra efforts when designing the wind shield. In such areas, it is not enough to make a plain wall since it will result in bothering turbulence behind it. The windshield should have an angle design to enable an even air current that blow over the area in which the visitors are standing.

*A roof over a just a part of the tower gives rain protection when needed but still the view above clear.*

*When visiting this tower it would have been nice with wind protection during windy days.*

**Architecture**

Good architecture contributes to constructions that better blend into the nature. Softer lines and suitable material make towers and other constructions less conspicuous. One of the purposes with a bird tower is not to draw attention to or to stand out, but rather the opposite. Constructions should be adapted to the environment and be aesthetically attractive and beautiful to look at. Avoid futuristic experiments since they hardly belong in nature. Many existing towers are designed as square boxes and they are not very beautiful to look at. Through fairly simple measures, it is quite easy to build towers that are far more aesthetic.

*Towers and windshields with a rounded shape and big windows. The roof out of reed links to the areas of reed beds nearby.*

*A bold architecture and big buildings can seem a bit strange and dominating in some areas.*

***Advice:***

- Investigate how high the tower needs to be to enable a good view of the area.
- Place the tower on a height in the terrain to decrease the height of the building.
- Use surrounding terrain and vegetation to create a wind protected position.
- Try to avoid putting the tower against the sunlight.
- Dimension the platform to the expected number of visitors.
- Try to build a tower that blends into the environment.

## 5.2 Accessibility and safety

When you make a tower, it is important to define the target group who is going to visit the construction. How to identify the target group is being discussed in chapter 4.3. The target group is then conclusive for making the tower accessible and safe. Some things of vital importance for accessibility and safety will be discussed in this chapter.

**Stairs and paths**

The availability and safety are mainly depending on stairs and paths. There are many dangerous examples with now existing towers. In general, the availability for a disabled person is very bad. A ramp instead of a stair is to prefer, if possible considered the height and terrain. This is also a condition for a person who is bound to a wheelchair, to get access to the tower. It is, after all, an exception to have the possibility to install an elevator. The inclination of a ramp should not exceed 5 % (1:20) and should have a two meter long resting level after a rise of 50 cm. The disadvantage with a ramp is that it can get very long at high towers and then demands a lot of space. At increasing heights, an alternative floor or a separate building is to prefer for persons with disabilities.

High towers and towers located without possibility for disabled to get to, stairs are used to get up in the tower. For safety reasons, the stairs should not be too steep or too long, which is often the case in many towers of today. A fall in a steep stair could have a fateful outcome if a person falls several metres before the fall can be stopped. The width of the stair should be at least 120 cm, to make it possible to meet another person. The depth of the steps should be at least 26 cm and the maximum height 16 cm, if possible even lower. The possibility for children to creep between the steps must be avoided. If the amounts of steps are more than 18 you must put in a ledge. Some sort of contrast marks on the steps makes it easier for a visually handicapped person, this is especially important on the first and the last step. More detailed instructions can be received from organisations for handicapped and authorities. (See reference: Outlines and standards. Accessibility for persons with disabilities to nature reserves). Keep in mind to make the stairs with a weak rise with short stair sections interrupted by ledges. If the stair is built in angles, a long coherent stair can be avoided and a fall down the stair can be stopped.

*By building a ramp around the tower, steep stairs can be avoided*

*Good example of a ramp, wide enough and with stable railings on both sides. The ramp also contains ledges on regular intervals.*

*This steep stair constitutes a severe risk in case of a fall. The fact that it is high and has a sparse railing increases the risk.*

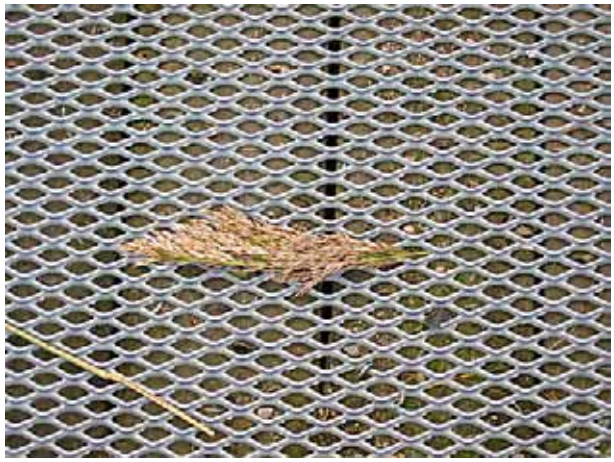
*High steep stairs with a narrow step of some steel bars is a big risk for falling accidents.*

Stairs and walk paths in towers are often made out of wood, which by time can get slippery because of alga and moisture. The stairs should be made with broad and firm steps and the steps must not lean. By doing the surface rougher and increase the friction, the slipperiness can be decreased. Boards with a tracked surface can be placed across the direction of walking. A net can also be put on the steps top get a less slippery surface. It is important that the net to be absolutely levelled to the surface so there is no risk of tripping. If a squared net is used the overlaying threads must be placed across the direction of walking to get a good grip. Different kinds of floor gratings also ensure a good grip, but they are fairly expensive and can also give much noise when walking up and down the stair.

*Example of a path assembled with tracked boards to decrease the slipperiness.*

*A net has been put in to the far too steep stair, to give a better grip at damp weather.*

*Floor gratings on this ramp to decrease slipperiness.*



*Close picture of the floor grating.*

**Rails**

Rails are another problem with all sorts of towers. The main purpose is of course to prevent falls, but at the same time, it should be possible for people of different length to get a view. The rail should both prevent children from falling and give children and persons bound to a wheelchair a possibility to get a view from the tower. There should be rails on all places situated at a dangerously high level over the ground. The people who enter the building are decisive for what safety measures that needs to be taken. A height of 0.5 m does not mean a threat for a healthy person, but can be of great danger for a person in a wheelchair. The assembly of rails is depending on target group and risk.

Rails should have a height of at least 1.10 m at platforms and ledges and 0.90 m in stair sections. The rail should be ***tight*** and not have openings bigger than 10 cm since that could make it possible for a child to get through. There must not be any horizontal parts on the inside of the rail **to climb up on**. There ought to be rails on both sides in stairs and ramps and the rail should pass the upper and lower step with 30 cm.
For children and people tied to a wheelchair, smaller openings can be done for viewing, if the rail is very tight. A net with a big mesh or sheets of transparent thermoplastic to see through can also be used, even if this is not perfect if you look through binoculars.

*Good example of a rail. High, stable and not easy to climb on.Opening giving possibility for children and people in wheelchair to see through the rail.*

*Good example of a rail with smaller openings for children. From security aspects the opening the opening should be a little bit smaller.*

*Horistontal boards inviting to dangerous climbing. Big openings that children can crawl through.*

*A big opening that children and adults could fall through when falling in the stair.*

**The view platform**

The view platform should give ***all people who use it*** a good ***view*** over the area. If the main view is only in one direction a square construction, with the longest side against the view, give more people the possibility to stand next to each other. With a floor in different levels, visitors can look over each other. Have in mind to avoid the risks of climbing at the rail when the floor is constructed in different levels. If the floor has a higher level at the back of the platform the rail can be heightened without destroying the view.

*A platform with lot of space for visitors.*

*An elevation in the platform gives children possibility to see over the rail.*

**Picnic areas and shelves**

It is always good if there are tables and benches in a tower that gives you the possibility to eat your packed lunch. A place for this should be made only if the size of the tower is big enough and should not trespass on the primary function of the tower. ***Persons with a disability*** should also be able to ***use a picnic area*** in a simple, independent and safe way. The seats should be 50 cm high and have a firm back support, possibly with an armrest at some seats. The table surface should have 50-60 cm of overhang in relation to the legs of the table. There should be a free space of 65-75 cm below the table board to give enough room for a wheelchair at the table.

While looking in the binoculars, it can be very useful with a shelf to put a book or a coffee cup on. The shelf should be placed within reach from the place of view and preferably at the inside of the rail to avoid exploitation of the floor area in the tower. A shelf can substitute tables and benches if the watchtower is small.

*A nice picnic area on a view platform with benches and tables that allow people in wheel chairs to use.*

*A small table with a bench in a tower can functions as a picnic place as well as a place to put different things on.*

**Accidents and security**

The biggest and most serious risk with towers is that people can fall from a level high above the ground. Many towers have a height compared to a house with two or three floors. The higher the tower, the more attention must be put on safety.

The reason for a fall can for example be that children climb on the rail and fall down. Make sure that no horizontal parts on rails exist or other equipment that makes ***climbing*** possible. Rails are made of plain boards or vertically oriented planks. If a horizontal bolt is needed it can be bevelled on the upper side to reduce the possibility of climbing.

Too **big openings** in rails make a potential risk of someone creeping through it or even falling through it in case a visitor slips on the floor. At greater heights, there must not be any openings that are big enough for a child to fall through. Completely tight rails are maybe the best solution but gives a boring impression and a feeling of being shut in, especially so if stairs and ramps are made tight. A firm thick net of steel wire gives a more airy impression. Sheets of transparent thermoplastics can also be used in some parts of a rail if they are thick enough. They must be thick enough to withstand violent treatment and therefore often becomes quite expensive.

Wet surfaces of wood often become very slippery and therefore constitute a big risk, especially in stairs and leaning ramps. To start with, stairs should be designed with steps big enough and ramps not leaning to steep. A milled pattern of the wooden surface or assembling some kind of protection against slipperiness can be done to decrease the risks. This has earlier been discussed in the section about “Stairs and paths”.

*Easy to climb on the rail. Big security risk in high towers.*

*Here is a lot to do to reach good security and accessibility.*

Objects that protrude out or, unmarked differences in floor levels can make one ***stumble*** and cause a fall. Paint the edges of the steps in a deviant colour to minimize this risk. If a protection for slipperiness is assembled, it must be plain to the surface and must not have parts that stick out. A weak net can break and be a dangerous snare.

Deep water close to the building can constitute a risk of drowning. Rails, reed and muddy beaches can also cause trouble when trying to save a person. A life buoy should be placed visible and accessible as an aid for rescue.

Through the years bearing parts of the tower can be damaged by rot or decay and cause the tower ***to fall***. A skilled person, to detect such problems in time, should do regular controls of bearing parts. The foundation as well as lower placed building parts is more often exposed to moisture and therefore more critical. The bearing parts are inspected, and especially holdings, which are the ones that usually weakens first. Stairs and paths are checked for damaging by rot to prevent stepping through. High towers that are held by a bracing-wire or an iron bar should be checked to detect damages from rust. The tension of the bracing-wire or iron bar is adjusted so that the tension is equally divided.

***Advice:***

- Design the stairs with a gentle rise and shorter stair sections with ledges in between.
- The rails should be as tight as possible without any chance of climbing them.
- Design the platform to enable a good view for both short and tall persons.
- Have in mind that also disabled people should be able to use the picnic area.
- Try to think of the risks for accidents to happen at the future building.

## 5.3 Choice of material and lifespan

**What lifespan should we dimension for?**

If the construction is built for a temporary purpose, the durability is not decisive for the choice of material. Cheaper material is often chosen when short-term economy dominates. Second hand material is sometimes used. It is important too think of an easy way to remove the building when it should not be used anymore. Big cast concrete foundations should therefore be avoided.

The most common is anyhow that a construction is built to have *as long durability as possible*. It should function for about 20-30 years, the building must then be dimensioned, and material chosen must be of good quality to achieve this. The foundation must withstand damaging by rot, corrosion and subsidence in the ground. The bearings should be made of appropriate dimensions and lasting material. Exposed parts must be able to withstand wear for a long period of time.

**Special environmental considerations**

Constructions are often situated in sensitive environments at or close to water, therefore ***substances that are hazardous*** to the environment should not be used. This means that impregnated timber should be avoided. Sheets of cupper, lead and zinc are further examples of unsuitable material. In general, it is important to choose a suitable material and find out its influence on the environment. Check if there are special rules or policies concerning environmental effects in the area

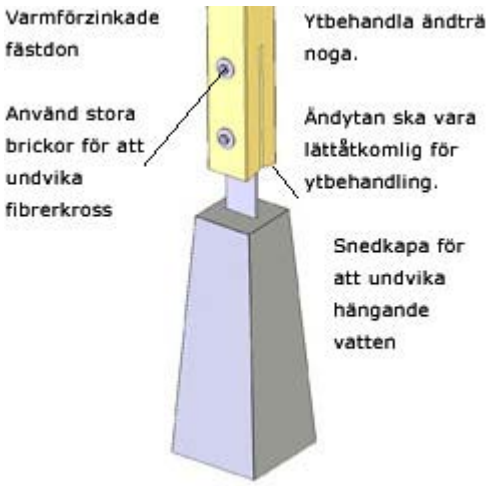
**Construction of foundation**

The foundation is the most sensitive part because of constant exposure to soil, moisture and water. The risk of damaging by rot is high and therefore some sort of construction of concrete should be used for the part that is below the ***ground surface***. Construction built in water will have the largest problems of damaging by rot at the water surface, where water in combination with oxygen speeds up the process. Constructions made of concrete would in this case become expensive and complicated, and should only be chosen in exceptional. Pillars of steel with a thick dimension can be a good alternative to use for a longer durability. If a construction of wood is chosen, a very thick dimension should be used to prevent that damage by rot destroys the construction. Black alder is the type of wood that has the best durability in water but it is very sensitive when in direct contact with soil.

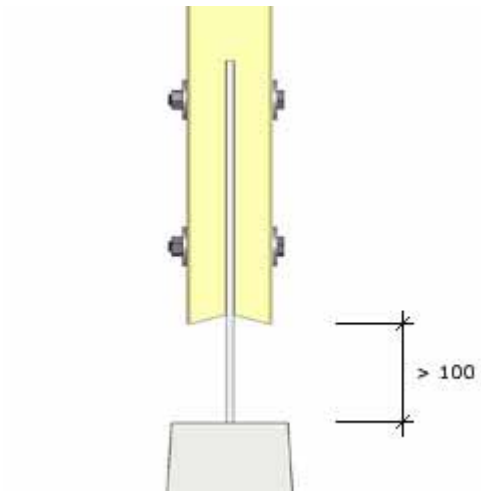
| Sort of wood | Expected durability for some wood species in contact with ground |
|---|---|
| black alder, birch | <5 years |
| spruce, pine | 10 years |
| larch | 15 years |
| oak | 15-25 years |
| teak | >25 years |

*Table. Durability of different core woods in contact with the ground.*
*(Source: BRE, CP6/76, Princes Risborough Laboratory.)*

It is very important to treat end parts of the wood against moisture through a constructive shape and finishing since the water will pass faster in the direction of the fibres than through other directions. Poles can be placed in a pole footing to avoid contact with the soil.




*Pole footing with an inserted steel plate secured with bolts and large washers to prevent damages of the wood.*




*The distance from end parts of the wood to the ground depends upon the construction and ground conditions.*

**Quality of wood**

Wood is the natural choice of material to use in the rest of the building. Detailed knowledge about wood quality has decreased dramatically the last decades. The access to impregnated wood and the industrialized sawmill industry are the main reasons. Earlier only full-grown trees that had grown slowly in the woods were used as building material. The knowledge about the different types of wood and how they could be used were better than today. Trees were intentionally damaged some years before cutting them down and thereby receiving a natural impregnation by resin. Some types of wood must dry properly before use. Today, it is almost impossible to find wood with these qualities.

Impregnated wood should be avoided because of risk of poisonous substances leaking to the surrounding environment. Old telephone posts and railway tracks of wood are often impregnated with creosote and therefore are poisonous! Choose durable wood that has grown slowly and thereby have a dense inner structure. Such wood is often found up in the north and cold latitudes.

***Larch, spruce, pine and oak*** are examples of wood that resists damage by rot for a longer time. The durability of lark has been overestimated the last years. Experience shows that the durability is only valid for slowly growing Siberian larch. Larches from warmer areas are not better than spruce and pine. It is also difficult to recommend the use of lark if it means that pristine Siberian virgin forests are being cut down. A disadvantage with larch is that it turns heavily and this causes a lot of wood chips, which can be a problem when building the construction. Core wood of oak is very resistant against rot damages even in a very damp environment. Oak is our most constant species of wood and is appropriate to use outdoors, but it needs to dry at least two winters before use. For all species of wood, the core wood is more durable than the wood in the outer part of the stem. Logs and split wood are more constant than sawed wood where fibres has been cut and left open. All wood should be dried to a moisture content of 18-20%. The place of growth and a careful selection of ***quality of wood*** are therefore very ***decisive for the durability***.

| Sort of wood | Unprotected, outdoors (years) | Under a roof, outdoors (years) | Always dry (years) |
|---|---|---|---|
| Black Elder, Birch, Poplar | 3-20-40 | 3-20-40 | <400-500 |
| Elm | 60-80-100 | 80-130-180 | <1500 |
| Ash | 15-40-60 | 30-60-100 | 300-800 |
| Beech | 10-35-60 | 30-60-100 | 300-800 |
| Oak | 50-85-120 | 100-150-200 | 300-800 |
| Pine | 40-60-85 | 90-100-120 | 120-1000 |
| Spruce | 40-55-70 | 50-60-75 | 120-900 |
| Larch | 40-65-90 | 90-120-150 | <1800 |

*The table shows the estimated durability for wood exposed to the open air. (source: Träguiden/Skogsindustrierna)*

**Constructions of wood**

You should aim at **constructive protection** of wooden details to prevent damage by rot and prolong the durability. Place outdoor constructions under a roof or similar to protect them from water. The bearing parts, which can be difficult to exchange, can be protected with a covering, which easily can be replaced.

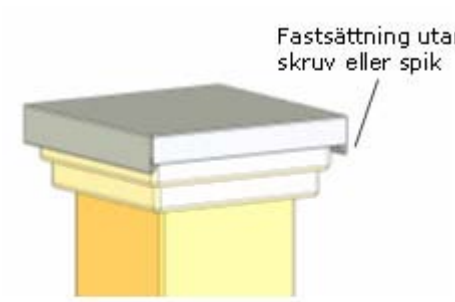
Other constructive measures are:

- to ensure water run off from the construction
- avoid wood in contact with the soil
- lean the exposed areas and thereby allow water run off, or cover with a protection against precipitation
- cover or seal end parts of wood
- create a good ventilation of all wooden details for a rapid drying and avoid narrow columns, hollows or corners where water and dirt are collected, and seldom dries out
- avoid cracks, hollows and surface damages, as for example damages of fibres at holds, especially important at horizontal areas

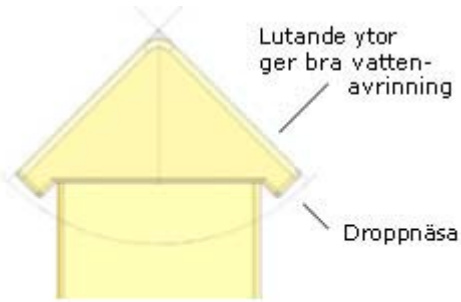
The largest risk of damage appears at the end parts of the wood and at the attachment of wooden details. These parts should be constructed with great care.

Areas of wood should lean to make water and snow run of faster from the surface. This lean should limit the absorption of moisture and prevent water to run in the wrong direction. The lean should be at least 18 degrees (1:3) to be effective. Drip edges and slots should lead the water away from the construction and should be at least 8 mm from the edge and at least 8 mm wide.

Parts that are difficult to change should be protected with a roof or as in the picture below with a covering. A covering of sheet metal is effective but can easily get buckled if the surface is carrying a load. A cover of a wood is less sensitive for vandalism and a good and cheap alternative. However, a cover mounted horizontally and made of non-impregnated wood, it probably needs to be replaced after 5-15 years.




*A covering of sheet metal attached by snapping. Design the protection to prevent capillary forces between the wood and the covering to suck up water.*




*A lintel with hart wood facing upwards and with the annual growth rings also facing upwards, which results in a higher durability.*

**Constructions of roof**

For constructions of roofs, there is a variety of materials to choose. A roof completely made of wood is possible, but then it is important to build the roof with enough inclination to ensure water to run off as quickly as possible.

Roofing felt can be used to give a waterproof surface also with a small inclination. Roofing felts comes in a variety of colours and it is important to choose a colour that blends with the environment. Roofing felts can last for about 20 years before it has to be replaced.

A roof made out of reed blends nicely with the environment. To make a roof out of reed demands certain level of skill to get a long lasting result. However, experiences have shown that ducks sometimes try to nest in these kinds of roof, which can cause damages.

A roof made from peat or grass is another environmentally friendly alternative. This demands a heavier construction to be able to carry the material also when it is wet. A sealed coating under the peat is also needed to make it waterproof, for example a plastic carpet.

Sheet metal is a cheap and waterproof material but badly blends in within the environment and should therefore be avoided. The roof is also noisy when it rains heavily. There is often a problem with condensation under the roof, which can cause rot damages on the framework of the roof.

*The tower in the background has a roof of planks. Big inclination of the roof makes the water run off quickly.*

*Ducks have picked out the reed straws from this roof. Proctection with nets can prevent damages.*

*Example of good foundation. Big distance between wood frame and foundation prevents moisture absorbance.*

*It is easy to get problems with condensation on windows in unheated speces. Here water has run down the wall.*

**Miscellaneous**

To resist shocks better, windows should be made of tempered glass. An alternative is to use sheets of transparent thermoplastic. However, such windows should mainly be used to allow light enter the tower, since the visibility through the plastic is quite bad.

***Advice:***

- Dimension and choose material with longest possible durability.
- Avoid substances that are harmful to the environment.
- For the foundations below ground level, a construction of concrete should be chosen.
- Choose a quality of wood with care for a longer duration.
- Protect sensitive parts of wood with constructive design.
- Design roofs with an inclination to facilitate a quick make water run off.

## 5.4 Minimization of maintenance

When planning the building it is important to design for minimal future maintenance. A well considered design of details can in a simple way, and with small extra costs, affect the need of maintenance. Therefore, it is good to make some extra efforts in this and thereby save future costs. Requirements to fulfil during the planning could be to achieve a specified lifespan and a minimal level of required maintenance of the final construction. With this as starting points in the project planning, a proposition of construction can be made.

**Protection against rot**

The choice of sort of wood and durability has been discussed in the previous chapter. It was stated not to use impregnated wood for environmental reasons. Overall, be careful with the use of any chemical product. To improve protection for exposed parts, for example end parts of wood, different types of tree oils are recommended. These oils should be made of naturally based products that are not harmful to the environment. The traditional tar is now being questioned because of harmful substances being emitted at the production. In general, it is best to use finishing products with great care and find out the contents of the products before use.

Do not use any kind of paint that completely seals the wood. This will capture the moisture inside the wood and fasten the damage by rot. Tree oil can also capture moisture if applied in too thick layers. Outdoor constructions like towers, hides and similar buildings are exposed to moisture during a great part of the year. The most important is that the building gets a chance to dry up now and then. The best protection is to prevent water to get inside the end parts of the wood and ***prevent standing water*** on any wooden parts. See chapter 6.3.

**Waterproof layer and water run off**

***Water should be lead away from the building*** and prevented to form standing water anywhere on the construction. Flat areas on the construction should therefore be avoided as much as possible. A roof should have a waterproof layer to prevent moisture to get to the frame of the roof. The inclination of the roof facilitates water run. Avoid sharp corners and hollows where leaves from nearby trees and other debris could be collected.

**Parts exposed to wear**

Floors and stairs are constant exposed to a large mobile load from visitors, which means that they can fall apart over the years. Use wide dimensions and stable holds to withstand the strain. The ***uses of screws are*** to prefer because they so not pop out during swelling of the wood as easy as nails do. It also makes it easier to replace damaged parts fastened with screws. To reduce wear at especially exposed parts, such as thresholds and other difference in levels, a piece of metal can be mounted on exposed edges.

**No cleaning**

Put a grating at the entrance where visitors can wipe off their shoes, to prevent gravel and soil from entering. The grating should be assembled in such a way that it does not constitute a risk of stumbling or is an obstacle. Floors should have narrow openings between boards for gravel to fall through. Avoid narrow hollows and sharp corners where dirt and debris often is collected.

*By useing screws can prevent planks from being pulled out.*

*A grating at the start of the ramp reduce the amount of gravel and soil in the tower.*

**Doors and windows**

Doors and gates are exposed to a lot of wear and often get swollen during wet and damp weather conditions. Simple but strong fittings are to prefer. Assemble with margins enough to prevent any swelling from jamming the door or window. Some sort of automatic closing mechanism ensures that no doors or windows are open during rainy weather. However, ensure that the mechanism do not prevent persons bound to wheel chairs to enter. Persons bound to a wheel chair must easily open the door. Windows should be of tempered glass that are stronger and reduce the risk for cuts if the window is broken. Transparent thermoplastic can also be used but it easily gets scratched and is not easy to see through with binoculars. Windows should be simple and have strong fittings to endure weather and wind. Do not paint doors and windows with a ***paint that completely seals the wood***. This will speed up the damage by rot. Use an environmentally friendly tree oil to get a surface that rejects water.

*Windows that can be pushed aside to open. Difficult to get tight joints that withstand rain.*

*Painted with tight paint has caused rot on windows. Unpainted parts still okey after 50 years!*

***Advice:***

- The best way to avoid damage by rot is to prevent water from getting into end parts of wood or standing water on the construction.
- Water must be lead away from the building.
- Screws give a more stable construction and a better durability.
- A grating at the entrance makes the indoor parts of the tower less dirty.
- Do not paint doors and windows with a colour that completely seals the wood and prevent moisture from leaving.

## 5.5 Construction and stability

The expected structural load on the final tower mainly determines the choice of construction, i.e. the number of visitors that simultaneously should be able to visit the tower. The ***height*** of the tower is another important determinate for the final construction and the dimensions.

**Choice of framework**

A framework of wood is most commonly used and has several advantages. Wood is a natural material that fits well into the environment. It is also easy to work with when adjusting and joining different parts together. Another important characteristic is wood do not propagate vibrations as much as other material and a framework made of large wooden poles reduces vibrations to a certain extent without any extra measures. Another possible framework material with a good durability is steel. However, steel might not fit into the surroundings as easily and it can be more difficult to work with. In some constructions, steel is used for some joists in the construction and are then covered with some other material. A disadvantage with steel is that vibrations are easily propagated and slender steel constructions suffer the risk of resonance vibrations to occur.

*A traditional frame of wood.*

*Steel pillar in the framework.*

**To dimension the construction**

To decide dimensions and construction of higher buildings, a specialist with correct competence should be engaged to ensure that required safety of the final construction is achieved. Fixations of the construction are critical and therefore needs to be designed in a safe way. To avoid rot damages on wood constructions, protection of end parts is necessary. Damages in the wood at fixations point should be avoided because these often constitute hotspots where rot begin. To dimension lower buildings is not as critical compared to higher buildings. In this case, it is often enough to copy used dimensions and experiences from other similar constructions. However, to be on the safe side, the use of larger dimensions than required will result in a more stable and firm construction.

**Stability and vibrations**

A bird tower can never be too stable. The most common problem with bird towers are propagating of vibrations from people walking in stairs or on the platform. These vibrations can be so severe that sometimes it is impossible to get a sharp view through a telescope or a pair of binoculars. To build a construction that minimizes this problem is therefore important and a heavy framework is a good starting point. This heavy framework needs to be complemented with several supporting struts to make the whole construction as rigid as possible. Towers of greater height might also require external supporting wires or metal poles to achieve a rigid enough construction. Such supporting wires and poles need to be adjustable because they tend to loose some of their initial tension after a while.

A very good way to eliminate vibrations is to design stairs and the rest of the building as two separated constructions. This can be done for both constructions with an external or internal stairs. To function effectively, no parts of the two constructions must be in contact with each other. Where the stair and the platform connect, a gap between them, ensure no direct contact and vibrations are prevented to propagate.

An additional way to minimize the vibration problem that arises from other visitors walking around on the platform is to build the floor in sections, without any contact with each other. Thus, long floorboards should be avoided. At least a part of the floor where telescopes are put up should be constructed in this way to create a zone without any vibrations. Finally, allowing the floor sections to be supported by some kind of rubber cushioning further helps to reduce vibrations.

*An adjustable wire makes the tower more stable.*

*Ramp separated from the platform to prevent vibtations. Here the opening need to be adjusted after subsidence.*

***Advice:***

- Choose a framework depending on expected structural load and height of the final tower.
- Engage a professional to dimension towers of greater height.
- Design and construct towers to minimize the problem of diffusing vibrations from people walking around in the tower.

## 5.6 Information

Different ways on how to present information are discussed in chapter 9. This chapter therefore only discusses the issues that are specific to bird towers.

**Signposts**

Directions from nearest public main road should be available to help people, without prior knowledge about the area, to find their way. Necessary permits and how these signs should be designed needs to be discussed with concerned authorities. At the parking place, a signpost informs about which trails to use to get to the bird tower. This signpost should if possible also contain information about ***distances*** and ***level of accessibility*** of the trail and the bird tower. Is it possible for a person with functional disabilities to access the bird tower?

**Information about the nature**

Visitors always appreciate a signboard with general information about the area, and even more so if it contains a map showing how to find the most interesting places within the area. Information about species identification of the most common species is also very useful for many visitors. Such kind of species information is best located within the bird tower, which allows visitors to use it when most needed.

**A notebook for observations**

A notebook available for visitors to write down their observations and to read about earlier observations made by others is very much appreciated. It is however important to protect the notebook from getting wet, which can be solved by a box with a lid (for example an ordinary letter box). As an alternative to a notebook, a note board could be put up where daily interesting observations and locations could be noted. This kind of information about what and where to find interesting species and observations are both helpful and appreciated by next coming visitors.

***Advice:***

- Signposts with way directions should also contain information about distances and accessibility.
- Information signs to help species identification is often very helpful.
- A box with a lid should be arranged to prevent the notebook for observations to become wet.

# 6 Hides

A hide refers to a building with the purpose to conceal people from birds, in front of the hide and allowing close encounters of wild birds in their natural environment, without disturbing them. The content of this chapter aims to give some advice about how to proceed when planning the design and building of hides and to show some examples of both good and badly built hides.

## 6.1 Design

**Placement and height**

The main purpose of hides is to conceal visitors from birds and thereby allowing close observations of their behaviour, in different natural surroundings. The hide should be located as close as possible to existing vegetation to conceal the building as much as possible. Of course, the location of a hide is dependent also on where birds normally occur. A hide without or with very few birds in close vicinity is very boring and therefore, before the localization is decided, a survey to find the places that attract a lot of birds during most time of the year, should be done. However, if the purpose is to create an opportunity for visitors to observe seasonal and perhaps short occurring phenomenon, such as for example the lek of black grouse or resting cranes, a hide could still be motivated even if no or very few birds can bee seen from the hide other times of the year.

A hide placed low above or on the ground, gives visitors a more close connection and better perspective when observing birds. However, this might means problems if the hide at the same time is situated close to water, and the ***water level*** varies considerably during the year. Knowledge about water level variation at the chosen area, including also extreme years, is therefore very useful to avoid problems with drowned hides.
The localization of a hide should also be chosen to avoid any disturbances on especially sensitive birds to avoid the risk of failed breeding attempts.

*A smaller hide close to water for observations of seabirds.*

*This large hide is built by a bog close to a lek of black grouse.*

**Size and furnishing**

The size of the hide is a function of the surrounding environment and the purpose of the hide. A local that attracts many birdwatchers requires a larger hide if it is desirable to give more people the chance to visit the hide. However, this might involve a larger disturbance on the birdlife as well as reduced enjoyment for some visitors. A large hide that holds a larger number of people should therefore be located further away from the birdlife, to reduce the disturbance effects in comparison to a smaller hide. Also, locations for larger hides should primarily be areas where species with less sensitivity of disturbance occur. If a hide is planned to be built in areas with sensitive species, several smaller hides spread out in the area is a better solution compared to a single large one. This also creates the opportunity to choose observation spot depending on the actual location of the birds.

Make a survey of which ***alternative suitable locations*** for a hide that exist, and then decide ***how many visitors*** that simultaneously should be able to visit the hide.

It should be relatively dark inside a hide to avoid silhouettes that might scare birds and therefore no light should be allowed to enter the hide from behind. The entrance, normally placed on the backside of the hide, should be equipped with a light-lock, which can be constructed by a wall placed just inside the door to prevent light from shining through the hide. The furniture inside the hide should mainly be benches to sit on when observing. View openings should be available in different heights to fit people of different length. Below view openings a shelf can be put up with the function of elbow support as well as surface to put things on.

*A hide dimensioned for a large number of visitors. Equipped with comfortable movable benches, which also allows visitors bound to wheelchairs to use the view openings.*

*Benches to sleep on in in separate room in a hide from wich lek of black grouse can be seen.*

**Trails**

Trails and footbridges for walking to the hide should be concealed as much as possible to avoid disturbance of birds. Vegetation surrounding the trail is often the best natural concealment of visitors walking on the trail. However, at some places the possibility of concealment is insufficient and instead some kind of screen could be put up with the same purpose. A screen made of natural materials, such as reeds, braided tree branches or wooden boards, often works fine. If the circumstances do not allow screens to be put up along the trail, a possible alternative solution is to put up screens on both sides of the hide and thereby shielding off approaching visitors from birds. Footbridges leading to the hide should preferably be made of a soft material such as wood to avoid noise from approaching visitors. Footbridges and other constructions made of sheet metal and similar material should consequently be avoided as much as possible.

*A trail that very well screen of visitors from the surrounding birdlife, which consequently minimize the disturbance caused by approaching visitors.*

*The combination of reed beds and a screen of wooden boards, allow visitors to approach the hide without disturbing or scaring birds in front of the hide.*

**Adjustment towards the environment**

Birds might not care so much about the hide itself, but from a human esthetical point of view the hide should be designed to blend in as much as possible in the environment. The use of ***natural building materials*** promotes this and for example a roof made out of reeds allows a hide to blend in well next to a lake with lots of surrounding reed beds. Similarly, a hide located in an area of meadows and wooded pastures, with a roof made of grass and other vegetation has the same effect. Natural wooden boards often achieve a nice silvery colour by age, which also promote to reduce the conspicuousness of the hide.

**Architecture**

It is not necessary to create hides as examples of architectural masterpieces. However some simple measures concerning the design and shape could greatly enhance the hide to blend in to the surrounding environments. Hides in the shape of ***square boxes*** seldom make a nice impression on anyone. A smoother design with more rounded and irregular shapes makes the hide less obvious in the surroundings. For example, a hide where walls and roof are combined at one side will result in a more irregular and thereby less attractive shape. Screens with an irregular upper edge along a trail also decrease conspicuousness of the screen itself.

*The placement of a hide in close vicinity of vegetation makes it less conspicuous in its surroundings.....*

*...and allows for a nice overview of a shallow bay and gives opportunities of close encounters with different kinds of wader birds.*

***Advice:***

- Variation in water level needs to be considered when deciding localization of a hide close to water.
- Survey what localizations and size options that exist for the hide, without causing too much disturbance on the birdlife.
- The use of natural building material and avoiding hides in shape of square boxes, minimize the conspicuousness of the hide within its surrounding.

## 6.2 Accessibility and safety

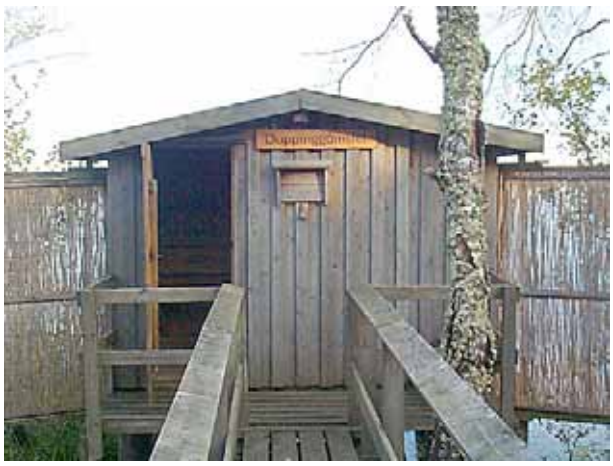
General issues about accessibility and safety have been discussed in chapter 5.2. In this chapter issues specific only to hides will be discussed. When discussing these issues, it is crucial to define ***which groups of people*** that will use the planned facility, since these aspects of course differ between groups. Therefore, the question to ask is if the planned construction should be accessible for people with functional disabilities, elderly people and children, or only for very fit people? This discussion therefore aims to shed light on the most fundamental functions of a hide and how these affect accessibility and safety for different groups, and to show some good examples on how to increase the general accessibility of a hide. For hides with very high requirements of accessibility, it is advisable to discuss these issues with relevant authorities and handicap organisations.

**Trails and footbridges**

Trails should possess signs with clear information about direction and distance. Trails made of materials that contrast the surroundings facilitate for people with visual handicaps to follow the trail. Trails containing many

and long steep slopes often becomes a problem for some people when walking and especially during wet and slippery conditions. Slopes in general should therefore be avoided as much as possible and this can be achieved by allowing the trail to follow the contour of the terrain to a great extent. In general, no slopes should exceed 1:20 of inclination and after 50 cm of rise, the trail should be flattened and form a two meter long resting level before proceeding onto the next slope. The width of the trail should depend on which target groups you are aiming for. The ideal width is 2.0 m, but 1.3 can be acceptable if the trail is equipped with regularly occurring extensions at an interval of at least 100 m, which allows wheelchairs to pass each other. Resting places with benches to sit down should be available along the trail with a maximum interval of 100-250 m. The surface of the trail should be hard and flat without any potholes, roots or protruding rocks. A minor sideward leaning (1:50) of the trail facilitate water run off and prevent standing water to appear. Fences that cross a trail needs to be passed and a gate or a cattle grid are two different solutions of passages. A gate through a fence should at least have a width of 90 cm and be equipped with a mechanism for opening and closing that can be operated by one hand only.

A footbridge also needs to be equipped with slide protections to prevent people and wheelchairs from falling off. The type of slide protection depends on the elevation above the ground of the footbridge. A footbridge close to the ground might only require heightened edges to prevent wheelchairs from sliding off. On the other side we have footbridges high above the ground, which might require proper railings to prevent people from falling off. To prevent people from slipping on footbridges, the surface can be provided with milled grooves or other measures to increase friction when walking. Individual boards of the footbridge should be positioned relatively close to each other so the gap between them does not exceed 1 cm. Read more about this in chapter 5.2.



*A footbridge leading to a hide, which has been screened of from the birds in front by large screens made of reeds. Proper railings along the footbridge prevent people from falling off. The narrow width however, makes it impossible for most people in wheelchairs to visit the hide.*

*A wide footbridge leading towards a hide under construction. Reliable railings and screens to shield the bridge from birds in the water are waiting to be put up.*

**Inside the hide**

There should be a space of at least 2.3 x 2.3 metres by the entrance of a hide that allows for manoeuvring of wheelchairs, and the entrance should be marked with a contrasting colour. The width of the entrance and the subsequent light-lock should be at least 0.9 m and height differences between the inside and the outside should be avoided. If doorsteps are necessary, they should not exceed 1 cm of height. At view openings, places to sit when observing the birds on the outside, needs to be arranged. A comfortable sitting height is 50 cm and some places could also be provided with back support and armrest. A 30 cm deep shelf placed 25 cm below view openings function both as elbow support and a surface to unload things. Depending on the size of the hide, one or more view openings should be accessible also for a persons bound to a wheelchair. All places should have a minimum ***leg space*** of at least 60 cm. It is desirable to have a relatively dark environment within the hide but a certain amount of light is needed; especially when all view openings are closed. Having one or more of the openings covered by a hatchet of a transparent material solves this problem.

**View openings**

View openings should be arranged both *at different directions and at different heights*. The height above the floor of openings should vary within the range of 95-125 cm to fit sitting persons of different length. To suit

standing persons there ought to be openings on different heights. Opnings situated up to 170 centimeters over the floor would be appropiate. Each opening should further have a minimum height of 20 cm. Openings not in use should be covered with hatches to prevent light to enter the hide. The mechanism to open and secure the hatches in an open position should be simple and preferably possible to adjust with one hand only. A chain on the top of the hatch and a hook in the wall above fill all these requirements.

*View openings with hatches easily adjustable by a chain mechanism. Openings are placed at two different heights to fit people of different length. A shelf below the bottom row of view openings function as elbow support. Observe the very low opening at the side that allows photographing of birds at ground level.*

*In this case, a higher positioned view opening would have meant a more comfortable position for the photographer.*

**Accidents and security**

As mentioned above, the highest risks of accidents are associated with footbridges high above the water where a potential risk of ***falling and drowning exist.*** During wet weather conditions of surfaces of wood often gets more or less slippery. Most of these aspects are discussed in chapter 5.2.

Trails and footbridges in bad condition and/or with a bad construction always involve a risk for accidents and injuries due to people falling. Strong and durable foundations of trails and footbridges are therefore important to reduce these risks.

Hatches and doors always involve a risk of people being ***hurt by getting caught,*** but this risk can be minimized. Ensuring only a small gap on the hinge side of a door significantly reduces the risk of anyone getting caught. All constructions that minimize gaps between a building and its doors and hatches reduce the risk for such accidents to happen. The door into the hide should not be equipped with a lock, to avoid anyone being locked in by mistake. Very large hides might also require an ***emergency exit,*** in case of fire or some other emergency, when the door is blocked.

***Advice:***

- Adjust accessibility towards the chosen target group without forgetting people with functional disabilities.
- Design trails and footbridges according to recommendations given by different handicap organisations.
- Remember that wheelchairs needs larger space to manoeuvre, as well as larger leg space below view openings.
- Place view openings at different heights to make them comfortable to use for people of different height.
- Try to think of and eliminate all possible risks of accidents and injuries..

## 6.3 Lifespan and choice of material

The lifespan of different constructions are highly influenced by the choice and quality of materials, which are further discussed in detail in chapter 5.3. Here, some aspects of this specific to hides will be presented.

**Foundations of hides in or close to water**

Hides as well as footbridges made of wood in more or less constant contact with water are more exposed to rot damages and often result in a shorter lifespan. Due to environmental concerns, impregnated woods should be avoided. Therefore, the best way with this respect, is to lay the foundation of hides in/or close to water by using poles made of ***concrete or steel***.

For a foundation of a hide in deep water and/or above a loose seabed, poles made out of steel are the most suitable choice. A metal H-beam or a pole can relatively easy be hammered into the seabed all the way until it reaches firm and stable ground and it withstands corrosion for many years. Alternatively, during conditions with shallow waters and a relatively firm seabed, poles of concrete or cement tubes filled with concrete are also suitable alternatives for the foundation. However, if wood is the only alternative to build the foundation with, care should be taken to find good quality wood that withstand the condition provided under water to achieve maximal possible lifespan. When using wood as material, the quality of the holds becomes even more important. In most cases holds of steel with a hot dip galvanization possess enough corrosion resistance, but stainless steel is always the safest alternative. Poles are hammered into the seabed with a heavy sledgehammer or by a drop hammer positioned on a suitable boat. An alternative is to do this during winter and use the ice as a platform to hammering. If not to deep, holes can be prepared in advantage by a spit.

Instead of building a foundation for the hide, a second alternative is to build the hide and the connecting footbridges on floating piers. These piers are then anchored by poles of 50 mm diameter hammered into the seabed and holding the piers through metal rings in each corner. This construction allows the hide to follow the current water level.

*Contact with water are more exposed to rot damages and often result in a shorter lifespan.*

**Roof construction**

A waterproof roof on a hide is necessary to protect the construction from getting wet and care should be taken in the design to avoid standing water on the hide. When designing the hide and choosing building material, special attention needs to be taken of the roof layer that is supposed to prevent water from entering through the roof. A roof construction with a large verge effectively prevents the facade from getting wet.

**Miscellaneous**

Rainwater can also find its way into the hide through ***view openings and hatches***. Therefore these should be designed to prevent this. Hatches on the outside of the facade effectively prevent water to enter through view

openings. Furthermore, a thin strip of wood on the facade and above view openings further minimize water run off from the facade to enter through openings.

Placement of a hide close to water means a damp and humid environment for the construction. To prevent rot damages and problems with mould, the hide needs to be well ventilated. Openings both at floor- and roof-level are normally enough for satisfactory ventilation.

***Advice:***

- Preferably foundations of concrete or steel should be used for hides in close contact to water.
- A large roof verge protects the facade as well as view openings from rain.
- Openings and hatches should be designed to prevent water from entering.

## 6.4 Maintenance

The design and construction of a hide should be chosen to minimize the need for maintenance. The choice of more durable materials and a design of a robust construction to withstand more abuse are two main factors determining the needs for maintenance.

**Rot-resistance and durability**

Frequent exchanges of parts damaged by rot during the whole life span of a hide are expensive. The use of chemical impregnated woods to better withstand rot and mould is not recommended due to environmental aspects. Then it will become even more important to choose more durable wood of high quality. Designing details of the construction to prevent standing water on the building are important to avoid rot damages. An example of one such detail to think of is to design the facade with a standing panel which ensure water run off from the surface. Their lower short open ends of the panel can be cut in angle to minimize the risk of water being absorbed.

The durability of concrete and steel are widely superior in humid conditions and in water. ***Poles of wood*** in contact with permanent water or in the ground should only be used if absolutely necessary and then it is important to choose a hold that makes it relatively easy to switch poles without the need of demounting too much of the building.

A hide placed by open water runs the risk during winter to be damaged by ***ice movements***. The forces practiced by the ice can be very high, and totally destroy a building if things go really bad. One way to reduce this risk is to cover poles with some kind of slippery material. Black plastic tube of enough dimensions will do the job fine. The tube also absorbs heat quicker and thus contributes to a faster ice melting around the pole.

**Parts exposed to wear**

Parts exposed to most wear and tear from visitors within a hide are mainly furniture such as benches and shelves. Construction of sturdy benches and shelves with strong holds ensure a longer lifespan on these.

**Waterproof layer and water run off**

The roof on a hide is constantly exposed to weather conditions, which puts extra demands on the roof material. A leaking roof most often involves large costs of maintenance, also from other parts than the roof itself. The layer that prevents water from passing the roof should be as durable as possible and require a minimum of maintenance. A good way to reduce the degradation of the waterproof layer of the roof is to cover the roof with a layer of reeds or peat to protect it from sun exposure.

**Cleaning**

A dirty hide will be experienced as unpleasant by most visitors. Grits from visitor's shoes, nests of spiders and other insects all contributes to make a hide dirty and unpleasant. Design and details to minimize these problems are desirable since regular cleaning of hides is rarely possible. A hide equipped with a ***scraper*** for shoes outside the entrance, ***gaps*** between floor boards allows grits and dirt to fall through and ***insect net*** covering ventilation openings and preventing some insects to enter are all means to reduce the dirt problem in hides. If possible, avoid building hides with lots of small corners and straight angles since this is the places where dirt tends to be collected.

*Simple but robust furnishing decreases the need for maintenance. Make sure that also people with different functional disabilities are able to use the benches.*

*Hatches on the inside could create problems during heavy driving rain with water entering through openings.*

**Doors, windows and hatches**

As mentioned in the corresponding chapter on bird towers, badly designed doors might require frequent maintenance to function. Choose sturdy doors with simple but functional fittings that withstand heavy wear during a long time. Make sure a correct ***size of doors*** is used to prevent problems with swelling doors that can't be opened during wet conditions.
Hatches should be made of a durable material, such as high quality plywood or sheets of transparent thermoplastics. Use robust holds and allow large margins in the adjustment mechanism of hatches.

***Advice:***

- Poles in constant contact with water or soil should if possible be made of other material than wood.
- Dimensions of the foundations of hides in water need to be big enough to withstand the ice forces during winter.
- Devices such as a scraper for shoes and insect net reduce the collection of dirt inside the hide.
- Design doors, windows and hatches with margins large enough to prevent them from seize function during wet conditions.

## 6.5 Construction and stability

Stability has been dealt with earlier in chapter 5.5. Parts of that discussion are also applicable on hides, but some aspects unique for hides will be discussed in this section.

**Choice of framework**

Because many hides are located in damp environments, the biggest issue to consider when choosing framework is how to maximize the lifespan. Important factors that influence this are ***ground conditions and water depth***.
On dry grounds, the most simple and cheap solution is to use a framework of wood standing on foundations of concrete. However, a hide placed in shallow water with a firm bed, a more suitable solution could be foundations of concrete pipes filled with concrete and reinforcement bars, which are hammered into the sea/lake bed. At greater water depth and less firm sea/lake beds, necessary foundations might have to be made of steel. Pipes or H-beams of steel are hammered into the sea/lake bed until they reach relatively solid ground.

**Dimensions on foundation poles**

The ***dimensions*** of foundation poles need to be thick enough to achieve a ***long lifespan***. The distances between poles depend on the expected load they are supposed to carry and the dimensions of the connecting joists. More closely situated foundation poles give a higher stability and smaller dimension of the connecting joists can be used. However, remember that the durability of joists is also influenced by their dimensions. To find out what dimensions to use on different parts you simply copy from similar buildings and talk to people with experiences

from similar projects. Larger and more complex buildings and especially buildings standing over deep water might require inputs from expertise within this area of knowledge.

**Stability**

Normally, stability is not a critical issue for a hide in the same way as for a bird tower, since most hides are built close to the ground. However, vibrations from walking on connecting footbridges can propagate to the hide and cause irritating and unwanted movements of binoculars and cameras. One way to avoid this is to build separated frameworks for hides and connecting footbridges. A gap between the two frameworks where they join ensure that no vibrations are propagated. Also, make sure the gap can be adjusted even if the frameworks will move independently as time goes.

***Advice:***

- Ground condition and water depth decides what construction that is the most suitable one for the actual hide.
- Make long life span high prioritized when deciding dimension of materials.
- Frameworks for hide and footbridges separated by small gaps minimize the problems of propagating vibrations.

## 6.6 Information

Advice on how different kinds of information can be presented and designed is discussed in chapter 8. This section discusses specific issues on possible ways to present information at hides.

**Way directions**

Clear directions on how to find the way to the hide should be available already at the parking place and along the current trail. Signs with way directions should also contain information about the remaining ***length*** of the walk and what ***accessibility*** the trail offers towards people with different functional disabilities. Indications on ***how many people that can visit*** the hide simultaneously can also be very helpful and are especially important for very large groups of visitors.

**Information about the nature**

Because a hide creates opportunities of close observations of birds, ***posters*** showing the most commonly occurring species are very informative and appreciated by most visitors. Many bird species in their breeding plumage are recognised relatively easy by many visitors. However, birds in their juvenile and eclipse plumages can be quite difficult to identify without any help. Therefore plates showing theses plumages are also highly appreciated.

*A sign board at a visitor centre showing where to find the different hides in the area and their accessibility.*

*Photos of commonly occurring bird species aid visitors to identify birds seen from the hide.*

**Notebook for observations of birds**

A box containing a ***notebook*** where visitors can note their observations of birds seen from the hide is useful and nice plus, it can be useful for next coming visitors. A sign encouraging visitors to note their observations could also contain information about the best way to do it and what to include (time of the day, distance, directions etc.).

***Advice:***

- Indicate distance, accessibility and how many persons that simultaneously can visit the hide.
- Posters put up in the hide with information that help visitors identify birds seen from the hide are very useful and appreciated.
- A device, such as a letterbox or similar, to keep a note book for visitors to write down their observations, should be arranged.

# 7 Trails

Trails are necessary and make an area accessible for most visitors. Besides facilitate access to the area, trails also have the function of canalizing visitors to certain areas and thereby minimize disturbance in sensitive areas. When designing trails, several aspects have to be considered. A good design gives accessibility also for people with functional disabilities as well as for elderly people and families with children. Thus, well-designed trails can help to create an attraction with a high number of visitors.

## 7.1 Placement and environmental consideration

Restrictions and concurrent possibilities when deciding design and localization of a trail is set by the nature. Efforts to allow the trail to follow the natural elevations and formation as much as possible, gives an interesting journey for visitors. Try to avoid slopes as much as possible, however in a terrain with lots of altitude differences, this can be impossible and slopes on the trail are unavoidable. Therefore, it is also important to realize that in certain places it might be difficult or even impossible to create accessibility for all visitors. One cannot create highest level of accessibility everywhere.

A trail with many long straight stretches will soon become boring for the visitors, in contrast to a trail that twist back and forth in the terrain, allowing for new impressions all the time. Strategically placed benches and tables along the trail, allowing visitors to rest and eat, increase the attraction and joy by walking on designated trails. Actually, most people stick to the trail most of the time and seldom leave it, a pattern that most likely are reinforced by a well-designed trail. This then has the effect of steering people to certain designated areas, while leaving other areas more or less undisturbed, which can be important if there are values that are sensitive to disturbance.

One important aspect to think of when designing a trail is that visitors should experience a feeling of being in a relatively undisturbed and pristine nature area. Thus, trails and other constructed facilities in the area should be designed to minimize the intrusion caused, both momentarily and in the future. One factor to consider with this respect is the choice of material for the trail. A trail with grit and gravel could mean a larger intrusion on the nature compared to one in wood, which quite easily can be removed if wanted. Furthermore, on wet meadows and other moist places with a lot of surface water, a footpath with gravel can prevent water's natural flows and thereby causing not wanted permanent changes.

## 7.2 Design

Depending on the prevailing conditions, different designs of trails might be appropriate. On firm and steady grounds, a trail of grit and gravel might be the easiest and most simple one to build. In damp and other wet areas however, an elevated trail made in wood is often required, and these kinds of constructions most often require more frequent maintenance and replacement - wooden boards of poor condition are often slippery and hazardous. In this chapter, we will elucidate some aspects of available trail constructions.

*Trail on dry ground with surface of crushed stones. Cheap construction and low maintenance cost.*

*Trail on wet ground built of wood. Expensive to build and maintainence as well.*

**Grit and gravel**

In flat and dry areas, clearings of bushes and undergrowth might be enough to produce a suitable trail. When high numbers of visitors are expected, which might produce extensive wear on the trail, reinforcement of the trail is often necessary. A layer of grit and gravel on the top of the trail gives a dry surface and withstand wear well. Furthermore, a tiny sideward slope of the trail facilitates water run off which help in keeping the trail surface in good condition. To achieve a smooth and flat surface of grit and gravel, a size gradient of the material with the more coarse material (0-18 mm or 0-10 mm) in the bottom is overlaid with finer material on the top. To create a real smooth and flat surface, a top layer of even finer material (0-4 mm) can be used.

Grit and gravel can be used also on moderately wet and moist areas but only in combination with a geotextile that underlies the gravel. The function of the geotextile is to keep the gravel on top and prevent a mixture with the moist soil below.

A trail of grit and gravel requires quite large transport effort of material, which means that precautions have to be made to avoid damages caused by these transports.

Several advantages are associated with trails of grit and gravel. One of the most important is the relatively low maintenance required, which means low costs of keeping the trail in good condition. A second advantage is that it creates a more or less slippery free trail. However, one disadvantage is that the edges of a trail of gravel might not be as well packed as the rest of the trail surface. This could mean a risk of overturning for wheelchairs, zimmer frames and prams if the wheels happen to come outside the edges. This can be avoided by equipping the trail with a stop edge, such as a board on both sides of the trail.

**Wood**

Trails constructed of wood are most often built directly on the ground or elevated on poles driven into the ground. The life expectancy of these kinds of constructions is often a problem and considerably shorter compared to trails of gravels.

Wet leaves and cold frosty weather often makes trails of wood dangerously slippery and during certain conditions, it is enough if the trail become wet for this to happen. One way to handle this problem is to build the trail with the boards placed at right angel towards the walking direction, which create a surface pattern that minimize the risk to slip. Other countermeasures could be to place a metal net or to make a milled pattern on the boards. If metal net are placed on the trail, make sure to choose a net that withstand wear and tear well to avoid creating protruding sharp edges from the net, which increase the risk of injuries.

*Net of metal on the trail to prevent accidents when it is slippery*

*Trail built of planks with tracks on upper side. Gives a less slippery surface.*

**Passages**

Along the direction of the trail, different kinds of obstacles appear, such as ditches, fences and stonewalls, that must be passed. Several different passage constructions exist but some are associated with a cost of reduced accessibility to certain groups of visitors. All passage over a fence results in lower accessibility, especially for wheelchairs, zimmer frames and prams.

*Robust passage over a fence.*

*Cattle grid combined with a gate that can be opened.*

A fence can be passed either through or over it. Remember that the construction of the passage must be done in such a way that the original purpose of the fence is maintained, i.e. make sure that the passage only works for visitors, not for animals. Some animals can also show an unexpected capacity to pass different obstacles. Protruding parts of the passage are vulnerable parts of the passage since animals often use these parts as scratching devices, which puts extra requirements on the construction.

A simple passage of boards is easy to build and for visitors to utilize, but comes at the cost of lower accessibility. A ramp is more complex to build but the accessibility becomes much higher with such a construction. The slope of a ramp should not exceed 1:12 (preferably 1:20). Similarly, after every 50 cm of elevation it should have a two meter flat resting surfaces with a width of at least 1,2 m. To prevent animals to use the ramp, it should be equipped with a gate or a cattle grid (färist in Swedish).

Similarly, a cattle grid also effectively prevents animals from using an opening in a fence. The bars can be made of either metal pipes or wood. However, this kind of construction lowers the accessibility for prams, zimmer frames or people with crutches.

*Self-closing gate. Very good when it is cattle on one side of the fence.*

*Bridge of round wood with nice design.*

An alternative is to put up a self-closing gate, either alone or as a complement to a floor of bars. Gates in general are good, but visitors all too often forget to close them after passing. A self closing mechanism is therefore needed, which could be achieved by a leaning gate pole complemented by a spring that effectively closes the gate. A fence with the purpose of enclosing animals on one side only, does not need a locking device on a gate if it is opened inwards towards the enclosure. The width of the gate should be at least 90 cm.

A more simple passage through a fence is a V passage. If the requirement of accessibility is not high, such a solution can be used with advantage. However, to prevent animals from using the passage it needs to be tight enough to also stop calves and sheep's from passing.

A bridge can be built to pass ditches and small streams. To prevent accidents by sliding or falling of the bridge, it needs to be equipped with some kind of protection at the edges. A bridge on very low elevation, where the risk and consequences of falling of is very small, might only require a simple slide protection on the edges. A bridge on higher elevation often requires proper railings to prevent accidents. The bridge should be as flat as possible, to minimize the risk of accidents due to slipperiness. At both ends of the bridge where the trail connect, quite substantial wear can appear, which in the long run often develop to deep cavities in front of the bridge. Such cavities effectively prevent wheelchairs, prams and zimmer frames to use the bridge and the following trail. Therefore, bridges might require extra maintenance and care to prevent this.

## 7.3 Accessibility

To provide maximum accessibility to an area by constructing a trail, several aspects of the design need to be considered. More detailed information about this than provided here, can be found at local and national authorities. See references (1) and (2) in chapter 11.1.

A good rule of thumb when designing a trail is to ensure a width of at least 1,3 m. Strategically located expansions of the trail allows meeting visitors to pass each other and further increase the accessibility. A width of 1,6 m will allow a wheelchair with an accompanying person to travel beside each other, but still strategically located expansions of the trail is needed for wheelchairs to pass each other. A width of 2 m allows 2 wheelchairs to pass each other without the need of expansions of the trail. Of course, shorter stretches might be narrower due to natural occurring obstacles or bridges.

The inclination of the trail affects accessibility and should not exceed 1:50. Of course, parts of the trail might possess slopes with a higher inclination, but to allow people bound to wheelchairs to use the trail the inclination of these slopes should not exceed 1:20 (1:12 can be accepted on very short sections if unavoidable). Furthermore, every 50 cm increase in elevation requires a 2 m long flat section for resting and recovery. It is very important that the standard of the trail are similar all over, to prevent for example a visitor in wheelchair to be trapped somewhere on the trail with a difficult passage! It has happened.....

The importance of tables and benches along the trail should not be underestimated! Many visitors capacity of walking even short to moderate distances are limited. Much of their comfort and pleasure from the visit might be settled by their utilization of tables and benches along the trail. More about this will follow in chapter 9.2.

**People with visual handicaps**

Cases where special considerations towards people with visual handicaps has been taken when designing trails, are relatively scarce. However, a few good exceptions exist, which shows that such concerns do not need to be very complicated. For example, facilitating for people who uses a blind stick to sense their way can be done by distinct edges of the trail. Similarly, a contrasting string of small stones along a path or a rope on poles along the trail can help guiding visually impaired visitors. Signs with information about distance and other vital information written in Braille, further assist these groups when visiting the area.

*With a rope to follow with the hand a blind person can walk this trail independent.*

*A surface with different colour makes it easier for a person with impaired vision to use the trail.*

**Beaches and sandy places**

On places with lots of sand such as beaches, it is often difficult to walk, not to mention when pushing a pram or a wheelchairs on such surfaces. Thus, one important function of a trail in sandy areas is to facilitate walking for most groups of visitors. Often trails in sandy areas are made of either wood, concrete, asphalt or iron bars. Sometimes the trail extends along water's edge and then precautions have to be made in order to avoid it from being flushed away by waves and tide. In addition, if there is a risk of ice damaging the construction during wintertime, vulnerable parts should be constructed in a way that makes them removable. In Denmark, several good examples of trails in sandy areas exist.

## 7.4 Maintenance

Regular maintenance of a trail is needed in order to keep it in good condition. All too often the result of neglected maintenance of a trail can be found, such as broken footbridges or overgrown vegetation. Many trails are mostly being used during summertime, which puts extra demands on maintenance during this time of the year. Unfortunately, this also collide with times when available maintenance personnel often are scarce due to vacations.

*Regular maintenence is important. Not easy to pass this hole with a wheelchair.*

*Trail over wet bog. It has started to rot and becomeing dangerous. Time to rebuild.*

Trails located close to vegetation, such as trees, bushes, grass and flowers often require regular clearances to keep the trail in good condition. Overhanging vegetation lowers the accessibility and cause nuisance to visitors during wet and rainy weather conditions. It also prevents the sun to dry the trail between periods of rain, which in the end could create a more permanent damp and moist environment. Nettles and thorny bushes are especially important to clear regularly, since they greatly decrease the popularity of the trail. Not to often the estimated efforts of maintenance required to keep a trail in good condition is underestimated, which cause irritation for visitors and sometimes lead to angry letters to the editor of the local newspaper.

Trails built in wood need to be regularly checked for rot, and if necessary be treated with some kind of environmentally friendly oil to prevent rot and thereby prolong the lifespan. Trails with gravel on top might need to be flattened out now and then, to avoid development of deep cavities and potholes that collect water and hinder people in a wheelchair to use the trail.

Regular and frequent surveillance of trail condition needs to be carried out to avoid accidents or nuisance for visitors.

***Advice:***

- Carefully define which groups of visitors that might use the trail.
- Construct the trail with highest possible quality.
- Plan both surveillance and the necessary maintenance of the trail.

# 8 Sign stands and information

In natural areas where visitors are directed, it is important to provide them with information. The information can be presented on large sign stands with extensive information about the area or on several smaller signs with more specific and detailed information along a trail. The information is how people find their way from the main road to the actual area is one of the most important and should be designed to avoid any risk of misunderstandings. Similarly, at parking lots and along trails, information about directions and distances is very important.

All information needs to be clear and presented in a uniform way. The occurrence of signs of different kinds and designs in the same area makes it difficult to find out what is the most important information.

*Big sign stand with good design.*

*Here it is easy to find the way to the tower.*

## 8.1 Road signs

To put up a sign by the main road, containing directions and distances, permission from the authorities concerned is needed. These signs are important to show visitors the best way to the area. The content should be carefully designed to avoid the risk of misunderstanding. Should I turn right here?

## 8.2 Sign stands

Areas that attract a high number of visitors often require extensive information on large sign stands. The information presented should contain interesting places to visit, regulations in the area, maps and other interesting information about the area.

**Content of sign stands**

It is important to keep the text as short and simple as possible and to avoid complicated terms. Too much text often results in signs never being read, or only read by a fraction of all visitors. Especially families with children seldom have the time and patience to read a longer text. The font should be chosen to maximize readability.

Before the text is written, it is important to decide to whom the text should be directed to. Is it for children, biologist or persons with a normal interest of nature? *All too often, the ambition level when writing an information text is too high, resulting in a piece of information that seldom is read*. The text should focus on information the readers most likely remember.

Illustrations make the signs more interesting and appealing for readers. An appropriate level of humour in the sign is also important. Often, a clear and easy understandable map of the area covers the most central part of the sign. Information about available toilets, resting facilities, distances and accessibility should also be found on the sign. Do I have the energy to walk to the next bench?

The need of presenting the information in different languages has to be evaluated. Areas frequently visited by foreigners might require information in English and perhaps also in German. Different ways of presenting identical information in several languages exist. One way is to make separate signs for each language or to write

separate textboxes on the same sign. A third alternative is to switch between the different languages within the same textbox.

As mentioned earlier, the problem with long information texts will become even more prominent when presenting it in additional languages.

Several different ways to produce signs exist, often with associated variations in costs. Factors such as life expectancy, maintenance required, exposure to sunshine, risk of destruction etc of the sign needs to be considered when choosing between available alternatives.

**Design**

The readability of a sign partly depends on its height above the ground. It is not uncommon to find sign stands with its centre 150-160 cm above the ground, which shorter people and children as well as people bound to wheelchairs, can find difficult to read. Most people, even very tall ones, can easily read a sign with its centre placed approximately 120 cm above the ground. Furthermore, signs should be designed in a landscape format to avoid parts of the sign being places too high or low. A sign leaning towards the reader further increase the readability, which could be necessary if a sign for some reason needs to be placed high above the ground.

Placement of a sign in a horizontal position above the ground increases readability. However, several disadvantages using signs with this position exist, such as the collection of dirt, litter, snow and frost, which all decrease readability. In addition, if placed in the shadow, such placed signs often become suitable surfaces for algae to proliferate on.

Signs should be fastened on a flat surface, either directly on the board or in a frame on the sign stand. Usually a removable strip on the edges pin the sign towards the surface. If the material of the sign doesn't allow holes to be drilled, this method is especially suitable. This also avoids potential problems caused by water penetrating the material through holes, and mechanical damages of the sign from the screw. Allow as little free space on the sign stand as possible, since this often tends to be filled with other, perhaps not wanted, notices put up by people.

A simple roof above the sign stand protects it from rain and bad weather, which also greatly increase the lifespan. A flat roof that is tilted backwards prevents raindrops from the roof edge to fall on visitors. However, some people might find a traditional angled roof with a tilt towards both sides as being more attractive. Many alternative designs of roofs exist and care should be taken when choosing material to make sure it blends in to the surroundings. Perhaps a traditional local roof design can be used? A roof design that minimizes the future maintenance is to prefer, but remember that a large roof is more vulnerable for strong winds.

A firm attachment of the sign stand into the ground is crucial, which also greatly increase the life span of the construction. Wooden poles put into the ground are continuously exposed to damp conditions. Probably only

*Foundation of a sign stand. A long lasting construction of concrete, but design could maybe be better?*


*Bad maintenence. Leafs and alga on the sign gives a bad impression. During the winter snow covers the information.*

impregnated poles and oak poles of good quality have a reasonable life span during such conditions. Metal poles can be hammered or dug directly into the ground and avoids the problem with rot damages. A plinth of concrete in the ground with a metal holder above the ground in which a pole of wood or metal can be fitted gives both a more firm attachment and greatly increases lifespan. The plinth mould should be dug into the ground completely and thereby avoid the look of to much concrete above ground. For very large sign stands, additional support might be needed in form of wires.

Smaller signs and way directions are often appreciated by visitors and sometimes also by grazing animals (cows and sheep's), although not for the same purposes! Animals often find these signs as perfect scratching devices and it is not unusual that they use them frequently for this purpose until they break or fall to the ground. In such cases, one needs to make a stable construction and firmly attach it to the ground to this extra strain.

**Maintenance and care**

Normally, sign stands require relatively low levels of maintenance and care. A good finish on the surface of parts exposed to wear and tear is most often enough to keep them in good condition. More important is regular and frequent maintenance of the signs and that they are replaced whenever they are bleached or have become dirty. Unfortunately, it is not unusual to find signs in very bad condition and more or less impossible to read!

**The ground**

Maintenance around sign stands are needed in order to keep the surface relatively flat helps people with functional disabilities to access and read from the signs. A layer of gravel on the ground further keep the ground dry and minimize the risk of standing water and mud to appear.

**Pamphlets**

A sign stand normally contains most of the information a visitor need during the stay. However, too much information during a short time is difficult for most people to absorb and much is forgotten already after leaving the sign stand. A mental picture of a map covering the area can be quite useful during the visit, but also this can be hard to remember. The possibilities for visitors to bring pamphlets offered to them, containing all or a summery of the information, including a map of the area, greatly help to keep visitors updated all through their visit. The pamphlets can either be available in a box directly on the sign stand or from a box placed separately. For either alternative, make sure it is protected from rain and bad weather.

**Placement**

The sun bleaches all colours which can result in unreadable signs already after a couple of years if exposed to direct sunlight. Thus, the lifespan of a sign increases if it is placed in the shadow and facing north, which sometimes result in a position that at first do not appears to be logical. If the sign stands is positioned at some distance from cars, the disturbance when reading is reduced and the risk for accidents to happen when for example children runs around is minimized. Sometimes, large sign stands might dominate the view more than expected. This can be reduced by placing it in close vicinity to a stand of bushes, a small slope or similar.

*Small and sturdy sign stand with detailed information along the the trail.*


*Signpost with a map on. Indicate direction, distance and gives a feeling of security.*

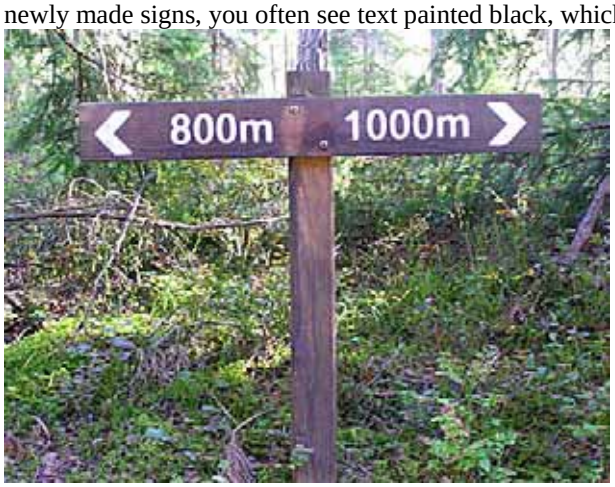
## 8.3 Smaller sign stands

As mentioned above, too much information presented at one single occasion is often hard to remember. Distributing the information on several smaller signs out in the area and in close vicinity to something interesting makes it easier to remember. This approach however, might require more maintenance but it could be done simultaneously as the regular maintenance of trails is being done.

## 8.4 Signposts

Clear and frequent signs showing directions and distances create a feeling of security for visitors, which is important and affect most visitors in a positive way by allowing a more pleasant experience from their visit.

Simple signs of wood with milled text about directions and distances are most commonly used for this purpose. Often the text is painted with a colour to increase readability by making it stand out from the background. On newly made signs, you often see text painted black, which initially contrasts well against the light background.




*Signpost telling how far there is to walk.*

*Cattle has pushed the signs down. Wich way is back to the parking place?*

However, as the sign gets older it also gets darker which reduces the contrast and therefore a white text might be a better choice in the end.

The shape of the sign also needs to be considered and mostly a sign with a more rough and natural shape is experienced as more pleasant compared to signs with straight edges. Remember that signs might attract the interest of both wild and domesticated animals, which could involve them being used as scratching device or similar. Stable and firmly attached constructions are therefore needed, since signs lying on the ground do not fulfil their purpose especially well!

**Trail markings**

As stressed above, the importance of frequent signposts cannot be underestimated. People walking along a trail should not experience any doubt about directions. Markings to show directions can be in form of paint on poles, rocks or trees. With such markings, consider that certain colour combinations can be difficult to detect for people with colour-blindness. Colour combinations of red/green, orange/brown and blue/green should thus be avoided. For example, an orange marking on a brown tree trunk can be very hard for some people to see. Signs with information about distances help to increase the safety feeling for visitors.

***Advice:***

- Analyze and define the total information need in the area.
- Limit the amount of text and write in an easy and understandable way.
- Plan the estimated maintenance and care.

# 9 Other service-functions

Besides such obvious things as well done nature-trails and bird towers, there are some other important service-functions that will be listed in this chapter.

## 9.1 Parking

Experience show that a well organised car park for functionally disabled people is very appreciated. This can increase the number of people visiting the facility.

If the car park is too small, or the maintenance insufficient to keep a good standard, this alone can be a reason for people to choose another place to visit. Thus, frequent and regular maintenance of the car park areas, to avoid accumulation of weeds and the origin of potholes in the ground, is very important.

**Placement**

Parking places for functionally disabled people should be located as close to the facility as possible to reduce any necessary transports, and thereby improve both function and safety. An alternative is to make a separate car park especially designated for people with functional disabilities closer to the facility.

**The number of parking lots**

It can be difficult to estimate in advance how many visitors a new facility will receive. The number of parking-lots estimated must cover the needs also during high season! To avoid disorder and achieve a more sufficient use of the car park, marking of each individual parking lot could be done.

The number of parking lots designated for functionally disabled people should at least be five percent or a minimum of two. It is important to make it clear where and how large, each parking lot for handicapped is. Put up easy-to-read signs with a handicap-symbol. It could also be of interest to have special designated parking lots for buses, which often require a lot of space both for parking and manoeuvring.

**Size**

All parking lots must be big enough to offer room to manoeuvre a vehicle without any problems. A parking lot for a normal car is 2.5 meters wide and 5 meters long. To give enough manoeuvre space in and out from the parking lot requires at least 6 meters of free space behind the parking lot. If the parking lot is 2.3 meters wide the free space behind it must be extended to at least 7 metres.

People with functional disabilities often require more space to get in and out from their vehicles. Some handicap vehicles are equipped with a lift that expands on the side. Therefore it is important to prevent other cars from parking to close to this kind of vehicles. The width of parking lots for handicapped depends on their location. Placed next to each other they require a minimum width of 3.6 meters. Single parking lots require at least 5 meters of width. The length of the parking lot should be the same as for other parking lots, 5 meters.

*Sign shower disabled where to find the parking-place.*

*Sign showing where the parking lot is.*

The size of a parking lot for buses needs to be at least 4 meters wide and 16.5 meters long. For safety reasons, the localization of bus parking lots should be in an area with no or very little other traffic exists.

**Surface**

Areas for parking needs to be well drained and with a good surface to prevent muddy areas to appear, in which both light and heavy vehicles can cause deep trails. A slight leaning (maximum of 1:50) of the ground enables rainwater to run off quickly. For people with functional disabilities, it is necessary that the surface is firm and flat, therefore regular maintenance is important, especially on surfaces with gravel. Otherwise they soon develop potholes and deep tracks from cars, which are annoying and a safety risk for many people.

***Advice:***

- Remember to include parking lots especially designated for people with functional disabilities.
- Make sure enough parking lots are created.

## 9.2 Benches and tables

It is important to place benches and tables strategically in connection to parking lots, viewpoints, rest areas and nature trails. A nice place to sit and relax can greatly enhance the value of the visit, especially for people with limited capacity to walk longer distances. Some visitors might spend as much as ninety percent of their visit sitting on a bench in the area.

Benches with associated tables should be placed in areas most suitable for longer brakes and picnics.

**Placement**

The placement of a bench is conclusive for its attraction level. A carefully picked area with benches to sit down and relax, perhaps with the company of a cup of coffee, can be a resort that will be used and appreciated by many visitors.

Things to have in mind concerning placement of benches. Comfort is composed by many things and there is no single solution suitable everywhere. Factors influencing comfort could be privacy, a good view, protection from wind and possibility to sit in the sun for example. However, some of these factors require individual solutions that sometimes might result in opposing effect on the comfort. For example, vegetation in form of shrubs effectively shields from the wind but they might also attract mosquitoes and other insects that negatively affect the comfort of visitors. One way to find the most optimal places for benches is to wander around in the area and question yourself where you would prefer to sit down and relax.

Benches and tables in vicinity of parking places should be located at some distance from the car park for safety- and comfort reasons.

**Distance**

The distance between available benches is based upon what target groups the facility are directed towards. If the target group is mainly old people or persons with a functional disability, the possibility to sit down and relax at regular intervals during the walk is of great importance. A high level of accessibility in the area with this respect, demands distances on average no longer than 100 meters between available benches. When the level of accessibility is lower the maximum distance should not exceed 250 meters.

On a nature trail with low level of accessibility, benches are placed strategically along the trail. In these cases, the numbers of suitable places determine the distances between available benches. However, don’t underestimate the need for benches!

**Design**

Benches and tables can either be anchored or moveable. If they are easy to move it is likely that they will be moved around a lot, which could cause problems. If moved to a less suitable place, it can be difficult for the next coming visitor to move it back. Tables designed as in the left picture, have in some cases been moved and placed next to each other, which means that it can be very difficult for a person with functional disabilities to use them.

*Bench adapted to persons with imobility impairment.*

*A simple bench made of oak planks. Not highest level of accessibility, but often enough.*

*Standing directly on the ground. Starting to rot after just a few years.*

These problems are minimized if tables and benches are heavily built, but on the other side such furniture might require some kind of vehicle to get into place.

A rustic design for benches and tables in a nature area often feels correct and nice. Tables and benches made of logs and thick boards (more than 7 centimetres) gives a pleasant impression, but theses kinds of furniture often becomes very heavy. Sometimes it can be enough to use a thick board or a split log as a seat, which can be placed either on a log on the ground or be anchored to the ground.

The height of a bench plays a decisive role for its comfort and this height varies depending on the length of individuals. A standard height of 45 cm is often used, which for some people with functional disabilities is rather low, and a measure of 50 cm can therefore be recommended. Too high benches might negatively affect blood circulation for some people!

For a bench to have high accessibility requires that it is equipped with back support and armrest. The seat should not be leaning backwards and the arm rest height should not exceed 70 cm above the ground. Combined benches and tables should at their short end have a seat- and table surface with at least 60 cm of overhang in relation to the legs of the table. This allows people in wheelchairs as well as other people with functional disabilities to use these kinds of tables and benches.

**The surface of the ground**

If many people use the bench the ground underneath it will be worn, especially if placed on a surface of grass, which often gets muddy after rain. Gravel as the surface under benches and tables is therefore preferred. However, sometimes it is not possible to transport the necessary gravel, and a grass surface or similar might be the only option. Benches and tables made of wood and standing on the ground should be placed on as dry ground as possible to avoid rot damages. A proper bed of stones will increase the lifespan, but make sure it doesn't elevate the construction. Make it possible to put wheelchairs and such around tables by preparing a suitable surface and make sure wheelchairs by the table do not block the nature trail.

**Lifetime and choice of material**

The lifetime of rock and concrete is long, but a bench made in this material will be very cold and not very comfortable. It can however be used as a foundation for a seat made out of wood. Apart from natural rocks, this material fits badly in the wild and that's one reason why wood is most commonly used. The wood material used in benches and tables needs to be of good quality. Resistance against rot-damages is important as well as placement on dry grounds on which sunlight can reach to dry up frequently. Oak of good quality and slowly grown pine is recommended material that exhibit good resistance against rot-damages. Good maintenance of furniture in these materials can result in a lifespan up to twenty years. Bad maintenance however, often greatly reduces the lifespan to only a few years. See chapter 6.3.

**Maintenance and care**

To increase the lifespan, wood has to be treated with a suitable oil once a year or every second year. Remember to give all surfaces this treatment, and special care has to be taken on horizontal parts and parts where moisture stays for long.

Tables and benches that are not needed for longer periods of the year, do much better if they are being stored elsewhere in a dry place, which also greatly increase their lifespan.

Regular and frequent maintenance is important to discover damages and do necessary repairs. If damages are detected, replace the damaged part or the entire construction before an accident occurs.

***Advice:***

- Think through how many benches and tables you need.
- Look for suitable places.
- Use good quality material in tables and benches and make sure of frequent maintenance.

## 9.3 Toilets

Toilets in existing facilities are often of low priority and therefore often need improvements. The standard of the toilets can be decisive for the impression of an entire facility. Our quality requirements of clean and good toilets steadily increase and improving the standard of toilets can greatly increase the attraction level of the whole facility. ***Therefore, a general request exists to spend more resources to upgrade the standard of available toilets!***

**Placement**

The toilet is often placed where it is possible to access it with some kind of transport. Often toilets are concealed and therefore require proper signs with directions in order for people to find them.

**Design**

The inside of the toilet must be designed to allow for easy maintenance. Smooth surfaces with few chinks are easy to clean and minimize the number of hiding possibilities for spiders, which are not always appreciated by visitors. Windows and white surfaces are important since they lighten up the toilet. The disadvantage with light areas is that they are more attractive for scribbles. To build toilets with high accessibility also for people with functional disabilities, many different requirements need to be fulfilled. See refrence (1) in chapter 11.1. The external design of the toilets can with advantage be adapted to fit any local building traditions.

**Technique**

Usually there is no or very little availability of pipes for water and sewage in the nature. That's why dry-toilets or some kind of compost toilets are often used. The expected number of people visiting the toilet and available ways of emptying it is decisive for what kind of toilet to build. In some facilities sludging is a good alternative, in others the waste needs to be carried away.

Today techniques exist which can reduce the amount of waste that arise. The odour of the waste can be reduced with systems that separate urine and support evaporation, which also reduce the weight of the remaining waste.

*Attractive design with roof of reed.*

*Traditional design.*

**Management**

Regardless of the standard of the toilet, it is important how it is managed. Frequent and regular maintenance has to work properly to make sure the toilet is clean and that it doesn't run out of toilet paper. A visitor should never be put in a situation where the toilet paper runs out. Also, one has to check that the toilets are emptied when needed to prevent them to become overfilled.

*Big containers. Need to be emptied every fifth year?*

***Advice:***

- Construct fresh toilets.
- Fulfil the demands of good accessibility.
- Prioritize supervision and cleaning of the toilets.

## 9.4 Management of waste

Littering spoils much of the nice feeling of being in the nature and can at certain places become a problem. To prevent further littering, frequent and regular cleaning of litter from the ground is needed. Once litter starts to collect in the surroundings, the problem often increases quickly. The access to trash cans do not always solve the problem. Most visitors bring their litter back home if trash cans are missing, but this differs between countries. Make sure to always look after the trash cans available on the facility.

*Simple trash can with plastic bag inside.*

**Placement**

The trash cans are often placed by the car park where they are easily emptied. This also offers the visitors to get rid of their litter before they leave. Trash cans close to parking places and roads sometimes tend to be used by others than visitors in the area, which quickly can result in full trash cans. At certain places, such as resting places and barbecue areas, more litter is generated, which often motivate trash cans in their vicinity. Lately, the so called single use outdoor grill has become very popular, and they are sometimes thrown in the trash can before the fire has been put out completely. This in turn can cause a fire and for this reason, trash cans of thin sheet metal can be motivated.

**Design**

The way trash cans are designed depends on several factors, such as how the litter should be collected (in plastic bags or containers), and how to open the trash can for emptying it. It is also important to have a stable construction that tolerates both strong wind and the interest from animals. It is always nice if the supporting structure of the trash can is made of some kind of nature-material, especially if the vessel consists of sheet metal or plastic. Many trash cans in one place can be stored in a small building to conceal them. In some areas the vessels needs special adaptations to prevent animals from reaching the trash.

**Maintenance and care**

Trash cans and their surrounding areas must be managed properly to keep it tidy and clean. If not enough resources exist to empty available trash cans often enough, it might be better not to have a trash can at all.

**Sorting**

In places where a lot of trash is generated, the opportunity for visitors to sort their garbage and thereby allow a higher level of recycling might be appropriate. The extent of the recycling depends on local conditions and should be restricted to perhaps only a few fractions. An extra trash can just for single use outdoor grills might be needed. To make the recycling as easy as possible, signs with text or pictures describing where to put the litter should be put up. If you are expecting a high number of visitors from other countries, signs with pictures are preferred.


*Collecting coloured glass. Text combined with symbols makes sorting easier.*

***Advice:***

- Think through where the biggest demands for trash cans exist.
- Organize opportunities for visitors recycling garbage.
- Organize supervision and emptying of the trash cans.

# 10 Realization of the construction

Next to planning and designing, which are the most important conditions for a successful installation, it is time for the realization of the installation. In this chapter we will discuss the process around implementation of the whole project. General concepts and praxis about how the building-process generally proceeds will be discussed. Even if there can be differences between countries, the main concept ought to be similar.
Practical instructions, useful relevant manuals and ideas will be handed over to the hopefully competent and skilful construction-workers who will perform the buildings.

## 10.1 Turning to a constructor

**Using own resources or involving a construction-contractor for building**

First you have to decide whether the construction is to be built with internal recourses or by a constructor. Simple installations are often initiated by non-profit organisations and the intention is to use their own resources also during the building process. The most important thing is to have access to ***competent resources*** with knowledge about how the construction should be built. If this is not fulfilled, the purpose in making the building your self can be spoiled. Mistakes done might force you to hire craftsmen later and the final price for the construction end up far higher than first expected. Lack of knowledge can also result in a construction with a short lifespan. Lack of internal necessary competences should thus result in hiring of craftsmen for the most complicated parts. After that, the non-profit organisation can stand for the supplementary work in order to cut costs.

When it comes to larger and more complicated constructions it is most suitable to turn to a construction-contractor from the beginning. There you find the right competence and the resources to do the job in a fairly short time. The access to machines and different technical aids also provides for a higher quality. Another benefit is that the construction-contractor often can get lower prices for material witch contributes to a lower final cost. It is preferable to choose a constructor that lets you decide when the work should be done. Try to avoid periods that can be unsuitable due to local conditions, for example winter-time. If you are forced to shovel snow and defrost the ground during the building process, the final price of the construction will increase.

**The basis for inquiry to invite tenders and type of contract**

If you are about to engage a construction-company, a basis for inquiry to invite tenders is needed. Such documents generally contain three different parts. First the administrative directions in which the conditions around the implementation of the construction are described. Then a document describing the desired construction techniques and materials, and then the final part containing all necessary plans and drawings to describe the design. How complex these documents needs to be depends on the complexity and size of the construction, but also on what type of contract you choose.

If you choose an ***all-in contract*** you only need to describe the function of the construction and its main appearance. You don’t need to present any detailed solutions or any constructive design since this is included in the undertaking of the constructor. This reduces the work with plans and descriptions of the building and also gives the construction-contractor freedom to choose what they think is the best solution. This can both be positive and negative for the project, the contractor can choose cheep solutions witch lower the price but at the same time it only gives limited opportunities to the project owner to influence the construction.
Put in other words, an all-in contract gives the constructive-contractor the responsibility for function within the frames given by the project owner. However, a common misunderstanding with this kind of contract is that everything necessary for the construction is included, which is wrong. Only desired functions specified beforehand by the project owner will be included.

A second kind of contract-form is a ***general contract*** which means, just like in all-in contracts that the construction-contractor is responsible for all the parts in the construction, but only if they are shown in plans and construction documents. Constructions, dimensions and selection of material, therefore have to be carefully specified in the documents forming the basis for inquiry. To put it simply, you get what you ask for and nothing more. A general contract can be a suitable contract-form if you want to have a larger influence on the constructions details, but it also means a higher cost due to the making of all the necessary construction documents. Also, the contractor might have some other rational solutions that you don’t get the benefit of by this contract form.

**Quotation and evaluation**

To find the best offer possible and the lowest price, ***inquiries for quotations*** should be sent out to at least three different independent construction-companies. Quotation inquiry can either be sent to selected construction-companies or be advertised in the local paper. For large projects, advertising can even be a requirement from EU. Make sure that the construction-companies get enough time to calculate and design their quotation. Depending on the extent of the project, a normal time for construction companies to put together their offers is three to six weeks.

After receiving all expected quotations they need to be evaluated and ranked. Start with reading each quotation carefully and make sure they comprise what you asked for. Then valuation and comparison of different parts within each quotation needs to be done. Important is to try not to focus exclusively on the price but also including performance, quality and competence of the different quotations. A good complement to the evaluation process could be to ask about references from others, involved with the different construction companies asked for offers. The highest ranked quotation then forms the basis when making and signing the final contract with the construction-contractor.

*Construction of this tower most definitely demanded a qualified construction-company.*

***Advice:***

- Make sure that the right competence is engaged in all elements of the construction.
- To avoid unnecessary costs, choose a suitable time of the year for realization of the planned construction.
- Make sure that the quotation inquiry describes the construction with its functions as you want it.
- Choose the contract-form that suites your project.
- Send the inquiry for quotation to at least three different construction-companies.
- Make sure that the offer/quotation contains all wanted parts of the desired construction.
- Sign a contract containing what is included and agreed about in the assignment.

## 10.2 Construction management

**Construction documents**

To perform the construction-work, you need valid construction documents. After a final review the inquiry documents can serve as construction document. However, it is not unusual that further viewpoints and complements appear later which can result in a revised document. When using complete contracts the contractor normally produces detailed documents after they have signed the final contract. These documents shall also be included in the construction documents when they have been approved. If construction documents are changed while the work is in progress it is important that construction documents are continually revised and updated and that always the latest version is being used.

**Construction supervision**

As contacts-person and representative for the project owner, you ought to appoint a construction leader. That can either be someone from the project organisation, who has knowledge of construction-processes, or someone externally engaged. The role of the construction leader is to be spokesman for the project owner but also to lead the construction towards the final goal.

**Control**

Phases of the work and material of great significance for the quality of the final construction should be controlled during the whole construction-process. It is therefore appropriate to establish a control plan, which lists all tasks in need of regular control. The control can then be performed by the constructor himself or by an external person. The most common way is to let the constructor do the control, this is called self assessment. The purpose with this control plan is to ensure that every important phase in the construction process is being performed in a correct way from the start.

**Construction costs**

Normally, the total price for building the whole construction is agreed upon when purchasing from the construction-contractor. As the building process progresses, the construction contractor normally invoice the project owner on a monthly basis. Besides the construction being agreed on, unforeseen circumstances might lead to that the project owner need additional work to be done by the construction contractor, which of course changes the final total cost. Similarly, other unforeseen circumstances might result in less work that needs to be done, which of course should lead to lower final costs. It is however important to make sure that there is a scope for additional costs in the budget.

***Advice:***

- Make sure that the most current construction documents are used.
- Appoint a build leader that supervise and lead the construction.
- Establish a control plan to make sure that the most important parts in the contract will be fulfilled.

## 10.3 Temporary constructions and transport

**Aids**

Since the constructions are often placed far away from other buildings you need to make sure that the work is possible with relatively limited aids. Often electricity is the limiting factor and a gasoline generator can be one solution. However, depending on the capacity of this generator it could limit the extent to use certain electrical machines and lightning.

Sometimes the surrounding terrain also limits the possibility to use certain machines, such as machines for carrying heavy construction-parts. Therefore it is preferred to avoid big and heavy merged parts if possible. If this can’t be avoided and there is scope for it in the budge, a helicopter could be an alternative.

**Transport**

Soft ground and an inaccessible construction-site can lead to large transport- and logistic problems. This should be considered during the design-stage and when choosing material. If you avoid overloading, tractor and other cross-country vehicles can be of good help. Another solution is to transport material during winter when land

and waters are frozen. Always make sure that the aids you use are in good condition and that they don't have any negative effect on the surrounding environment, for example through leakage of oils etcetera. Plan and solve the transport-problem in an early stage of the building process.

***Advice:***

- Consider that the possibility to use different kinds of aids for construction can be limited.
- Transports can be a big problem that needs to be considered early in the project.

## 10.4 Accomplishment

**Final inspection**

After completion of the contract a final inspection of the construction should be done, preferably by a ***professional inspector***. This inspector, also writes a protocol of the result from the inspection and after this protocol have been approved of the project owner the warranty period starts and formal responsibility is handed over to the project owner. The purpose of the final inspection is to ensure that the construction is properly done and in accordance with the latest valid version of the construction documents.

**Guarantee-commitment and follow-up**

Normally the construction-contractor should give a two year warranty period for the construction. This means that any damages or faults that arise within this period caused by insufficient work or bad material used by the construction contractor should be attended by the construction-contractor without any charges. This however does not include normal wear or vandalism. Damage and faults should be reported to the construction-contractor when they arise. After two years you make a warranty inspection to see how the construction works and too make sure no damages have arisen. In certain cases it is up to the owner of the real estate to call for a guarantee-inspection and if this is not done in time, one can no longer make the construction contractor responsible for faults and damages that arise on the construction.

***Advice:***

- Engage a professional inspector to perform the final inspection after completion of the contract.
- Make sure to call for a warranty inspection before the expiry date of the warranty.

# 11 References

## 11.1 Literature

1. Access to the forests for disabled people. *Skogsstyrelsen. Rapport 2/2005. Ylva Lundell*
PDF-file on www.svo.se/forlag/rapporter/1678.pdf

2. Outlines and standards. Accessibility for persons with disabilities to nature reserves. *Västra Götalandsregion & County Board of Västra Götaland.* PDF-file that will be available in english during spring 2006. Contact Mats Rosengren for information.

## 11.2 Contact persons

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# 12 Appendix

## 12.1 Checklist

### Checklist when constructing bird towers, hides, trails and information facilities.

**Programme phase**

| | |
|---|---|
| ❑ **Idea** | Explore alternatives. Discuss these with different interest groups. |
| ❑ **Requirement/purpose** | Define the needs and purpose with the construction. |
| ❑ **Organisation** | Establish an organisation for the project and involve different interest groups. |
| ❑ **Accessibility** | Investigate what is needed to give accessibility also to people with different kinds of functional disability. |
| ❑ **Transports** | Investigate the transport facilities of material and machines in the area. |
| ❑ **Location** | Investigate what is the best localisation with regard to expected function and environmental concerns. |
| ❑ **Economy** | Make a budget for the project. |
| ❑ **Time schedule** | Make a time schedule for each main element in the project. |
| ❑ **Landowners** | Contact affected landowner-s to discuss the prerequisites and circumstances of the project. |
| ❑ **Permits** | Check if there are any regulations in the chosen area and what permits that are needed for the project. |
| ❑ **Building permits** | Investigate if building permits is necessary. |

**Planning phase**

| | |
|---|---|
| ❑ **Planning** | Engage necessary competence needed for the planning process. |
| ❑ **Design** | Decide variables such as size, height and general architecture of the construction.<br>Design also to minimize the amount of maintenances needed. |
| ❑ **Accessibility** | Design to allow accessibility also for the chosen target group-s of people with functional disabilities. |
| ❑ **Security** | Check that level of security is enough. |
| ❑ **Material** | Decide material based on criteria's such as expected lifespan and environmental impact. |
| ❑ **Building documents** | Establish in what extent building documents are needed and at what level. |
| ❑ **Permits** | Apply for necessary permits (such as building permits). Follow up that all necessary permits are given. |

**Construction phase**

| | |
|---|---|
| ❑ **Construction competences** | Define what construction competences and resources that are needed. |
| ❑ **Inquiry documents** | Produce a file with documents relevant to the projects to invite tenders.<br>Always ask for tenders from at least three different entrepreneurs. |
| ❑ **Choice of entrepreneur** | Choose entrepreneur based on criteria such as price, competence, warranties etc. |
| ❑ **Control** | Establish what level of control is needed during the building process. |
| ❑ **Final inspection** | Perform a final inspection when the construction is finished to assure a proper performed job. |
| ❑ **Warranty** | Define what warranties are valid and control at the end of the warranty time. |

**Administration phase**

| | |
|---|---|
| ❑ **Organisation** | Define who's responsible for operation and maintenance of the construction. |
| ❑ **Maintenance plan** | Make a plan of the short- and long-term maintenances needed and at what time intervals. |

## 12.2 Examples of towers, hides, trails and sign stands

The following part of this report is a collection of experiences from different countries. A short description is followed by an evaluation of what is good and bad with it. There are always a lot of things to describe, but we have tried to restrict it to those things that provide more experiences to the report. Photos are very important to give an idea about how it looks like and what is good and bad. We have tried to get up to four photos to illistrate every object. Finally a contact person is mentioned. This is a person that knows about the object and that you can contact. In some cases more detailed questions will be forwarded to other persons that nows more about the object. Information about how to get in contact with them you will find in chapter 11.2 Contact persons.

# The tower on Fågeludden

Sweden, Lake Hornborga
County Bord of Västra Götaland




**General description**
This 15 meters high tower was built in 1965 to make it easier to investigate the birdlife. This was when the plans of a restoration of Lake Hornborga had started. Until the beginning of 1990th it was a pineforest around the tower, but it died when the water level in the lake was rised. It has a 25m$^2$ big room with windows and a platform on top. At the base of the tower is a room with benches, that gives shelter from wind and rain. Often used by school-clases. From the beginning it was mainly bird-watchers that used the tower, but by the time more and more of the visitors are common people.

**Good and bad**
From the tower it is a very good wiew over the lake, but it is today higher then necessary. It is well built, but yet it is problem with stability. The tower is shaking when people are walking in the stairs. Even though it is stabilised with wires.

Accessibility is not so good and there is problems with security. The rail around the platform is tight, wich gives good windshelter, but children can´t see anything. A small elevation in the middle of the platform is some help, but not enough. The windows in the floor below is possible to open and placed 114 centimeter over the floor – once again problem for children to see.

The stairs are dangerous – too big openings in the rail and between the steps. Far most dangerous in the tower is the rail around the stair on the top platform. It is easy to climb on and is used by children too make it possible for them see over the rail. It is 15 meters to the ground… This old tower will then be taken down.

**Contact person:** Mats Rosengren

# Haeska tower

Matsalu national park
Estland, West-Estonia

**General description**
This is a new tower made for bird watchers, tourists and schoolclasses. Made of round timber, very robust and with good stability. The stairs are 80 centimetrs broad and rails are 108 centimeters high. There is room for 10-15 persons on the platform and there is also a small platform half way up and a lot of benches to sit on. No shelter from wind and rain. The tower is well placed with ”support” from the trees.

Signs from road and beside the tower is information about suroundings on several languages. It is 100 meters from the parking place, with space for ten cars. There is a toilet with good accessibility.

**Good and bad**
A robust tower with a good design, looks atractive. Good with parking place and toilet close to the tower. From the tower it is problem with the sun, when looking towards the lake. Acceesibility for those that can use stairs, but they can be slippery. Openings in the rails are far to big and the rails also possible to climb on. Makes a big risk for accidents and therefor the tower is not so good for children.

**Contact person:** Marju Pajumets

# The tower at Alam-Pedja

Alam-Pedja Nature Reserve
Estonia




**General desciption**
This is a very unsusual tower situated at the edge of a big bog area. Built of round timber on a foundation of concrete. It gives a very ancient feeling. Inside it is light and pleasant. Totaly three levels high and the roof is made of wood chips in the traditional way. Big openings in the walls to look through, 90 centimeters over the floor. Information signs in the tower.

The Selli-Sillaotsa nature trail (1 km) pass by the tower. Trail both on wet and dry ground. Close to the parking place is information with map and a toilet. Along the trail is a lot of information on robust information stands.

**Good and bad**
The tower is well situated with support against the forest. The view is very good and the tower gives shelter against rain and wind.

The openings are big, but too low over the floor. There is a risk to fall down. The stairs are a little bit too steep and with to big openings in the rails to give good security. Accessibilty is limited by the nature trail to the tower (sometimes narrow and with soft surface) and the steep stairs in the tower.

**Contact person:** Robert Oetjen

# The tower at Odensåker

Lake Östen nature protection area
Sweden, Västergötland




**General description**
A tower, twelve metres high, that gives a good view over the southern parts of Lake Östen. The height of the tower gives you a possibility to watch over the reeds and observe water birds also at the open water surface further out in the lake. The tower was built in 1953 by local hunting associations to direct and give people the opportunity to observe the rich bird life. At the top of the tower there is an observation platform with a view of 270 degrees. Below the platform there is a sheltered place in case of bad weather. Here the windows can be opened. On the ground floor there is a room with beds for overnight visitors. The framework of the tower is made of round wooden poles standing in holds of concrete and with additional support by several wires.

Signs from public roads direct the way and visitors reach the tower after a walk of 1 km. The last part of the trail consists of a footbridge when crossing a marsh area.

**Good and bad**
The place of the tower at a grove makes it blend with the environment and gives a very good view of the lakes most interesting parts. It also shelter from the wind and protects from bad weather. The available sleeping accommodation is useful for persons that want to be there early in the morning.

Steep and slippery stairs constitute a large safety risk. The rails are easy to climb and have wide openings at high heights which make them very dangerous, especially for children. Neither the tower nor the trails are adjusted for disabled persons. In spite of supporting wires, vibrations are spread from people walking in the stairs, which makes it difficult to use a telescope.

**Contact person:** Mats Rosengren

# The tower at Öja

Lake Östen nature protection area
Sweden, Västergötland




**General description**
A relatively newly built tower from 2003, with a nice architecture and built with local materials. The tower is built on a hill and therefore the building height has been kept low but it still offers a good overview of the surrounding lake and marshes. On the ground floor there is enough space to give a good shelter at bad weather but also to get a good view because of sliding glass sections. There are also tables and benches for a nice picnic. On the roof there is a smaller platform for observations up in the air. A smaller table for books and coffee cups has been placed in the middle, to be reached easily. The tower is placed on an insulated foundation of concrete and has a frame of gluelams with a central pillar of steel. Larch is used as an outer material for the building. The roof has a waterproof layer of tarred board covered with reeds. The stair rests upon a separate framework.

From a parking lot for about ten cars, a trail of 300 metres through an enclosed pasture leads to the tower. To avoid damage from grazing cattle the tower is fenced-in.

**Good and bad**
The nice place for the tower with a lot of alternatives depending on weather and interest makes it a popular place to visit for a lot of categories of visitors. A very heavy framework makes the tower almost completely free of vibrations. Large windows with the possibility to open, give an opportunity to stand inside and use a telescope.

Bad construction of the sliding glass sections causes leakage of water during heavy rains. The view is partly destroyed by trees. The narrow stair makes it impossible for two persons to meet and can be too tight for a person who carries a lot of equipment. The trail leading to the tower is far too uneven to be used for a disabled person.

**Contact person:** Kenneth Franzén

# The tower at Hägna

Lake Östen nature protection area
Sweden, Västergötland




**General description**
The tower at Hägna was built in 1991 to get a view over the lakes outlet. The tower blends well with the woods in the background. It is about seven metres high and the framework is built by used telephone poles. The platform is large and easily holds a bigger group of visitors. A table and benches are available for a picnic. The rail is high and tight which gives a high degree of safety. At the floor below the platform is a smaller room with enough room for a few people to take shelter during bad weather. The windows can be opened and are attached with side hinges of regular standard. The stair of wood consists of three very steep sections, each equipped with rails with lots of open space within it. The problem with slippery steps is avoided by a steel net, with checked pattern. On the ground, close to the tower, is a picnic area with a table.

A 800 metres long hiking trail equipped with signposts lead to the tower, starting from a big parking lot at the information centre. Neither trail nor tower is adapted for disabled persons.

**Good or bad**
The tower has a nice and sheltered position along the stream and with a spacious platform that gives a good view. The sheltered space to use during bad weather conditions is good, even if it’s small. The platform rail is high with few openings, which is good but children have no possibility to get a view.

The tower is placed far away from open water surfaces of the lake, which makes it difficult to watch resting birds. In the morning the view can be restricted due to disturbing backlight. Vibrations are propagated when people are walking in stairs or at the platform. The place of benches and tables close to the rails constitute a possible risk for climbing children. The wide openings of the rails in the stairs constitute a serious safety risk.

**Contact person:** Mats Rosengren

# Siikalahti tower

Siikalahti nature reserve
Finland, South-East Karelia




**General description**
This is a big and robust tower, eight years old. Robust built of round timber and the tower is very stable. It is unpainted and don´t require so much maintenance. Two levels and seven meters high, the lower one gives rain shelter. Towards the south, but also towards west and east is good wiews over birdrich wetlands. One disadvantage is that main views is towards the sun in middle of the day.

On the top platform is a low elevation possible to stand on. It makes it possible to see over people in front. To make the rail safe around the elevation, there is an extra log on top of the rail. Information about birds on the rail.

A 900 meters long nature trail leads to the tower.

**Good and bad**
It is good with two levels. Gives shelter against rain and wind. Bird-watchers appreciate open air to make it possible to watch birds flying over the tower. It has good stability and is well adopted to the surroundings. The trail to the tower could be better with higher degree of accessibility. There are plans to rebuild the trail.

**Contact person:** Anne Pyykönen

# Keemu tower

Matsalu national park
Estonia, West-Estonia




**General description**
A ten years old tower built with a frame of steel and a superstructure of wood. It is six meters high and target groups are birdwatchers, tourists and schoolclasses.

After very steep stairs access to the superstructure is through an opening in the floor. It has four windows situated 80 centimeters over the floor and four benches. A stable tower that gives shelter against wind and rain.

Information about shore meadows, Matsalu bay and with a map over the region. Close to parking place and with a good toilet. A new and very good wind shelter just beside the tower.

**Good and bad**
Good view over Matsalu bay and no problems with the sun. Hard to open the windows. They are small and situated low, wich gives problem with security and problem to see when standing up. Stairs are very steep and the tower is not well adopted to the surroundings.

Wind shelter, toilet and information stands are new and well designed.

**Contact person:** Marju Pajumets

# The tower at Sakiai

Novaraistis ornitological reserve
Litauen, Marijampole

**General description**
A light and relative cheap tower built of steel parts from an old fire watching tower. Stairs are very steep and access to the platform through an opening in the floor. The steelconstruction gives a lot of noice when people use the stairs and the noice scares away the birds. Tower for bird watchers, but not for common people.

**Good and bad**
The advantage is low maintenance cost. The level of accessibility and security is very low. The stairs are steep and slippery. No good entrance to the stairs from the ground and no rails around the opening in the platform. It is also possible to climb on the rails around the platform.The roof gives rain shelter, but stops birdwatching upwards. The tower is not well adopted to the surroundings.

**Contact person:** Argaudas Stoskus

# Nemuna Delta tower

Nemunas Delta Regional Park
Litauen, Klaipeda

**General description**
A new tower that is well adopted to local building traditions. A balcony around the tower gives shelter against rain and wind. Big windows to look through.

**Good and bad**
Interesting design, but the construction is too week. The stability  is not good enough, resulting in vibrations from wind pressure and people walking. The stair is too steep and with too big openings in the rail around the balcony, children can fall down. The balcony seems very narrow and there is an obviuos risk to break the windows with elbows by accident. Several windows has been broken and are now covered with board.

**Contact person:** Argaudas Stoskus

# Lehmsiek tower

Germany, Schleswig-Holstein

**General desciption**

This tower is not built only for bird watching, but also to study bothany and zoology up in the trees. It is only two years old and very stable. The height is 3,5 metres and situated along a 1,5 kilometers long forest education trail. There are questions about nature along the trail.

**Good and bad**

It is a robust construction that gives shelter against rain.

**Contact person:** Beate Lezius

# Rannajõe tower

Matsalu national park
Estonia, West-Estonia




**General description**
A new tower that is four meters high and the view is over flooded shore meadows. The tower is built of round timber with sturdy logs that gives good stability. The platform is 20 $m^2$ big and there is a table and two benches, A ramp leads up to the platform and rails are 118 centimeters high. Problem with the sun in the evenings.

**Good and bad**
A stable and simple construction. The ramp seems to be too steep to reach good accessibility. A high slippery risk when it gets wet and ice on it. It is possible to climb on the rails and risk that children can fall down. The rail around the platform is at the same level as the eyes of  people in wheel–chairs.

**Contact person:** Marju Pajumets

# Platform at Svartåmynningen

Svartåmynningens nature reserve
Sweden, Östergötland





**General description**
Platform in a birdrich area. The height is only two meters, but enough to make it easy to watch the birds. Most birds are east and north of the platform. Built of larch wood in 2003. The ramp gives accessibility for disabled and elderly. The platform is 3,4 x 8,0 meters big and ramp is 1,3 meters broad. It is 500 meters to parking place and the road is not adapted to wheel chairs. Maybe possible for disabled to drive to the platform.

**Good and bad**
In this open and flat landscape it is enough with a low platform, wich also gives a short and not so expensive ramp. It is good with different levels on the rail as long as security is good. In this open and windy landscape it could be good with a wind shelter. A lot of information at the platform.

**Contact person:** Dan Nilsson

# Platform at Glänås

Tåkern nature reserve
Sweden, Östergötland




**General description**
A platform built in 2003 with very good accessibility. From the platform, that is 3,5 meters high, the view is good over reedbeds and open water areas of lake Tåkern. A long ramp (1,2 meters broad) with inclination 1:12 leads up to the platform. There are resting levels and space to meet every sixht meters. A galvanized steel pipe on the inside of the rail as a handrail. Eveything is built of larch wood and stability is good. In connection to the platform is also a nature trail with high accessibility and a lot of information.

The work has been done in cooperation with organizations for disabled. They contribute a lot of knowledge!

**Good and bad**
A very good accessibility to a fantastic bird rich area. The ramp and the platform are well adapted to the surroundings and the platform is situated on a very good place. The platform is one good part of many efforts to make good accessibilty. Very good to concentrate a lot of work on a limited area. Platform, information and trails adapted for disabled. One of the best places in Sweden to study good examples of work with accessibility to nature for disabled.

**Contact person:** Dan Nilsson

# Siikalahti platform

Siikalahti nature reserve
Finland, South-East Karelia




**General description**
A new platform built in 2003 with very good accessibility. The platform is situated right against the road through lake Siikalahti, so it is a very short distance to walk to the platform. It is 1,5 meters high, 25 $m^2$ big and has access via a stair and a ramp. Both are 1,0 metrs broad anf with rails 0,9 meters high. The inclination of the ramp is 8 % (1:12). The platform has a stable foundation of concrete and the wood structure is painted grey. A wire on top of the rail prevent birds from sitting on it and making it dirty.

**Good and bad**
Well situated and here it is enough with this very low platform making accessibility very good. The view over the area with birds is good, but directing against south and the sun in middle of the day.

**Contact person:** Anne Pyykönen

# Platform at Östen

Östen nature protection area
Sweden, Västergötland




**General description**
A platform built in 2002 with a low and stable design, adapted to give people with different functional disabilities the opportunity to experience the bird area by Lake Östen. The platform is situated in wind protected location and offers an easterly view of the wetlands and the flight passage of geese. The height of the floor above the ground is 1.80 m and a ramp with a weak inclination leads up to the platform from the parking place nearby. The platform is equipped with two tables with accompanying benches, where one of the setup can be moved. The height of the railing has been chosen to avoid blocking the view for people in wheelchairs.

A smaller private road leads down to the platform, which only is allowed to be used by people with different functional disabilities. A parking place with space for two vehicles to park has been constructed 20 m from the platform.

**Bad and good**
An easily accessible and wind protected platform located close to a parking place especially designated for people with functional disabilities. The frameworks of the constructions are very stable and the problems with disturbing vibrations have been reduced by separated frameworks for ramp and platform.

Railings where horizontal boards have their wide side facing upwards constitute a risk in combination with climbing children. Furthermore, the localization of the platform far away from open water surfaces reduces the experiences of resting water birds, with the exceptions during years with high spring flooding.

**Contact person:** Kenneth Franzén

# Other towers

*A tower with unusual design of the rail. Finland, Mikkeli*

*Robust tower with attractive design. Estonia, Pennijoe.*

*A tower with a frame of steel. Estonia, Kiideva*

*Platform with openings in the rail, making it possible for children to see through the rail. Germany, Delver Turm*

*A simple and robust tower. Maybe the stair is too steep and long? Finland*


*Another robust tower. Poland*

# Hide at Fågeludden

Hornborgasjön nature reserve
Sweden, Västergötland




**General description**
Around the visitor centre Hornborga naturum at lake Hornborga there are three hides of this model. They are built of pressure impregnated wood nearly twenty years ago. In the hide is space for app. six pesons. There are fixed benches in two hides and moveable chairs in one to make it possible to use for people with wheel-chairs. The openings are 110 centimeters over the floor and they are 16 centimeters high. Support for elbows 90 centimeters over the floor.

To reduce the disturbance on the birds there are tight railings on both sides of the hide.

**Good and bad**
The function is good. The birds comes very close to the visitors if the keep silent. Accessibility is rather low, even in the hide that has some adaption for disabled. People in wheel chairs has problem with the openings that are too small and too high over the floor. According to the fact that there are so many vistors and also many school classes the hides should be bigger. Photographers wants bigger openings.

**Contact person:** Mats Rosengren

# Big hide at Getterön

Getterön nature reserve
Sweden, Halland




**General description**
A big hide made for birdwatchers built 10-15 years ago. Outside the hide there are good areas for waders and ducks, wich gives good opportunities for birdwatching and photographing. There are 39 openings mainly against three directions, wich gives possibility to avoid the sun. They are situated on different levels on two floors. Trapdoors are opened by lifting a chain, that can be hanged on a hook.

It is a 300 meters walk from the information centre and parking place.

**Good and bad**
One advantage is that it is big enough for a school class. Most of the openings are 110 centimeters over the floor and that is to high to be suitable for children. Some of the trapdoors are made of plexi to let some light in. No information inside or outside the hide. The hide is very popular!

**Contact person:** Mats Rosengren

# Hide at Långhultabacken

Långhultamyren nature reserve
Sweden, Halland




**General description**

This relaively big hide is made to make it possible to observe the lek of black grouse. It is a bird that is easy to disturbe and the lek is on early april mornings on open bogs. There is space for 15 persons to sit on benches and another 15 to stand behind. There is a small room with space for three persons to sleep.

Foundation of pressure impregnated round timber on cruched stones. The openings are on three levels: 100, 140 and 160 centimeters over the floor. They are 18 centimeters high. A bench 45 centimeter high and a shelf for he arms 75 centimeter over the floor.

**Good and bad**

The place for the hide is very well choosen. Discreet from the birds view and with a fantastic feeling of wilderness.

**Contact person:** Mats Rosengren

# Hide at Trönninge meadows

Trönninge meadows bird sanctuary
Sverige, Halland




**General description**
A relatively big hide with good opportunities to study birds on short distance. Only one hundred meters from parking place and with a trail that is well protected from view by a soil bank and wood railings. On the north side it is very close to pastured shore meadows. On the south side there are purification ponds with deeper water. Trapdoors are opened by lifting achain that can be hanged on a hook. The size of the openings are 55 x 18 centimeters. They are situated 90 and 140 centimeters over the floor. Benches are 40 centimeters high.

**Good and bad**
The hide is very well situated, with short distance to the birds in both directions. Towards the south the vegetation can be to high and block the view. Good information about different bird species with nice color photos.

The toilet at the parking place have a fairly good accessibility for disabled. Information beside the parking place about different places for birdwathing along the cost.

**Contact person:** Mats Rosengren

# Small hide at Getterön

Getterön nature reserve
Sweden, Halland




**General description**

A small hide situated in a big reedbed and target group is birdwatchers. Walls of plywood and foundation of concrete. The trail leads through the reedbed and is protected from the birds by a wood railing the final ten meters. Space for seven persons to sit on a 44 centimeters high bench with a shelf 75 centimeters over the floor.

Openings are 50 x 21 centimeters big and placed 100 centimeters over the floor. Another five openings on the levels 144, 152 and 160 centimeters over the floor. There are also twor openings in the gable 90 centimeters up. They could suit children, but they are blocked by the vegetation. Often not so many birds in front of the hide.

**Good and bad**

Good to have the trail in the reedbed as a shelter against the birds. If all trapdoors are closed and the door is closed it becomes totaly dark in the hide. Some permanent opening would be appreciated. It is very tight behind the benches.

**Contact person:** Mats Rosengren

# Hide at Siikalahti

Siikalahti nature reserve
Finland, South-East Karelia




**General description**
A new hide that is 10 m2 big and reached by a 800 meters long trail. The final part is on both sides sheltered against the birds by a lot of thin branches of Salix. The seven opnings are covered by glass windows that easily can be pushed aside. Simple moveable benches to sit on.

The hide is built of wood that is painted grey. The roof is covered with roofing-felt.

**Good and bad**
Easy to observe birds from the hide. Situated out in the water with good view against areas with breeding birds. Openings against east might cause problem with the sun in the morning. There should be openings higher up that can be used by standing people. The trail can be slippery, but shall be reconstructed.

There is a toilet with good accessibility at the parking place. Along the trail is a grill-place and a house with lot of information. In the area is also a platform and a tower.

**Contact person:** Anne Pyykönen

# Hide at Limsjön

Limsjön
Sweden, Dalecarlia

**General desciption**
A small hide built 2005 with space for six persons. Target groups are common people, birdwatchers and children. Accessibility is good for elderly and children. It is possible for disabled to reach the hide, but the door is only 80 centimeter wide. A 75 meters long boardwalk through a reedbed leads to the the hide. The boardwalk is 1,2 meter broad and without rails.

The hide is floating on the water and that results in that the hide is rocking a little when people move in it and when there are wawes on the lake. Openings are fairly big (30 x 50 centimeters) situated one meter over the floor. They are towards east so there is only problem with the sun in the morning. Benches are moveable.

**Good and bad**
A very simple construction with good function. Risk to fall into the water.

**Contact person:** Staffan Müller

# Observation place Getterön

Getterön nature reserve
Sweden, Halland




**General description**
A observation place with good view over birdrich shallow water areas. A natural hill is used instead of building a tower. There is lot of space to sit on the nine meter long bench. It is 55 centimeters high and the shelf is placed 85 centimeters over the ground. The rail is 90 centimeters high. When it is raining or blowing it is good to go inside the shelter. Some small stool are useful when there are a lot of people inside the shelter . The shelter is 5,0 x 3,5 meters big and three meters high.

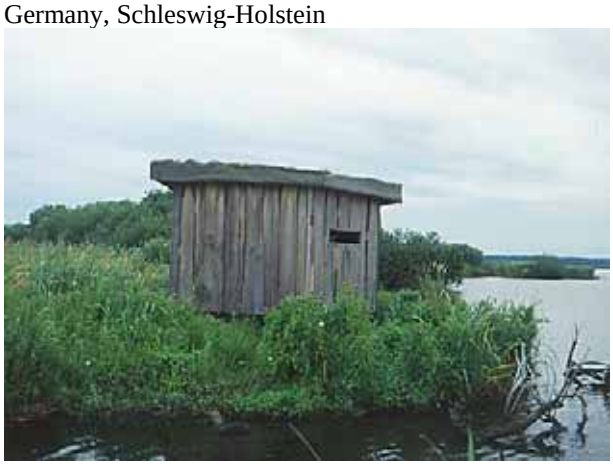
**Good and bad**
Well situated with good view over a big area. The possibility to get shelter from wind and rain is very good. This is a coastal area with lot of windy days.

Accessibility is limited, but can be better by small measures. If parts of the bench is taken away, disabled gets the same access to the view as others. The trail from the parking place and the information centre has an uneven surface and the last part up to the shelter is too steep for a wheel chair.

**Contact person:** Mats Rosengren

# Hide at Hohn

Germany, Schleswig-Holstein



**General description**
A hide made of wood and with roof covered by grass. It is four years old, 15 m2 big and just over two meters high. Openings against the lake. It is situated along a six kilometers long nature trail and there is information about the reserve.

**Good and bad**
The hide has a design that makes it well adapted to the surroundings. Accessibility is normal, but there is no toilet.

**Contact person:** Beate Lezius

# Other hides

*Very comfortable with a lot of space and soft benches. England*

*A simple hide. A shelter of reed with a bench to sit on. England*

# Wibeck trail at Store mosse

Store mosse national park
Sweden, Småland




**General description**
A nature trail adapted to people with mobility impairment made 2005. The trails total lenght is 600 meters and at the end is a very attractive resting place with benches and tables. Strong atmosphere of wilderness and the view over the bog is fantastic. The trail is on wet and dry ground. Most of it has a surface of gravel – geotextile with crushed stones 0-35 on and chrushed stones 0-18 on top.

Over very wet areas is a 1,6 meters broad boardwalk made of wood. The material is spruce treated with tar oil. This treatment is repeated every second year. There are three benches along the trail and there are plans to adapt the trail to people with impaired vision.

The trail starts 200 meters from the parking place and it is a gravel road to the start. A toilet with good accessibility besife the parking place.

**Good and bad**
Beautiful nature and good adaption to the terrain. Only a minor slope up to the resting place. The resting place is fantastic! This is a trail with good accessibility for many disabled, elderly and families.

The edge of the parts of the trail with chrushed stones on is soft, with risk that wheelchairs might overturn. The ramp up to the resting place should maybe have resting level on the middle. To build directly on the ground with wood of spruce can maybe give a short lifetime.

**Contact person:** Arne Andersson

# Nature trail to Svartgölen

Store mosse national park
Sweden, Småland


**General description**
A nature trail made 2000 with good accessibility for people with mobility impairment, elderly and families. It first leads on a sandy ridge and then on a 550 meters long boardwalk over the wet bog. The trail is 1 800 meters long (and the same back). The boardwalk is 1,2 meters broad and made of spruce treated with tar oil (repeated every second year). The dry part of the trail is normaly two meters wide and with a surface of chrushed stones 0-18. Information about distance along the trail.

The trail ends on a big resting place beside a little lake. There are a lot of benches and tables and a small shelter to change pampers behind.

A lot of information (even on english and german) and broschures can be found at the parking place. There is also a toilet with good accessibility. Good signs from the big road.

**Good and bad**
A well designed trail with a strong feeling of wilderness. The resting place has a lot of space. The lifetime of the boardwalk might be a little bit too short considering the big work to build on a bog. There ought to be more benches along the trail. Very good with distance information. One long and a little bit too steep slope reduce the accessibility for people with mobility impairment.

**Contact person:** Arne Andersson

# Nature trail to Winderatter lake

Germany, Schleswig-Holstein

**General description**
This is a sandy area with a little lake, nice shores and cattle grazing around the trail. It is built of wood, 60 centimeters wide and two kilometers long. The trails is on both sandy and wet ground. Only two years old.

**Good and bad**
The trail is too narrow to give good accessibility and there is no toilet.

**Contact person:** Beate Lezius

# Nature trail at Wildes Moor

Germany, Schleswig-Holstein

**General description**
The trail is one kilometer long and 1,5 meter wide. Built of steel and wood ten years ago and without any stairs. This is a wet area. Along the trail there is wind shelter and rain shelter

**Good and bad**
A relatively wide trail and without big inclinations. That gives a fairly good accessibility.

**Contact person:** Beate Lezius

# Nature trail at Glänås

Tåkern nature reserve
Sweden, Östergötland




**General description**
Nature trail adapted to people with mobility imparment. Built 2003 and adapted during 2005 to people with impaired vision. The trail is made of gravel through the forest and then a boardwalk through the reedbed and over the shore meadow with orchids. In the reedbed is a nice resting place with benches. Parts with gravel is normaly two meters wide and boardwalks 1,25 meters wide. All wooden parts are made of larch. Extra space to turn around at the end of the shore meadow.

In connection to the trail is also a platform adapted to disabled. A parking place for disabled close to the start of the trail. A lot of information along the trail.

**Good and bad**
A very varied trail without any inclination. Positive with accessibility also for people with impaired vision.

**Contact person:** Dan Nilsson

# Nature trail on Omberg

Omberg nature reserve
Sweden, Östergötland




**General description**
Made as a trail adapted to people useing wheelchairs. Starting outside Omberg information centre. The trail is 650 meters long and leads through a beech wood. During the spring 2005 it was adapted also to people with impaired vision. A rope hanging on poles leads the person along the trail. There are information on braille on small signs along the trail.

At the beginning of the trail is a big information stand with the signs very low – middle of signs 110 centimeters over the ground. That makes them easy to read from a wheelchair.
There is also a tactile map on wich blind persons can study the trail and the rurroundings.

Outside the information centre there are an exhibition of bird boxes. On them are information on braille.

**Good and bad**
Very good to adapt the trail to people with impaired vision. Well done and the function is good. The information on the information stand is easy to read also for people standing up.

**Contact person:** Dan Nilsson

# Nature trail at Siikalahti

Siikalahti nature reserve
Finland, South-east karelia




**General description**
The trail is nine years old and the lenght is 900 meters. It leads to a tower and a hide. This is an area with a lot of birds an many differnet species of dragonflies. 300 meters of the trail is on dry ground. 600 meters is on wet ground and consist of a 60 centimeters wide board walk of wood. On the most wet parts there is a rail on one side. It is 100 centimeter high and with an extra plank on the middle.

200 meters from the parking place is a big exhibition in a house. Beside the house is a grill place and a resting place. When the trail passes a very wet area there is a good platform. The board walk is untreated and has started to rot and therefor a rebuilding is planned. The trail is not marked but easy to follow.

Beside the parking place is a toilet with good accessibility and information about the area. Four small information signs along the trail tells the history of Siikalahti and about ypical species. Information also in english.

**Good and bad**
The problem that the trail has to be rebuilt after ten years is a problem that it shares with many trails built with untreated wood. Small meeting places and the platform is good and so is also grill place and information.

The level of accessibility is low. The hide could have more visitors if the trail was better.

**Contact person:** Anne Pyykönen

# Nature trail around Limsjön

Sweden, Dalecarlia

**General description**
Close to the small town lies lake Limsjön. Ten years ago a seven kilometer nature trail was built around the lake to give access to the public. To a large part old gravel roads are used. New parts are built of crushed stones (0-70 in bottom and 0-8 on top). On wet areas a geo textile is put under the stone layers. One kilometer of the trail is over et areas and the ninimum widht is 1,2 meter. There is some bridges of wood along the trail.

**Good and bad**
It is a very popular trail and it is posotive that it is so close to the town. Many visitors useing wheelchairs and vistors with baby carriagies. Not so much maintenance and mainly to take away grass along the trail five times a year. A big road passes close to the trail and that causes some disturbing noice.

**Contact person:** Staffan Müller

# Nature trail on Fågeludden

Hornborgasjön nature reserve
Sweden, Västergötland




**General description**
A short trail to Hornborga naturum (information centre) and then further to two hides and a tower. The trail was built in 1985. The water level in lake Hornborga changes a meter during the year and the trail is partly in the lake and is built on old telephone poles. To the information centre the trail is two meters over water level, two meter wide and totaly flat. After that it becomes 85 centimeter wide and is about one meter over the water level. To incease the lifetime of the poles there are covered on top by sheet metal. On top of the rail there is a wire that prevents mainly black headed gull to sit on the rail and make it dirty. One part of the trail is on dry ground over a small hill. The last part is a woodened board walk built on the ground.

The rails construction varies a lot. First part has both nets and planks. The net (40 millimeter squares) makes it easy for children to look through the rail. After that a long distance with only two galvanized steel pipes as a rail. That feels unsafe for children, especially considering that it is water under the board walk. The last part of the board walk has a simple rail of planks. The board walk is very low and it is dry under it nearly all the time.

**Good and bad**
The birds get used to have people walking on the board walk. Visitors van see breeding birds only some meters away. Meeting places with benches are very appreciated.

The board walk is to narrow and has some inclinations that is far to steep to gain good accessibility. A more wide board walk should make it easier to meet on it. In springtime it can be crowded. The poles probably contains strong impregnation chemicals.

**Contact person:** Mats Rosengren

# Other trails

*Vegetation getting high, need of maintenence.*

*Trail on wet ground. Sweden, Långhultabacken*

*Very wet and slippery, Bialowieza Poland.*

*Trail on wet ground. Sweden, Sjöbo-Knäppan*

# Sign stand at Ombergs bokskog

Ombergs bokskog nature reserve
Sweden, Östergötland



**General description**
A simple sign stand. A pressure-impregnated pole punched into the ground. The size of the sign is A2 (60 x 42 centimeter). The centre of the sign is 150 centimeter over the ground. The frame is made of split stems of juniper.

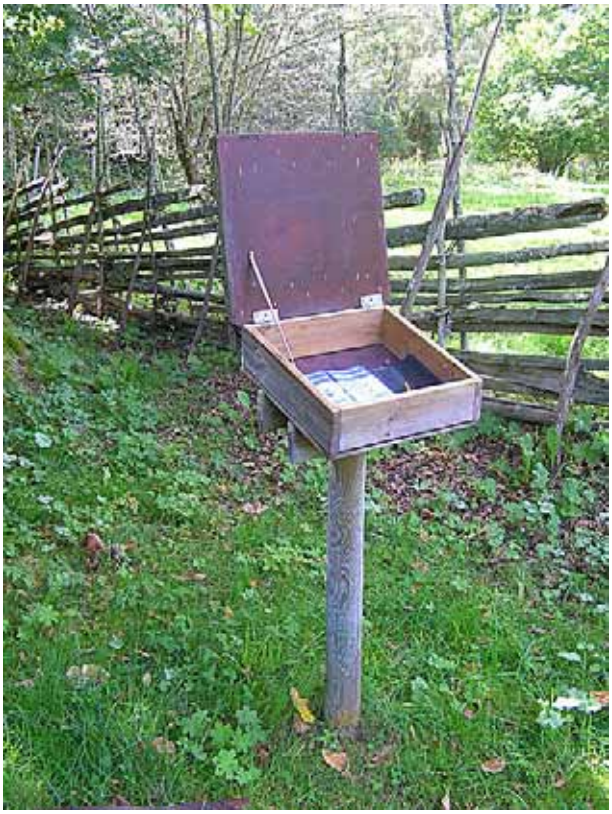
The sign stand is situated beside a small parking place and the ground is soft. The information is shortly about the reserve, contains amap and gives regulations to the public. Information also in english and german.

**Good and bad**
The frame of juniper gives a natural impression. Good with information on several languages.

**Contact person:** Dan Nilsson

# Sign stand at Sättra ängar

Sättra ängars nature reserve
Sweden, Östergötland

**General description**
A big sign stand. Four meter wide, 2,4 meter high and supported by two planks on the back side. The construction is very stable. The poles are put in the ground and with concrete around. A big roof that goes 60 centimeter backwards and 120 centimeter forward.

The signs are put on larch planks that are 30-40 centimeter wide. The centre of the big signs are 155 centimeter over the ground. Frames of split juniperus stems.

Information about the nature reserve, species in meadows and grazed areas, guided tours and cottages for hire. Broschures in a box beside.

Situated close to parking place and resting place.

**Good and bad**
The sign stand gives a very solid impression and is well situated close to a big oak. It is directed towards north, wich is good for the signs that will not bleech so much. The box with brochures is good and has no problem with rain water.

**Contact person:** Dan Nilsson

# Sign stand at Getterön

Getterön nature reserve
Sweden, Halland

**General description**
A new sign stand outside Getteröns information centre. A sturdy construction with big poles deep into the ground. Roof made of broad planks. The whole stand is painted grey.

Total widht is 3,2 meter and the centre of the sign is 125 centimeter over the ground. The direction is towards east.

**Good and bad**
Very good with the sign placed low making it easier to read for children and people in wheelchairs. The low construction make the information stand not so dominating. Maybe the ground in front of the stand should have a more hard surface of gravel to make it easier to reach with a wheelchair.

**Contact person:** Mats Rosengren

# Sign stand at Siikalahti

Siikalahti nature reserve
Finland, South-east Karelia





**General description**
A two years old sign stand adapted to disabled. The stand is made of wood with a roof covered by roofing-felt. Wood is treated with a mixture of tar and linseed oil. Signs put on a aluminium plate. The surface in front of it is hard and the centre of the signs is 120 centimeter over the ground. Four signs size A2. There is information about the nature in the area and about the restauration that has been done.

**Good and bad**
This sign stand has a high level of accessibility. Signs low making them easy to read by people in wheelchairs and children. Easy the read even by standing people.

The design is good, making the stand fit into the landscape, even though it is avery open area. It is easy to change the signs.

**Contact person:** Anne Pyykönen

# Other sign stands


*A robust sign stand. Up to the left is a bird-box. Bird-songs start when people comes close to the signstand.*

*Robust signstand in a open landscape.*

*A little handicraft makes it look nice. Lithuania*

*Sign stand in Grazute RP, Lithuania.*

*Lithuania, Panevezys.*

*Lithuania, Telsiai.*

*Big sign stand. Finland, Siikalahti.*


*Robust sign stand at the entrence. Sweden, Omberg.*


*Estonia, Puise*


*Estonia, Puhtu*

## PARTNERS IN BIRD PROJECT

**Estonia**
Peipsi Center for Transboundary Cooperation, Tartu County Environmental Department, Haaslava municipality, Alatskivi Municipality, Vara Municipality
**Finland**
Metsähallitus, Municipality of Rantasalmi, Rantasalmi Institute of Environmental Education, Municipality of Parikkala, Regional Council of South Karelia
**Germany**
State Agency for Nature and Environment Schleswig-Holstein
**Latvia**
Talsi District Council, Liepaja District Council
**Lithuania**
Marijampolé State Forestry Enterprise, Nature Heritage Fund, State Service for Protected Areas, Lithuanian State Department of Tourism, Žuvintas Biosphere Reserve, Alytus District Municipality, Marijampolé Municipality, Lazdijai District Municipality, Meteliai Regional Park
**Sweden**
County Administration Board of Västra Götaland, County Administration Board of Östergötland, Swedish Environmental Protection Agency, Skövde University College, Municipality of Falköping, Municipality of Mariestad, Municipality of Skara, Municipality of Skövde, Municipality of Töreboda, Municipality of Motala, Municipality of Mjölby, West Sweden Tourist Board, East Sweden Tourism Council