

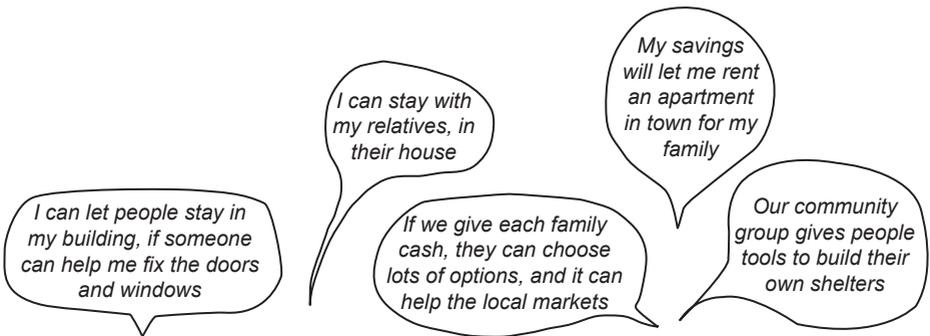
# **SITE PLANNING**

**Guidance to Reduce the Risk of  
Gender-Based Violence**

***THIRD EDITION***

## WHERE ELSE CAN PEOPLE LIVE?

Many settlement options other than camps may be **cheaper**, **provide more privacy and protection**, and be better suited to the needs of each family



## CAMPS ARE A LAST RESORT

**They can be unsustainable, can last for much longer than expected and are expensive to run and maintain.**

**However, when camps do need to be built or upgraded, planning can vastly improve the health, security, privacy and dignity of those people living within them.**

*Our local health clinic is full of sick people coming from the camp!*

*Our planning office can't find enough safe land to fit everyone in!*

*How can our town pay for all the electricity and water for many years in the camp?*

*I wanted to plant crops on that land this year, but now I cannot!*

*There is no work for me in the camp!*

*I cannot find any privacy here!*

*I do not feel safe living in tents!*

## ACKNOWLEDGEMENTS

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**Third Edition  
April 2018**

Digital versions of this document are available for free download at:  
[www.sheltercluster.org/gbv](http://www.sheltercluster.org/gbv)

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## i.1 What is this guidance about?

This booklet on site planning and the reduction of gender-based violence provides practical guidance for measures which can be taken to reduce risks to affected populations around camps and sites.

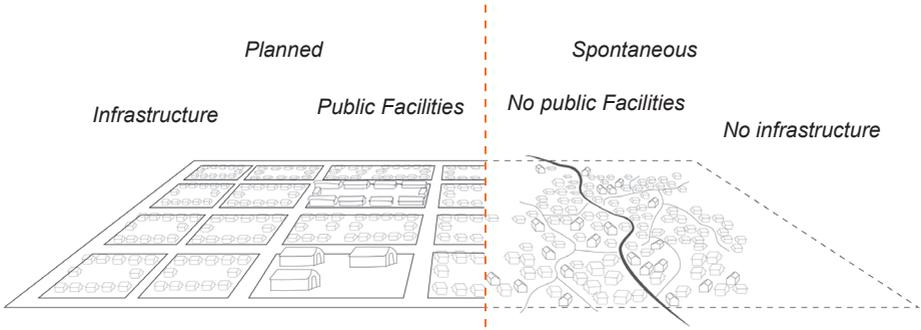


Image 1: Planned camps and spontaneous settlement sites often provide very different quality of life for their inhabitants

The primary purpose of any site is to reduce risks to health, security, privacy and dignity. Protection of women and girls, men and boys, is deeply rooted in universal human rights, and is expressed as such in key resources for humanitarian response, including The Sphere Project, and the mandates of UN humanitarian agencies, international organizations, the Red Cross movement, and international and local NGOs, as well as many national governments. However, establishing practical programmes that link rights with identified needs is highly dependent upon the context. This booklet is based on consensus for best practices.

Camps can play different roles in different types of disasters, and within different comprehensive shelter and settlement programmes. For example, camps built as a response to natural disasters should be as small and as close to the area of reconstruction as possible. On the other hand, camps built as a response to armed conflict need to be at a safe distance from the conflict. However, this is not always possible and camps' locations normally depend on people's perceptions of safety. In general, the distance from conflict areas as well as from damaged houses or livelihoods needs to be considered when assessing potential site locations.

For further guidance on the role of camps in different types of programming, see [📖 Transitional Settlement: Displaced Populations](#), [📖 Transitional Settlement and Reconstruction After Disaster](#), and [📖 Urban Shelter Guidelines](#).

## i.2 Who is it for?

This booklet is written for all people who are involved in the planning and maintenance of sites. **Wherever possible, skilled site planners should lead or be actively engaged in the process.** However, it is not always possible to deploy experienced site planners, and the majority of camps and sites come into being 'spontaneously'. More often than not, camps are planned and installed by those who have limited or no direct experience working in site planning within a humanitarian context.



*Many of those who have been tasked by local or national authorities, or by their communities, to lead decision-making on site planning have valuable ranges of skills which can make key contributions to site planning.*

Professionals should always be brought in to construct or intervene in larger camps with tens of thousands of inhabitants. As a result this document focuses primarily upon the neighbourhood level, and the level of site-planning appropriate for a camp more typically with a population range of 250-5,000 people.

## i.3 How should it be used?

Each camp or site is different, as is the context for the displacements into that site. There are clear dangers in copying a universal numeric indicator, or pathway design, without thinking about whether or not it fits into the local context. This booklet guides discussions, it does not give prescriptive orders about what to do.

In smaller camps especially, not all types of locations (schools, health clinics, distribution centres) may be present, and so the reader should concentrate upon sections which are more relevant.



Image 2: In smaller camps or sites, it could be possible for the displaced population to utilize existing facilities and infrastructures of the host and surrounding communities

Every camp has a different lifespan, and different speeds at which upgrading, maintenance, expansion or consolidation become necessary, so each section in the booklet can be referred to independently of the other sections, if there is limited time.

### i.4 What does it include?

This booklet follows the lifespan cycle of camps and sites, from first installation to closure, and each step of the way examines key risks across the range of different locations – residential and non-residential – in a site.

This booklet does **not include**:

- Detailed technical engineering guidance on infrastructure, exact distances, gradients, road surfacing, etc. ([📖 UNHCR Handbook for Emergencies](#))
- Guidance on project management, procurement, or organizational development ([📖 RedR Engineering in Emergencies](#))
- Guidance on camp management programming, except in terms of involvement in site-planning decision-making ([📖 CCCM Cluster Camp Management Toolkit](#))
- Guidance on the rights of the displaced in camps, or project management for Gender-Based Violence (GBV) programming ([📖 OCHA Guiding Principles on Internal Displacement](#), [📖 UNHCR Handbook for Emergencies](#), [📖 IASC Guidelines for Integrating Gender-Based Violence Interventions in Humanitarian Action](#))
- Templates of the legal agreement documents necessary to establish a camp in the first place ([📖 Transitional Settlements: Displaced Populations](#))
- Guidance on interventions in indoor or collective centres, although the principles illustrated may inform physical interventions in collective centres as well ([📖 CCCM Cluster Collective Centre Guidelines](#)).

## i.5 What is Gender-based Violence?

“Gender-based violence (GBV) is an umbrella term for any harmful act that is perpetrated against a person’s will and that is based on socially ascribed (i.e. gender) differences between males and females. It includes acts that inflict physical, sexual or mental harm or suffering, threats of such acts, coercion, and other deprivations of liberty. These acts can occur in public or in private.”

 IASC Guidelines for Integrating Gender-Based Violence Interventions in Humanitarian Action, 2015.

Gender-Based Violence (GBV) can affect women, girls, men and boys, although the overwhelming majority of survivors worldwide are women and girls. As well as having an impact upon safety, GBV can also have an impact upon health, if women and girls are excluded from accessing health services; upon security, if they are forced to live in shelters in insecure parts of the camp, and upon their privacy and dignity.

Fear of violence is often the most common factor that prevent women and girls from accessing health and sanitation facilities, basic services or livelihoods. It also has the worst overall impact upon privacy and dignity.



While much GBV takes place within the home or, – in a camp or site context – within the shelter or shelter plot, there are also significant risks for attack or threat of attack upon women and girls outside the shelter. There is no part of a camp or site, or the site surroundings, where this risk may not be present.

Vulnerability to GBV is heightened for those with other vulnerabilities, such as those with disabilities. See  IFRC, Handicap International, CBM *All Under One Roof* for further guidance.

Any interventions to address the risk of GBV must be done in consultation with the women and girls in the site. There are a number of ways to conduct assessments of the risk in and around the sites, and these are best done with staff with an expertise in GBV programming. The assessments can include:

- Focus-group discussions,
- One-on-one interviews,
- Group safety audits, that is, analysis of the safety of all parts of the camp, conducted by walk-throughs, map-based analysis, or other group-participatory means.

Every camp has a different context, and those living in the camps come from different cultural backgrounds – measures to address the risk of GBV which have worked in one camp may not work in another. Consultation is key to understanding these varied needs and risks.

Site Planning and Shelter construction in camps can contribute to positive reductions in the risk of GBV in and around camps. However, it will not fully remove the risk of GBV if undertaken alone without integrating into a comprehensive camp management strategy with other key sectors such as Protection, Water Sanitation and Hygiene (WASH), Education, and Livelihoods/Food Security, as well as those from local authorities and host communities.

Remember to consult with the GBV AoR and GBV specialists whenever relevant, to receive advice on how to effectively manage discussions on sensitive topics such as GBV.

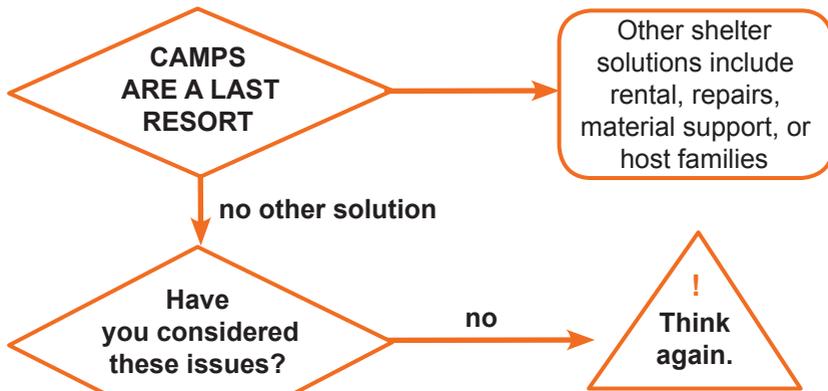
*For the purposes of this booklet, the term ‘GBV’ will be used as the umbrella term where appropriate, but in order to discuss the ways that specific interventions can have an effect upon the risk of GBV, the discussions will refer as much as possible to the specific types of violence which may be encountered in specific locations within a camp or site, or the combinations of different types of violence, to better understand the concrete connections between each site intervention, and the risk-reduction objectives of that intervention.*

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## A1: SITE PLANNING CONSIDERATIONS

### A.1.1 New Camps or Sites

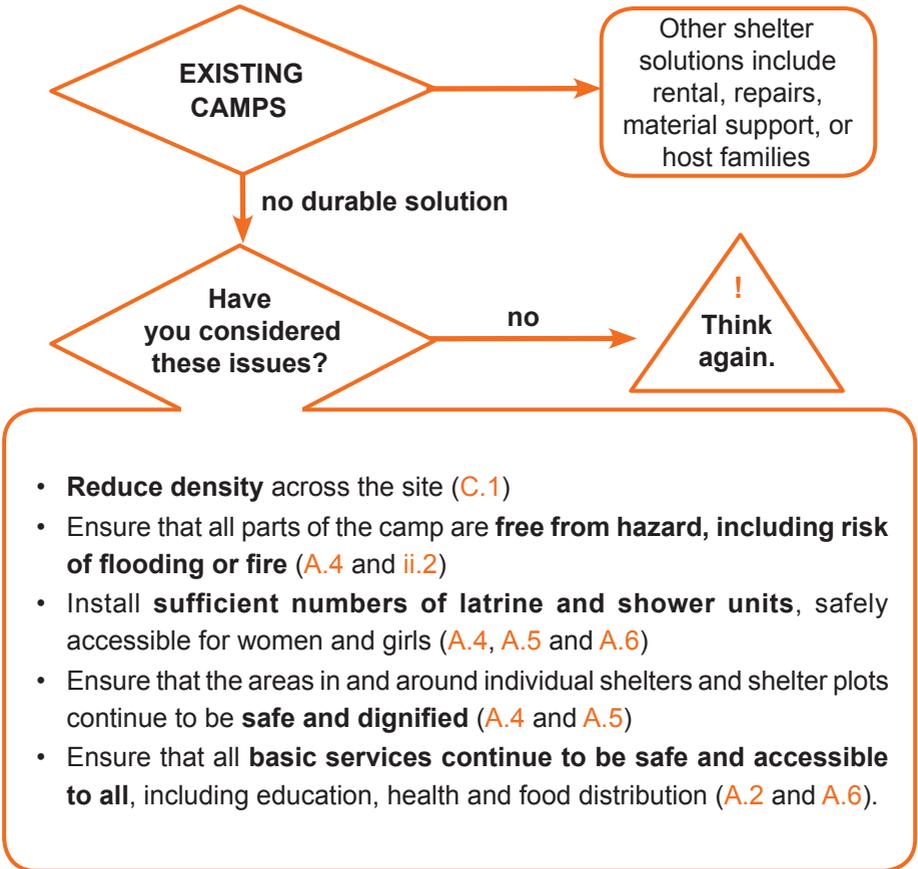


- There is an **exit plan** (A.2)
- **Establish planning figures** (ii.1)
  - Calculate **how much space** will be needed
  - Consider future population increases (ii.1)
- Calculate **how much water and other resources** will be necessary for the population (A.4 and A.6)
- Identify a location – if one site does not have enough space, then the population may need to be spread out over multiple sites (A.4, A.6 and C.1)
- Ensure that the site is free from hazards (A.4)
- **Map the site** (A.2)
- Demarcate the perimeter of the site (A.4)
- Identify the areas for each element of the camp (A.2)
- Create the **drainage plan** (ii.2)
- **Design the shelter blocks** and agree on the dimensions of household plots (A.5)

Remember that no camp should be constructed without having a plan for how to manage the camp!

### A.1.2 Existing Camps or Sites

Many existing camps are in need of maintenance, upgrading or expansion.



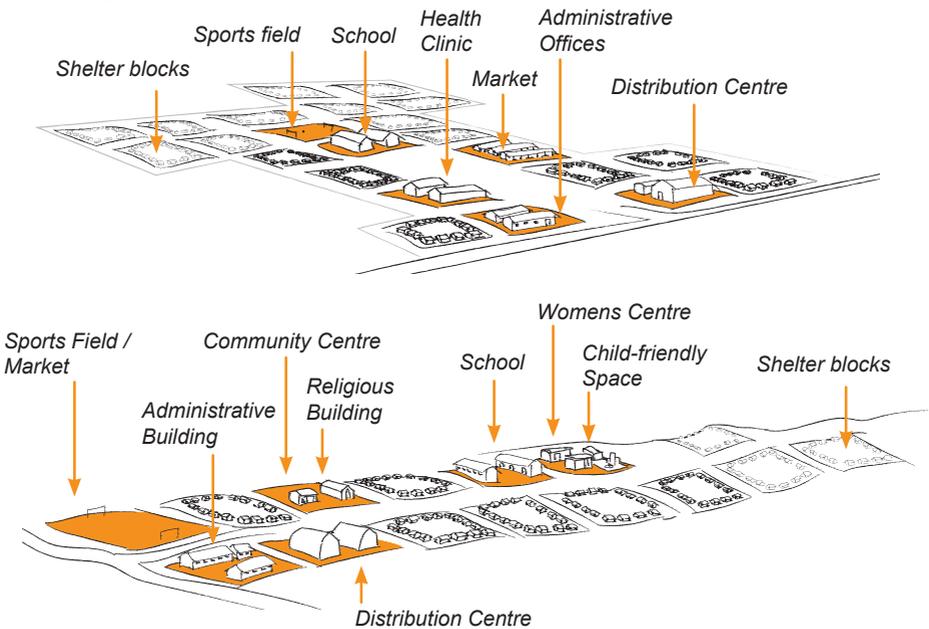
## A2: PLAN THE WHOLE SITE

### Overview of typical camp layout



Site planning is not something that can be done by drawing a plan remotely. It needs support on site to interpret the findings and to make any adaptations on site. Even aerial photographs of sites do not give the full picture.

Each camp has many elements, not just shelters. Only with these other elements can those living in a camp have safety, privacy, dignity and access to livelihoods. Not all camps are large enough to need all elements, and often it is best to use nearby existing facilities. However, a camp without access to the necessary facilities will fail.



Images 3a and 3b: A camp has many elements, not just shelters

A camp is a network – shelters combined into blocks, blocks into sectors. Some elements, like latrines, should be near every shelter. Some, like water points, need to be near every block. Some, like distribution points, may only be in one place in a camp.



Image 4: Different elements come together to form the network that makes up the camp

The frame for this network, is the drainage channels, infrastructure lines, and street and pathway grid.



Image 5: Drainage and water supply often define the structure of a camp

**REMEMBER THE CONTEXT:** Roads and drainage follow the contours of the location, to help the site to drain, reduce erosion and flash-flooding, and provide easier access for those with physical disabilities. See [A.4.5] on drainage.

**ENVIRONMENT:** Plan environmental management and environmental recovery from the start. Protecting the environment can have a positive effect on sharing resources with the host community, dignity and safety for those living in the camp, and on more sustainable livelihoods.

 [UNHCR Environmental Guidelines](#).

**REMEMBER THE CONTEXT:** A map of the camp doesn't stop at the boundaries of the camp itself. Show the roads where people will come in and out of the camp, show the location of the host communities who will give their support to the camp, and show other resources, such as water sources.

**PROS AND CONS:** Most sites for camps do not have enough space to include everything, and many camps struggle to have enough space to meet international minimum standards. Under these pressures, there need to be clear discussions about whether any extra space should be allocated to allow flexibility.

***If the intended inhabitants of the camp have not arrived, women and girls in the host community can be a very valuable source of information about the area surrounding the intended camp. If a road or a piece of woodland is unsafe for local women, it will probably be unsafe for women from the camp, as well.***

### A3: INSERTION OF ELEMENTS INTO A CAMP

The majority of camps are spontaneous or unplanned, and even those which were planned may not have all the infrastructure needed to meet minimum humanitarian standards, as the camp population grows, and the activities in the camp evolve. See [Section \[B\]](#) for guidance on how to provide more room for both shelters and other elements of the camp through expansion of the camp. If this is not an option, then insertion of necessary infrastructure and elements into the existing camp may be necessary.

If there is no space to insert all of the elements which are required, then there must be a consensus on which elements to select. Priority must always be given to those elements, or infrastructure, which by their nature are life-saving:

- Water points and water-supply infrastructure
- Fire-breaks
- Drainage

In general, it is better to insert infrastructure which provides at least some of the needed capacity, rather than not inserting anything at all. [\[A.6\]](#) provides guidance on how to insert each of the key elements into an already existing and crowded camp.

### A4: CHALLENGES FOR ALL SITES

#### A.4.1 Density and Size

Sites are very often too small for the population in them. Calculating density is a way to measure overcrowding of a site (see [\[ii.1\]](#)). Guidance on how to anticipate, cope with, or reduce high population density, are contained in [\[B\]](#) and [\[C\]](#).

In many camps and sites, density is not uniform across all blocks or locations. Density is likely to be at its highest in the oldest parts of the camps, or in those parts nearest administrative centres, distribution centres, or central markets.

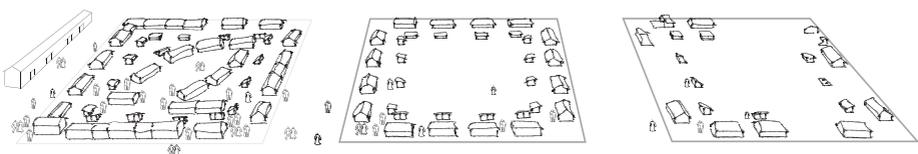


Image 6: In a camp, over-density is not uniform across all blocks or locations

“Overcrowding in urban areas or camp situations can exacerbate family tensions, which in turn can contribute to intimate partner violence and other forms of domestic violence. Overcrowding can also increase the risk of sexual assault by non-family members, particularly in multifamily tents, multi-household dwellings or large communal spaces. Some families may arrange child marriages in order to alleviate congestion or attempt to protect their daughters from assault in communal dwellings. Even when camps are planned to avoid overcrowding, problems may arise as populations grow and additional land is not available.”

 *IASC Guidelines for Integrating Gender-Based Violence Interventions in Humanitarian Action, 2015*

“For camp type settlements, a minimum usable surface area of 45 square metres for each person including household plots should be provided. The area should have the necessary space for roads and footpaths, external household cooking areas or communal cooking areas, educational facilities and recreational areas, sanitation, fire-breaks, administration, water storage, distribution areas, markets, storage and limited kitchen gardens for individual households. Where communal services can be provided by existing or additional facilities outside of the planned area of the settlement, the minimum usable surface area should be 30m<sup>2</sup> for each person.”

 *Sphere Handbook 2011, Shelter and Settlements Standard 2, Guidance Note 7*

**Over-densification of public spaces in the camp can have negative effects upon GBV risk, including:**

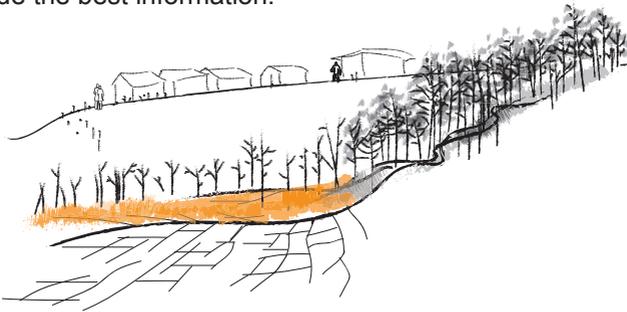
- *Exclusion of women and girls from markets and economic activities.*
- *Overcrowded markets, making it easier for physical harassment, or intimidation.*
- *Narrowing of pathways by the informal extension of shelters or shelter plots, potentially increasing fear and likelihood of hidden attackers.*
- *Increased waiting time for communal latrines or showers, increasing the exposure to physical attack.*
- *Longer distances to gather firewood or food, increasing the chances of rape or sexual assault.*

### A.4.2 Location and Security

Many sites which at first glance might be available for the construction of a new camp, have been left uninhabited by local host communities for good reasons. If local communities have not used the land, it can be because of natural hazard, such as flooding, erosion, landslides or mudslides, or high winds. It can also be because of man-made hazards such as unexploded ordinance (mines or bombs) or chemicals from industrial uses.

Just because a site looks safe and secure today does not guarantee the fact that it will be safe during an entire year.

Flooding of valleys or river beds can occur only in specific wet seasons. In some parts of the world, heavy rains which cause flooding or landslides might only happen every two or three years. Consultation with the local population will provide the best information.



*Image 7: Look for visual signs such as cracked mud, sudden changes in vegetation or elevation*

Extreme seasonal wind, heat or cold can also make a camp uninhabitable, if it is built on an exposed piece of land with no protection, it may be extremely difficult to ensure that safe shelters can be built on site.



*Image 8: Houses built on exposed piece of land can be vulnerable to extreme wind*

Migrations of wild animals – or of livestock and their herders – may only take place at specific points in the year. Talk with locals and look for wide channels without vegetation (because of previous animal grazing), older collections of animal droppings, or larger numbers of herd animal bones.

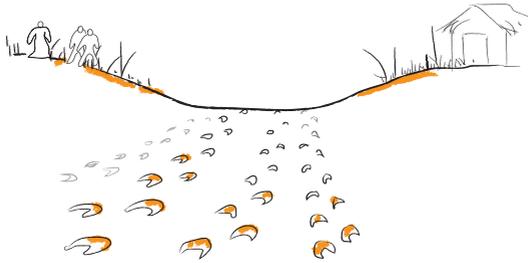


Image 9: Look for old herd-animal trail that may look like a wide channel with animal droppings but no vegetation

Ensure site locations provide protection from physical violence:



- If a camp is too close to front lines, it can be occupied by militias, thus increasing the risk of violence, rape or abduction, as well as fear of violence.
- Placement of a camp close to or on a military placement or transport road, even if far behind the front lines, can also increase the likelihood of attack or harassment of camp residents.
- Be aware of unexpected changes in the situation and how these may affect site security.

### A.4.3 Land Ownership

The use of the land for a camp is often highly political, and will need to be negotiated, by and with the local authorities.

**NOTE: HUMANITARIAN AGENCIES SHOULD NOT PAY FOR LAND** as it is the responsibility of the relevant authorities to meet the needs of affected populations.

Often sites will have to be agreed with multiple authorities: one authority or landowner may control the rental or sale of the land, whilst another might control what sort of structures can be built on the land, or access to water.

The perimeter of the camp needs to be clearly demarcated, both on maps and physically on the site.

**NOTE:** Only under exceptional circumstances do sites need to be fenced. In most cases, it is better for both safety and fire-evacuation if a site remains unfenced. Long perimeter fences are also costly, and require resources for maintenance. A well-planned camp with clear entrances can guide vehicle and foot traffic, and direct people away from private land nearby.

Although it may be easiest to negotiate construction of a camp on the land for a shorter, fixed period of time, the actual lifespan of camps is often unpredictable, and can be longer than initially hoped for, so any negotiation should leave open to extend the time period of use.

If there is no agreement from national and local authorities, and from local host communities, about the location of a camp, then the resulting knock-on effects can include:

- Refusal of permission to expand the camp, in order to take care of population increases or over-densification.
- Insecurity about sudden evictions of all or part of the camp population.
- Refusal of permission to build shelters or facilities in stronger, 'permanent' building materials, meaning they may have to be replaced many times.

Where the demand is made for the return of just part of the land of the site, that part can be the edges of the camp, or in the newest extension areas, and more likely to have a greater number of marginalized vulnerable households living in those parts – including single women, or women-headed households.

#### A.4.4 Water supply

Not enough water can threaten the existence of a camp, or otherwise severely reduce the quality of life in camps, increasing health risks, curtailing livelihoods activities, and contributing to personal stress.

Trucking water is expensive and subject to insecurity. Site plans need to prioritise locations for boreholes, water, treatment and storage. Consult with water-supply experts on the location of these facilities in or nearby the camp. Operational costs are reduced when these facilities are on ground higher than the camp. All water supply facilities need year-round road access, to ensure maintenance.

#### **Basic survival water needs**

Survival needs: water Intake (drinking and food)	2.5–3 litres per day	Depends on the climate and individual physiology
Basic hygiene practices	2–6 litres per day	Depends on social and cultural norms
Basic cooking needs	3–6 litres per day	Depends on food type and social and cultural norms
Total basic water needs	7.5–15 litres per day	

 *Sphere Handbook 2011, Water Supply Standard 1, Guidance Note 2*

Access to water is not just about the volume of water available, but the distance, speed and safety at which those collecting water – and in most camps and sites in the world this is predominantly women and girls – can bring the water back to their shelters.

250 people per tap	Based on a flow of 7.5 litres/minute
500 people per hand pump	Based on a flow of 17 litres/minute
400 people per single-user open well	Based on a flow of 12.5 litres/minute

 *Sphere Handbook 2011, Water Supply Standard 1, Guidance Note 5*

Water must be drinkable, and free from contamination – water points must be kept distant and at a greater gradient height from any sewage treatment facilities or other ground-pollutants, and from places where livestock drink. **Consult an expert concerning minimum distances between water sources and pollution sources, as they depend upon gradients, soil types, rainfall patterns and population densities.**

The distribution of water across the camp must be balanced and equitable, and accessible to all – high population density around one water point can deny users the minimum amount of water needed, and can result in increased risk of violence through competition for the remaining water.

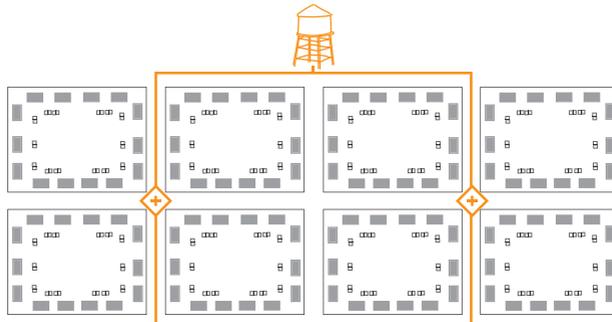


Image 10: Water distribution system must be balanced and equitable

*Long waits in queues for water collection for women and girls means less, or no, time for livelihoods activities, or for attendance at school, but can also increase the exposure to harassment, as well as the need to collect water from less secure sources. Longer walking distances, especially carrying heavy jerry cans full of water on the return journey, have been cited by women as increasing their risk of physical attack.*

### A.4.5 Drainage

Avoid flood-prone areas for accommodation or critical infrastructure. If a camp is poorly drained, and prone to flooding, shelters can be damaged or destroyed, and pathways to facilities can become blocked. Any plan to mitigate flooding in a camp should focus upon measures for the worst-affected areas first.

*Long, deep surface drainage channels can block escape routes. Make sure that surface drainage channels have regular bridges, or go into culverts at short regular intervals.*

Site plans should follow the drainage flows for the site. For steeper land, the contours define the best places for infrastructure. Major roads should follow drainage systems, as this will ensure roads have manageable gradients, prevent flooding of the roads, and reduce the costs of installing infrastructure. Fire breaks should also be aligned into the drainage system, as long as that does not result in the gaps between fire breaks becoming too wide. Using fire breaks to channel surface water run-off can reduce the degree of erosion and gullies on pathways and within the shelter blocks.

*If women, or women-headed households are marginalized within the camp, they may have been forced to live in less desirable parts of the camp – where there is more likelihood of flooding. This can have a disproportionate effect upon their safety, dignity, and freedom of movement.*

### A.4.6 Fire breaks

Fire in camps is the most deadly and destructive risk. Whilst they cannot stop smaller fires, fire-breaks can prevent fires from spreading and becoming catastrophic, and can save lives.

“Assess fire risks to inform the site planning of temporary communal settlements and the grouping of individual household shelters. Mitigating actions should include the provision of a 30-metre firebreak between every 300 metres of built-up area, and a minimum of 2 metres (but preferably twice the overall height of any structure) between individual buildings or shelters to prevent collapsing structures from touching adjacent buildings.”

 Sphere Handbook 2011, Shelter and Settlement Standard 2, Guidance Note 8

Keep fire breaks clear of both encroaching buildings, and of undergrowth, to stop fires spreading.

*Because fire breaks must be kept clear and unoccupied, they can also be unwatched no-man's lands with heightened risk of attacks on women and girls. See [A.6.9] for more discussion about how to mitigate this risk.*

#### A.4.7 Roads and Access

All parts of the camp need to be accessible to emergency vehicles. This can be most easily achieved through a simple grid system.

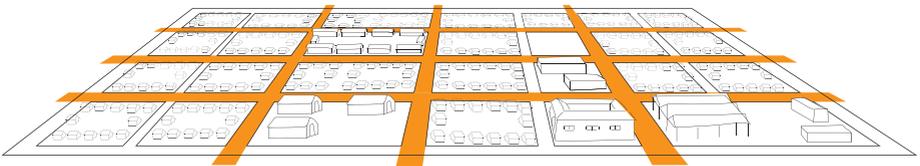


Image 11: Access for emergency vehicles can be achieved through simple grid system

Major roads between shelter blocks need to be wide enough for two vehicles side by side (for emergency or other traffic going in opposite directions). They also need to have enough space for drainage, and for infrastructure. Remember that on many roads or paths in the camps, people will want to install small shops or stalls. This can be supported, as a way of creating livelihoods, and as a way to have more watchful eyes on the street, reducing the risk of GBV – but no shops should be allowed to encroach or block the pathways themselves.

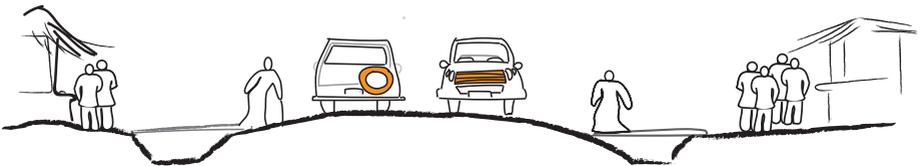


Image 12: Major roads in the camp need to be wide enough for two vehicles, provide space for pedestrians, drainage, as well as activities such as market stalls

With some soil types (e.g. Black Cotton, or soils with heavy clay content) unsurfaced roads may not be usable by vehicles during the rainy season. In order for essential services to continue, major roads at least will need to have their surfaces reinforced. To do so, the roads will also need to be widened (see [📖 REDR Engineering in Emergencies](#) for guidance).

## A5: BASIC SHELTER GROUPING LAYOUTS

### A.5.1 Plot sizes

The size and shape of the single-family plot is a defining decision about the future plan and expansion options of a camp. A difference of 5m<sup>2</sup> per family plot size, multiplied over a camp for 2,000 families can add an additional hectare size to the total.

“At the beginning of an emergency, the aim should be to provide sufficient material to the refugees to allow them to construct their own shelter while meeting at least the minimum standards for floor space as follows:

- Minimum 3.5m<sup>2</sup> covered living space per person in tropical or warm climates, excluding cooking facilities or kitchen (it is assumed that cooking will take place outside). Minimum height of 2m at the highest point.
- Minimum 4.5m<sup>2</sup> to 5.5m<sup>2</sup> covered living space per person in cold climates, including kitchen facilities as more time will be spent inside the shelter (cooking, eating, and livelihoods). 2m ceilings to reduce the heated space”.

 UNHCR Emergency Standards and Indicators, Emergency Shelter Standard

“A minimum surface area of 45 m<sup>2</sup> per person including household gardening space should be allocated. 30 m<sup>2</sup> per person will be necessary for roads, foot paths, educational facilities, sanitation, security, fire breaks, administration, water storage, distribution points, markets, storage of relief items and, of course, plots for shelter. It excludes however, any land for significant agricultural activities or livestock. The remaining 15 m<sup>2</sup> per person is allocated to household gardens attached to the family plot which should be included in the site plan from the outset.”

 UNHCR Emergency Standards and Indicators, Camp Planning Standard, Indicator 2.1

Over time, families may need to add extensions to their shelters, and may need to replace older latrine pits. Each plot needs enough space for fire-safety spaces between these structures as well.

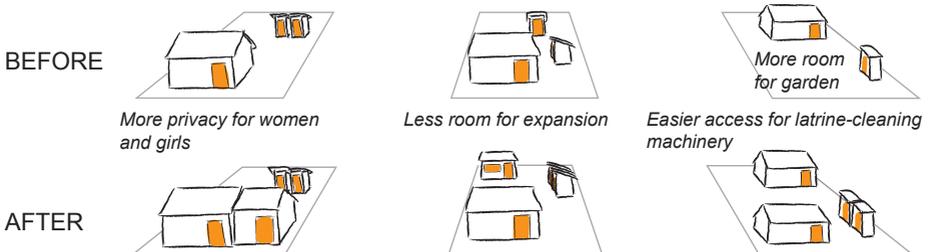
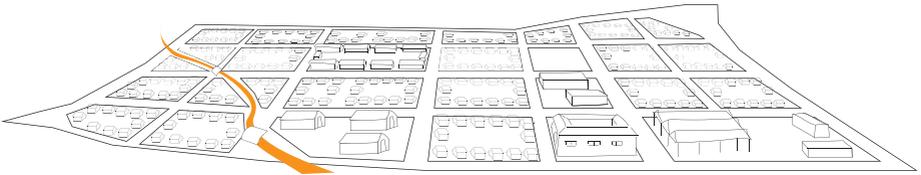


Image 13: Over time families may add extensions to their shelters

## A.5.2 Shelter Blocks

Create groupings of blocks of shelters, and then copy the layout of those groupings of shelters across the site plan for the residential areas of a camp or site.

Keep the shelters in small groupings to allow flexibility in the arrangement, so that the groupings can be placed along the contours of the site, and can avoid steep slopes, gullies or waterways.



*Image 14: Shelter blocks should allow for flexibility in arrangement when working with existing landscape of the site*

Provide shelters in uniform groupings to ensure equitable distribution of shelter plots between all households, making it easier to calculate the amount of land needed for the camp.

Installing shelters in small groups or clusters supports community cohesion, can provide space for livelihoods generation amongst extended families or neighbours, and can enable the mutual support, teamwork and watchful eyes which can make shelters, shelter plots, and family sanitation facilities safer for women and girls.

There are a number of standard design approaches for these clusters of shelters, some of which are presented below. All of them have their pros and cons, and need to be considered in the context of the standards of the communities who will be inhabiting them.

More designs on [📖 \*Transitional Settlements: Displaced Populations\*](#), [📖 \*Camp Management Toolkit\*](#).

One shelter layout which does not work, however, and which should be avoided, is **long, unbroken** 'military style' lines of shelters or tents. This design not only inhibits community cohesion and allows fewer obvious spaces for livelihoods activities, but may also have negative impacts upon the risk to the population:

- Reducing the number of escape routes from any point, and making it easier for attackers to block a path.
- Reducing the amount of safe private space shared between communities.
- Limiting the directions from which security patrols or emergency vehicles can enter and intervene.



The choice of which layout must be balanced with what is possible with limited time and resources. Options 1 and 2 below require more time, and greater staff capacities and equipment. Under pressure, Option 3 is an option that those with limited experience can do quickly with more confidence.

Often capacities of the technical teams reading the plans, surveying and laying out the site and installing the shelters, is limited. In such a case then consider Option 3 below, where back-to-back lines of shelters are divided into groupings of 16 or 20 families, so there is still some community grouping.

### A.5.3 Upgrading shelter group layout options

Population increases within the shelter clusters, and the increase of extensions and construction of shelters, can block entry and escape routes and increase social tensions. Population increases may also put increased stresses upon access to water, to latrines and shower units, and adversely affect drainage and fire safety.

Sometimes, to reduce density and improve drainage, roads or fire breaks, one or more households need to be moved out of the cluster, and into a new expansion section of the camp. Camp management and protection actors are critical to ensure that any transfers of families is done on rights-respect basis.

 *Camp Management Toolkit, Chapter 7.*



Selection of families for transfer out of an over-crowded shelter cluster is a complex and often contested process. See Section B on ensuring that expansion and transfers are transparent, well-informed processes which respects the rights of all involved at each step of the way. Transfers should avoid splitting family groupings, and should avoid situations where only most-vulnerable households are forced into leaving the shelter cluster, or intimidated into being selected for transfer, so that other families can make a land-grab for their old shelter plot.

**NOTE:** The following illustrations are not to scale. Refer to detailed technical guidance such as UNHCR’s Handbook for Emergencies, or local fire codes, for minimal distances between tents or shelters.

### Grouping Option 1: Square blocks

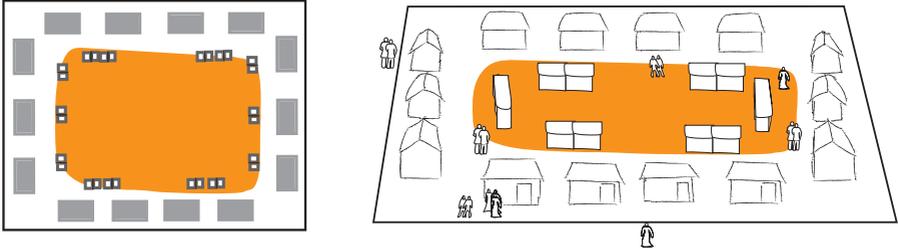


Image 15: Square blocks are arranged with shelters on the outside and latrines and other WASH facilities on the inside, enclosing some common space within

Pros	Cons
Provides community shared spaces within the cluster, and away from public paths	The space in the middle of the cluster can be contested, or taken over by one dominant family. Emptying of latrines may be difficult.
Provides space for gardens, and privacy for latrines and showers within the cluster	<i>Informal fencing or barriers annexing part of the space within the cluster can create blind alleyways, or enclosed spaces where women and girls can be trapped and attacked.</i>
Provides space for expansion or additions to the shelters	

<b>WHAT MAY CHANGE</b>	Part or all of that space may become divided or annexed, probably unequally, between one or more of the families.
<i>Barriers to divide up the land may exclude women and girls from access to latrines and shower units. Fencing should not create winding narrow pathways that block night-time light coming from surrounding shelters, which may increase risk of physical attack.</i>	

In shelter blocks closer to the central areas of the camp, this blocking off may have been increased by families at the corners of the clusters attaching new extension structures on the pathway side, to contain shops or other livelihoods enterprises.

**OPTIONS FOR MITIGATION:** Negotiate with the families in the cluster for at least one clear entry into the centre of the cluster from each side. Combine this with negotiations for a more equitable division of the community space.

## Grouping Option 2: Horseshoe or Open-U Shape

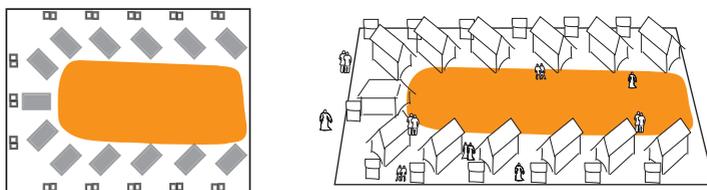


Image 16: Horseshoe block shape can provide more privacy but can be more difficult to construct

Pros	Cons
There is a protected community space, and at the same time a wider opening to public areas.	The space in the middle of the cluster can be contested, or taken over by one dominant family
Turning shelters on a 45-degree axis means that every shelter looks inwards – but not at each other.	Very limited space for individual household latrines, which can get pushed next to the shelters
Provides space for expansion or additions to the shelters	<i>Informal fencing or barriers annexing part of the space within the cluster can create blind alleyways, or enclosed spaces where women and girls can be trapped and attacked.</i>
	More difficult to construct, and most challenging and time-consuming to scale up for larger sites

<b>WHAT MAY CHANGE</b>	Part or all of that space may have been divided or annexed, probably unequally, in a land-grab by one or more of the families.
<i>Barriers to divide up the land may exclude women and girls from access to latrines and shower units. Fencing should not create winding narrow pathways that block night-time light coming from surrounding shelters, which may increase risk of physical attack.</i>	

<b>WHAT MAY CHANGE</b>	Families may have erected barriers around their own latrines behind the shelters.
<i>On the one hand this may have made the individual latrines safer for women and girls, and reduced the amount of no-man's-land at the backs of the shelter clusters, but on the other hand any remaining external space between the barriers is more likely to be narrow winding alleyways, with increased risk of attack.</i>	

**OPTIONS FOR MITIGATION:** Consult with the families in the shelter clusters, to explore whether the introduction of drainage channels through communal area can be used to demarcate boundaries, preventing encroachment. Explore whether the planting of trees for shade can also be part of this demarcation.

**Grouping Option 3: Short Double Line**



Image 17: Short double lines with communal latrine blocks at the end

Pros	Cons
Easiest to lay out when time, space, or worker capacity, is limited	No shared space to foster community cooperation for self-protection
Clearly defines exactly which part of the land belongs to which household	Less room for expansion or additions of shelters
Can accommodate later installation of individual latrines and showers	<i>In the first phase, latrines may not be located near the shelters – and are accessible to passing strangers in the public paths.</i>
Gives families options for livelihoods from the shelter – shops or workshops	
More area can be monitored by security patrols or community watch teams	

<b>WHAT MAY CHANGE</b>	Families will have built more shelter additions in the rear of their plots. Dense self-building of extra structures will increase the fire risk for this layout. Many families may have also installed latrines in their plots.
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*Self-built, improvised surface drainage channels are not only a potential health risk, but can also act as a barrier against escape for women and girls.*

**OPTIONS FOR MITIGATION:** Rationalize drainage channels, placing them along the edges of the shelter plots, and providing bridges or culverts where necessary. Replace self-built latrines with four-unit latrine blocks at the interior corners of the shelter plots.

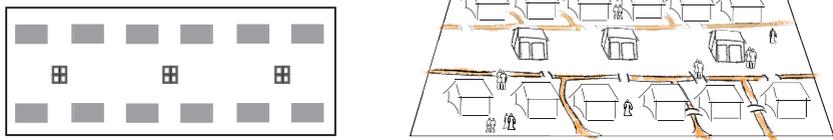


Image 18: Shared latrine blocks placed within the interior of the block provide more privacy, but can be challenging to ensure that access for de-sludging is kept clear.

## A6: DIFFERENT ELEMENTS AND THEIR LOCATIONS

Camps must ensure access to all basic services like education and health, and enable livelihoods to ensure dignified living conditions. This section gives guidance on key facilities that are found in many camps or sites.

**REMEMBER THE CONTEXT:** Look for facilities or services nearby the site, which can already be used. Duplicating them can be expensive and time-consuming, and can lose an opportunity to invest resources in upgrading the existing services for the longer term, for the host community.

*Facilities can be sites of a variety of different GBV risks – but can also be the sites for interventions which reduce those risks, have positive effects upon the camps, and give support to the empowerment of women and girls, their families and communities.*

**REMEMBER THE CONTEXT:** Sometimes, land use can be negotiated by offering to hand over the buildings and facilities of the camp to the host community during the lifespan of the camp, or after the camp has closed. Discuss whether facilities like women’s centres or child-friendly spaces can be placed within the residential areas of the camp (so, closer to many of the women and girls in the camp using those facilities), or whether they will need to be placed closer to the front entrance of the camp, in order to facilitate their use by women and girls from the host community.

**NOTE:** Camps change over time! This section also discusses what might happen in each part of the camp over time, and how this can affect safety, protection, dignity and privacy, and risk of GBV. For each element, there are options for what to do to upgrade, or mitigate the risks in already existing camps.

### A.6.1 Water points and water infrastructure

Water points must be located in places where they can be safely accessed by all. The distribution of water points throughout the camp has to be equal, so that some water points are not overloaded by demand. If a water point does need to provide water to a larger number of people, then it needs not only a bigger delivery capacity, but also more taps for people to use at the same time. Remember that in many camps, water is not just used for household cooking and washing, but also for livestock or vegetable garden irrigation!

It is likely that women and girls will have to visit water points more often than any other type of facility in a camp. Although tensions can sometimes rise at water points, water points themselves may not be areas of great risk. Instead, more focus may need to be paid to access to and from the water points, especially when carrying heavy full jerry cans of water. Also, the relative safety around the water points is no longer guaranteed later in the evenings, or when few other women are present.

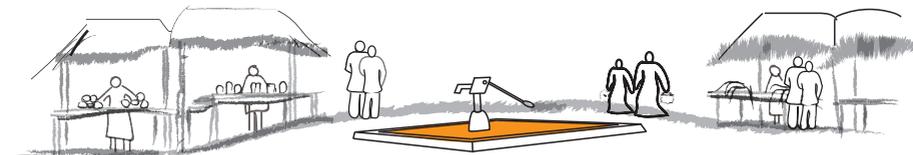


Image 19: Market stalls may increase security at water points, but should not encroach on the access and the area around the water point

<b>RISK</b>	Physical attack at, or near to the water point
	Intimidation and exclusion from use, along the route to and from the water point

Prevention Actions	Key Considerations
<b><i>Decentralize and disperse the water points into the shelter sections.</i></b> One water tap per 250 people is roughly equivalent to one water tap per three 16-family shelter clusters. This reduces the distance each woman or girl has to walk to and from the water point, and keeps it closer to people who are known.	Placing water points actually inside shelter clusters may invite strangers to enter into the private community space. <b>Placing water points at the edges of shelter clusters may avoid this.</b>
<b><i>Create enough space around the water points so that community members can install small shops or enterprises, without encroaching on the space near the water point or reducing accessibility.</i></b> Stall owners are often the best watchful eyes on a place, and have an economic interest in ensuring that the area near their enterprise is seen as safe. If the number of stalls expands into nearby pathways, this also expands the safe, watched area.	There have been cases where stall owners also try to annex the water point as well, in order to illegally sell access to the water. Insist that the stalls are placed near, and around the water point – but not right next to it, or within an agreed-upon minimum distance.

**WHAT MAY CHANGE:** Access to water points may have become encroached upon by small stalls or shops. In camps where there is little or no rain, the encroachment may be in the form of families making land-grabs to fence off the area around the water point so that they can use run-off water from the water point to irrigate their own private vegetable garden.

### **Inserting water points in an existing camp**

*In many crowded camps, the challenge for insertion of a new water point may not just be the space needed for the water point itself, but for the insertion of the pipes to the main water supply, as well.*

*If water points have to be constructed directly next to shelters, then ensure that the water-capture barriers and drainage around the water point direct water away from the shelters, and towards drainage channels on the pathways.*

*Look for local community-created open spaces, such as entry areas in front of community-built buildings for religious worship, to locate the water point, before requesting the reduction of individual shelter plot spaces.*

### **A.6.2 Infrastructure: paths and roads**

The pathways and roads which connect all of these locations can also be places of risk of attack or harassment. Paths should be straight and wide enough for access including people carrying large packs, or for people with wheelbarrows.



Image 20: Wide paths allow for easy access and circulation of groups or people carrying items

**Straight and wide paths will also allow women and girls to see ahead and identify any threats at a distance, and allow people to walk along together. This is particularly important for women and girls with disabilities, who may need extra space for mobility.**



Image 21: Pathway should be wide enough to allow people to carry packs in groups together

*For access to some facilities, on the return journey women and girls will be more vulnerable to attack by the fact that they are having to carry valuable, large and heavy items such as dried food sacks.*

**WHAT MAY CHANGE:** Drainage can become eroded or blocked, and roads and paths can become blocked or encroached upon by shops, stalls, or other structures. To reduce risk of catastrophic fire and floods, negotiate with members of the camp community to keep roads and infrastructure clear.

### ***Inserting paths in an existing camp***

*In very overcrowded camps, paths and roads may be the only spaces which can act as fire-breaks or evacuation routes, between shelters. Work with camp managers engaged in fire-safety campaigns to negotiate any rationalization of shelter plots.*

*Effective evacuation routes have at least two exits, or go through a shelter block, rather than having a dead end. Negotiate with the shelter block community to identify external paths or camp elements with which to make the new pathway connections.*

### **A.6.3 Latrines and showers outside of shelter plots**

Section [A.5] gives some examples of how latrines and shower blocks can be placed into or nearby residential shelter clusters. In some cases, especially at the starting phase of building a camp in an emergency, these options are not possible. The need to regularly remove the waste products from the latrine pits using mechanized equipment and vehicles may also mean that latrines have to be placed next to public pathways within the camp.

However, the further away from the shelters a latrine is placed, the higher the risk that women or girls will be attacked whilst visiting the latrine.



Image 22: A latrine block in a camp

*Safety audits by women and girls in many camps around the world, highlight walking to the latrines – especially at night – as their priority safety concern.*

*In all cases, ensure that latrines for women and latrines for men are clearly physically separated, with different directions for access, and with visual privacy barriers between the two sets of latrines where possible. This must also be the case for hand-washing stations which need to accompany each block of latrines.*

<b>RISK</b>	Physical attack, including rape, when approaching, inside or leaving the latrines and showers
	Intimidation and exclusion from use

Prevention Actions	Key Considerations
<b>Install security lighting around the latrines.</b> Lighting can remove the shadows where attackers might hide, and enable the latrines and showers to be used on 24-hour basis.	Lighting can attract groups of men, who may dominate the lit area as a night-time social space, and can make women and girls well-lit targets for attackers hiding in the dark. <i>Rows of smaller lights may be more appropriate than a single strong light on a high pole.</i>
<b>Place the latrines with space all around, not at the edge of a pathway.</b> Making a latrine or shower approachable from all sides is better than having a latrine tucked into the side of a narrow pathway, where the entry or escape can be easily blocked by an attacker.	If a latrine is too far away from any structures, it becomes ‘un-owned’, used by strangers more than by a community, and un-maintained. <i>Even in a clear space, a latrine needs to be close enough to be watched over, and for people to hear shouts for help.</i>
<b>Put the latrines in watch-able spaces.</b> Inside a shelter cluster, the households can watch over the safety of a latrine or shower. Outside the cluster, placing a latrine close to a shop, community centre or religious building can also put it where it is not isolated.	Latrines or showers near shops can be ‘privatized’ by shopkeepers, who then charge women an illegal fee in to use them. If a local community centre or religious building is used predominantly by men, it is unlikely that women or girls will use a latrine nearby. <i>Consult with women and girls to find out which places they visit, or feel comfortable placing the latrines and showers near to.</i>

**WHAT MAY CHANGE:** Maintenance of communal latrines and shower units drops, as more families build near or gain access to latrines and showers. As the latrines become less popular and less frequented, the risk of women and girls being isolated and physically attacked whilst visiting the latrines increases.

Mitigation Actions	Key Considerations
<b><i>If there is enough space and resources, formalize and support a replacement of communal latrines and shower blocks with ones inside individual shelter plots.</i></b>	Latrines on individual shelter plots may still not be safely usable by women and girls, if they are too close to the edges of the pathways, or with their entrances facing the public. <i>Even latrines on individual plots may still need privacy barriers.</i>

**HOW TO TALK ABOUT IT:** Latrines and showers are often installed in phases, with basic temporary communal installations being replaced by more permanent, individual units. This phased process can give many opportunities to talk about and understand the needs of women and girls, using focus group discussions or group safety audits. Understand if the latrines and showers are unsafe, but also which approach routes are the most dangerous, as well. Ask members of a focus group discussion about what they currently do to cope with the present risks.

#### ***Inserting latrines and showers in an existing camp***

*In many camps, families will have already constructed makeshift latrines of their own near their shelters. In these cases, replace both the superstructures and pits with more hygienic designs.*

*In overcrowded camp with no latrines, look for small widenings of footpaths, for instance at the junctions of pathways, as possible locations, in order to minimize the need to move any shelters.*

### A.6.4 Schools

(Many of the risks discussed in this section also apply to other types of basic public facilities such as health clinics)

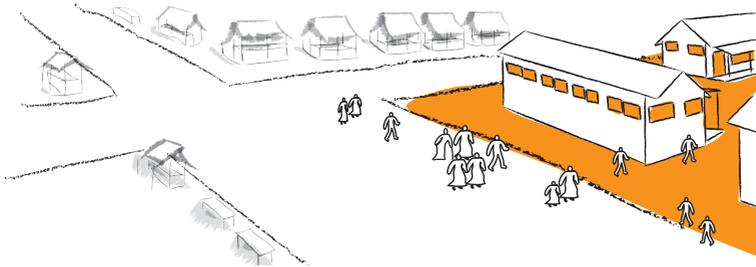


Image 23: Schools should be located in an easily accessible location within the camp, with multiple routes to ensure safe access for all

Unless there are overriding reasons against, place schools in the centre of the camp, so that the walking distance is equitable for all girls and boys. Multiple routes to the school location also mean that there is an increased likelihood of a safe route being available, particularly for girls and boys from minority nationalities or ethnicities, who may only live in one quarter of the camp.

<b>RISK</b>	Intimidation and exclusion from use
	Sexual assault during the journey to and from school

Prevention Actions	Key Considerations
<p><b>Create a plaza or open area all around the school.</b> Remove hidden corners where potential attackers can hide.</p>	<p>If the plazas are too big, they too can become intimidating 'no-man's-lands'. <b>Make sure that both school entrances, and roads away from the schools, are clearly visible and safely reachable across the plaza. Divert road traffic, or commercial foot traffic if necessary.</b></p>
<p><b>For evening classes, place security lighting not just around the school, but along the main routes between the school and the residential blocks as well.</b></p>	
<p><b>Ensure that there are multiple routes leading to the school.</b> Make sure that each shelter section has its own access to school, give girls the chance to choose the paths which they assess to be the safest and reduce the chance of all routes being blocked, or becoming traps.</p>	<p>Too many routes can end up looking more like labyrinths, or providing escape routes for attackers. <b>Choose one main road leading to the school from each section of shelter clusters, rather than many small ones.</b></p>

Prevention Actions	Key Considerations
<p><b>Ensure paths leading close to the school are wide enough for groups of girls to walk to school together, and not just individually, or in single file.</b> Girls walking together are safer than those walking alone, and a group can give better protection to the youngest, or to those with disabilities.</p>	<p>If the road is too wide, it can become the main internal 'highway' for vehicles in the camp, bringing its own dangers. Consider adding speed bumps into the road surface at the same time.</p>

**WHAT MAY CHANGE:** Shops and stalls may have been installed around the school plaza. On the one hand, this can have increased the number of watchful eyes present. On the other hand, the stalls may have encroached so much on the pathways and plaza, that there is no longer enough room for girls and boys to walk safely together as groups. The area around the school can become a large crossway or interchange for vehicles, raising the risk of accident, but also increasing the number of unknown adults next around the school.

Mitigation Actions	Key Considerations
<p><b>Negotiate with stall owners, for a clear demarcation of boundaries for stalls and pathways.</b> Drainage channels and shaded areas can be used to make those boundaries clear to all.</p>	<p>Emergency vehicles still need access to the area. Negotiate with emergency service providers for the acceptable placement of the speed bumps, or look for re-routing emergency vehicle channels to go around the back of the school area, instead.</p>
<p><b>Construct speed bumps at the entrances to the school plaza, and if necessary within the school plaza, to deter through vehicle traffic.</b></p>	

### **Inserting a school in an existing camp**

*It is unrealistic to plan to insert an entire school into an already overcrowded camp. Instead, insert single classrooms. Where appropriate, negotiate to use the external space around buildings of religious worship or community meetings, to locate the classroom.*

### A.6.5 Distribution Centres

Safe access for delivery trucks and shorter vehicle journeys through the camp, often dictate that distribution centres have good road access, and therefore are at some distance from many of the shelters.

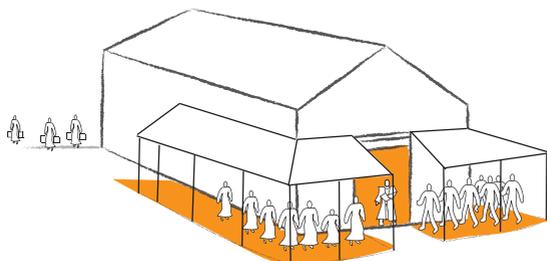


Image 24: Distribution Centres must cater for logistical demands as well as providing safe space for women and children to wait in line for relief items

<b>RISK</b>	Physical attack, on the journey to and especially from the distribution centre
	Harassment in the waiting lines for distribution

Prevention Actions	Key Considerations
<p><b>Create a plaza or open area all around the centre.</b> Remove hidden corners where potential attackers can hide.</p>	<p>Distribution centres are often built out of structures without windows, and have 'blind sides', increasing the likelihood of attack along those sides of the centre. Explore the use of those areas for activities which do not interfere with delivery of goods to the centre, such as parking, which ensure a continuous presence of watchful people.</p>
<p><b>Use barriers and shade areas, to clearly separate the waiting line areas for entry to the distribution centre.</b> Discuss with women whether a separate line for women is needed, and whether that line should be in parallel to the line for men or approach the entrance to the centre from a different direction.</p>	<p>Separate waiting lines can also mean that women and girls become separate from men in their families during distribution. Confusion in trying to find family members after a distribution can also make women or girls vulnerable to attack. Make sure that the space around the exit of the distribution centre is large enough and safe enough for waiting for and meeting other family members.</p>

Prevention Actions	Key Considerations
<p><b>Install security lighting around distribution centre.</b> Because the centre may be unused or unoccupied at night, the area around it may become a darkened no-go zone.</p>	<p>Lighting can also attract groups of men, who use the lit area as a night-time social space, and can also make women and girls well-lit targets for attackers hiding in the dark. <i>Wider rows of smaller lights may be more appropriate than a single strong light on a high pole. Consider the placement of the light in relationship to the post for the security guard for the distribution centre warehouse, depot or vehicle park.</i></p>

**WHAT MAY CHANGE:** Increases in camp population will mean an increase in waiting times and waiting lines for distribution centres. Old waiting line structures of shade and barriers may no longer be large enough or adequate. Like other central facilities with lots of foot traffic, the open area around the distribution centre may have become encroached by small stalls or shops. Resulting traffic bottlenecks for delivery trucks pose a double risk – of both traffic accidents, and increased harassment of women and girls in overcrowded pathways.

Mitigation Actions
<p><b>Upgrade or increase the dimensions of the shaded waiting areas.</b> Look for resources for doing so by seeking partners who can use the increased waiting lines to provide information or advertising. <i>Placing the waiting lines along the walls of the distribution centre allows the shade from the walls to also be used.</i></p>

### **Inserting a distribution centre in an existing camp**

*As a distribution centre is a major building for official use, it is unlikely that an entire new centre can be inserted into the middle of a camp. Instead, negotiate for new space at the edge of the camp, even if the identified location is exterior to the camp boundaries. Local market areas can also be used for small-scale distributions.*

## **A.6.6 Women’s centres (and child-friendly spaces)**

Locations which are seen as exclusively for women or girls can unfortunately become a target of attack, or a target of resentment amongst some men, for that very reason. In many countries, centres in camps which include GBV-counselling for women do not publicly advertise the fact, keeping those services in low profile, and instead present themselves as centres for women’s education or community activities. GBV programme managers, camp managers, and the groups of women and girls who they work with, may need to consult with construction managers and security advisors on the exact layout and dimensions of perimeter fences and entrances. (Typically, a fence needs

to be high enough so that no-one can easily climb over it, and there will need to be discussions about whether having only one entrance allows control of access, or raises too high a risk of being trapped.)

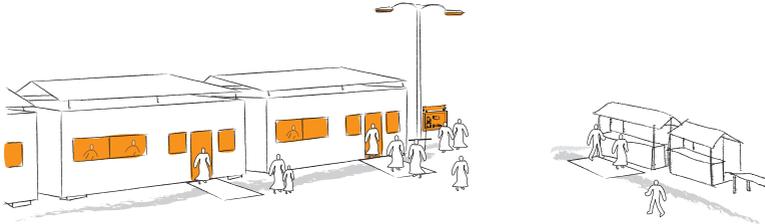


Image 25: Women’s centres and child-friendly spaces should be easily accessible, potentially close to other facilities that women will often visit such as market or health clinic

<b>RISK</b>	Intimidation and exclusion from use, on the pathway to and from the centre, or at the entrance
	Forced entrance, or physical attacks into the centre

Prevention Actions	Key Considerations
<b>Make sure that a women’s centre is on accessible routes, with clear lines of sight for women who are entering and leaving the centre.</b> Being able to see along an approach road can help anticipate and avoid attack.	If the centre needs to keep a low profile, it may be best not to situate it alone in the middle of an open plaza. <i>Instead, look to situate it in a grouping of other facilities buildings, for instance next door to a vocational training centre or health clinic.</i>
<b>Install the centre closer to where women go, inside the shelter sectors, rather than near the front entrance of the camp.</b> Discuss with women whether locating a centre close to a decentralized subsidiary marketplace, or close to a child-friendly space inside a shelter section might be a safe option.	

**WHAT MAY CHANGE:** If a women’s centre has been situated nearby other community facilities, encroachment by shops or stalls onto the approach pathways may happen as a result of the livelihoods opportunities connected to those other facilities, as well.

Mitigation Actions
<b>Discuss with women options for establishing women-run stalls or shops in the area around the women’s centre, as a way of expanding the safe space into the public areas.</b> The planning for the installation of the shops can also contribute to planning for reversal of encroachment into the pathways nearby.
<b>For child-friendly spaces, add shaded waiting areas at the entrance gate of the space, so that children and mothers can wait for each other, and a clear boundary is given against encroachment.</b>

**Inserting women and child-friendly spaces in an existing camp**

*If there is not enough space for an entire women’s centre, create with women from the camp a list of all the separate activities which would take place in the centre, and then identify those activities which could take place in smaller, single roomed structures, or which could be housed in already-existing structures in the camp.*

**A.6.7 Administrative buildings and centres**

Administrative buildings and agency compounds are usually located near access roads, in order to facilitate evacuation in case of attack.

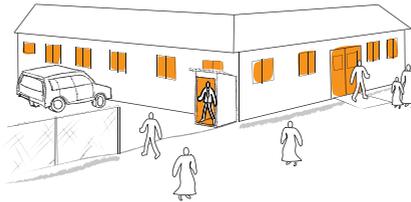


Image 26: Administrative buildings

<b>RISK</b>	Intimidation and exclusion from use
	Physical attack on the way to or from the administrative centre, especially if the it is isolated from other parts of the camp

Prevention Actions	Key Considerations
<b><i>Make sure that the observation posts, and observation horizons for security personnel guarding the administrative buildings also include the areas outside and surrounding the buildings, as well.</i></b> This increases the watched-over areas.	Security guards have contributed to a number of reported harassment of women and girls. <i>Reduce this likelihood by having multiple-person guard teams. Make sure that the guard posts are appropriate for women guards, and are observable and monitorable, by those working in the administrative buildings.</i>
<b><i>Install local, multi-use community centres within the shelter sections and shelter blocks.</i></b> Reduce the risk for women and girls in walking to central administrative buildings, by taking the functions of those buildings into the women’s own neighbourhoods, instead.	It is possible for women to become trapped or attacked within a local community centre. <i>Talk with women in the community, to design a centre which makes a balance between openness and inclusivity, and security and privacy.</i>

**WHAT MAY CHANGE:** It is less likely that there will be encroachment by shops and stalls nearby the administrative buildings. However, this means that the area may still be approachable only by crossing an open no-man’s land.

*Women and girls living in shelter clusters away from the administrative buildings will have to walk longer to access those administrative buildings. On the other hand, in order to accommodate vehicles and to keep evacuation routes clear, it is likely that these buildings will have clear spaces around them, with few hidden corners around which attackers can hide.*

**Inserting an administrative centre in an existing camp**  
*It is unlikely that an administrative centre will need to be inserted into the middle of a camp. Instead, negotiate for space exterior to the camp.*

### A.6.8 Main entrance

Not all sites have clearly defined main entrances: this section applies to those where there is one. The front entrance of camps can often be badly defined no-man’s-lands, and the one place in a camp where there may be many strangers congregating from outside the camp, and where the strangers are more likely to be men – taxi drivers offering transport to the nearest town, policemen coming to work in the camp, or drivers of trucks delivering food, NFIs, construction materials or machinery.

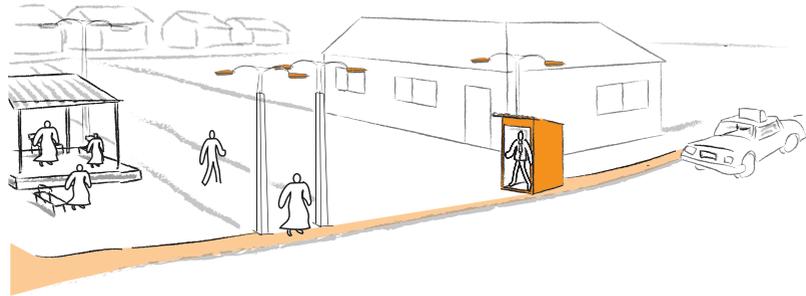


Image 27: Main Entrance to a site (note that most sites are not - and should not be - fenced)

<b>RISK</b>	Physical attack, including abduction and rape
	Harassment and intimidation

FROM THE FIELD

In Kurdistan in 2015, in response to complaints by women of harassment whilst waiting for taxis at the entrance to one refugee camp, an NGO built specific, well-lit taxi-waiting areas for women.

Prevention Actions	Key Considerations
<p><b>Provide secure waiting areas for women and girls waiting to leave the camp.</b> These waiting areas need to be well-lit, but can also be places for posting information and promotional materials.</p>	<p>The waiting areas can be taken over by the taxi drivers themselves. <i>Work with camp security to ensure that taxi drivers are not permitted within the waiting area, and add design features like having an entrance to the waiting area facing only the inside (not the outside) of the camp, to reinforce this message.</i></p>
<p><b>Have the entrance gate wide enough so that women are not pushed into large crowds where they can be anonymously assaulted.</b> Wider entrances also provide more chance for escape, in case of attack.</p>	<p>Wider gates may attract more and more heavy vehicle traffic, with its own dangers. <i>Build separate entryways for vehicles and pedestrians.</i></p>
<p><b>Construct an outdoor shaded area for people to have their IDs or baggage inspected.</b> This removes the excuse for male security officers to force women or girls inside their offices, and away from protection.</p>	

**WHAT MAY CHANGE:** Camp upgrades and population increases mean a greater amount of heavy vehicle traffic bringing construction materials, and unknown men, visiting the camp. Demand for local taxis or minibus services also increases, increasing the number of unknown taxi or minibus drivers in the area.

### Mitigation Actions

**Consider establishing totally separate entrances for vehicles and foot traffic.**

#### **Inserting a new entrance in an existing camp**

*DO NO HARM: Inserting a new main entrance to a camp is a major undertaking, resulting in the redesign of the entire camp's road system and administrative and security procedures.*

*Ensure that the road system, and any associated drainage system for the new entrance, connects with the road and drainage system for the already existing entrance.*

*Increasing the number of entrances into a camp can increase the risk of GBV, though the increase of men from outside, coming into and through the camp.*

### A.6.9 The edges of a camp or site

In almost all camps, the shelter clusters at the edges of the camp are likely areas to be under-populated, the location of socially undesirable behaviour in general, and of heightened risk of GBV, far away from the more desirable clusters towards the central markets or central distribution centres.

In many camps, these ‘edges’ are not just limited to the periphery of the camp – they can include internal edges, where shelter clusters come up against fire-breaks, waste-disposal areas, or erosion gullies (which often get turned into informal waste dumps).

**ENVIRONMENT:** Badly designed or badly managed waste-disposal facilities affect not just the areas nearest them, but can pollute the environment over the rest of the camp as well. Get expert help on the design of solid waste disposal, and community recycling schemes.

**FROM THE FIELD** In Sierra Leone in 2004, fire-breaks in camps were being used not only as hiding places for attackers, but as footpath getaway routes for men attacking women within their shelters. The camp management agency instigated a programme of removing long grass and undergrowth to improve fire-breaks, and to remove the hiding cover of the attackers.

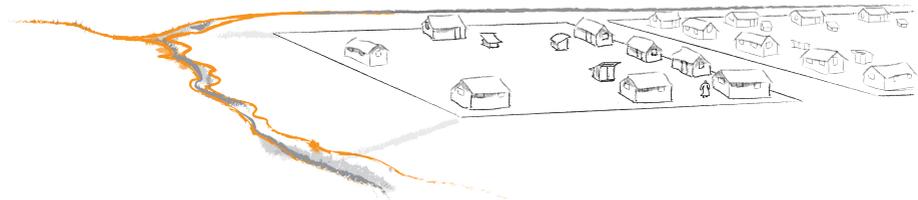


Image 28: The edge of the camp

**RISK** Physical attack, including rape, both inside under-populated shelter clusters, and outside the camp

*Firebreaks without vegetation can become the location for male-dominated sports, with possible exclusion of the space from women and girls.*

Prevention Actions	Key Considerations
<b><i>Install local community centres, or provide the space necessary for small local market areas, or places of religious worship to be constructed in or near shelter clusters at the edges of camps.</i></b> These can act as community anchors, to counter moves to the centre of the camp.	Places of religious worship may also be exclusionary to women and girls. <i>Have a mix of anchors – religious and non-religious, rather than just one type.</i>
<b><i>In more extreme situations consider installing resting posts for community security patrols nearby to problem areas.</i></b> Even if the resting posts are only occupied some of the time, their presence may still help to push back the areas of anti-social behaviour.	If facilities for community security patrols become abandoned, they too can become the location for anti-social behaviour. <i>Make the posts multi-purpose or multi-usage by also making them places for posters or other means of information sharing.</i>
<b><i>Discuss with women whether other community activities can be supported through space allocation at the edges of the camp.</i></b> This may include livelihoods enterprises, or vegetable gardens.	Gardens, with high-growing plants, can also be places with a risk of attack.

## FROM THE FIELD

In the Philippines in 2015, women in post-typhoon transitional settlements were supported to build fences around their market gardens, to make them safer to work in, and to protect their produce.

**WHAT MAY CHANGE:** De-population, or the movement of people from edge shelter clusters to clusters in the centre of a camp increases in time. The size of erosion gullies, and the amount of waste in a camp both increase.

If new extension sections are planned to be added at the edges of the current camp, then remember that the problem areas at the edge of the camp may now be in the middle of the camp. People walking from a new expansion section to the centre of the camp will have to walk through an extended area of high risk.

## Mitigation Actions

***Strengthen the presence of watchful eyes along the main roads from expansion areas going through ex-edge problem areas.*** Install extra water points, or shaded areas to encourage community centres or shops along the sides of the roads.

### A.6.10 Market Places

During the daytime, central markets in camps can be busy, well-populated places. There may be less likelihood of severe physical attacks, but there may be the risk of strangers taking advantage of the anonymity of large crowds. Central markets may be a distance from many of the shelter clusters, and so become abandoned at night, risking being either darkened no-go zones, or else more likely to have groups of men hanging out, and again increasing the risk of attack or harassment.

Enabling the establishment of local stalls, shops and markets within the shelter sections is one key way to reduce the overall risk associated with central markets, as those who own the local stalls are likely to come from nearby shelters, and may also be present in those stalls for longer hours in the evenings. Whilst in some camp situations, the provision of shaded areas or stall construction materials may be necessary, it doesn't need to be complicated, and often all that is needed is just the provision of adequate space, in small open areas or squares at key crossing points amongst the shelter sections.

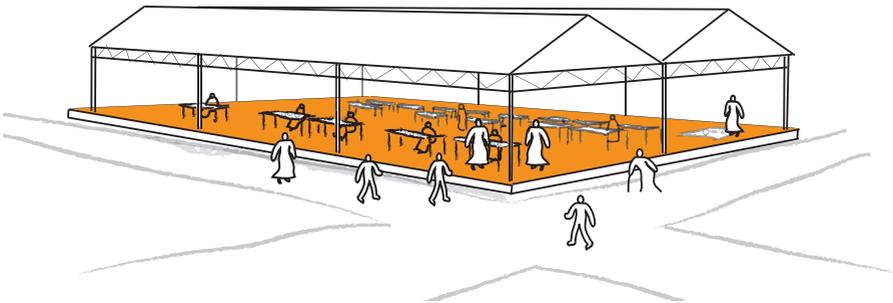


Image 29: Market places should be clearly demarcated and can be secured at night when not in use

<b>RISK</b>	Physical attack, including rape, in the central marketplace at night
	Physical harassment and verbal abuse in large crowds during the day

#### **Inserting a market in an existing camp**

*In many camps, families will have already built their own stalls or kiosks, near their shelters. Upgrade these if necessary, focusing on ensuring that upgrades include drainage and areas to collect and remove refuse.*

Prevention Actions	Key Considerations
<b><i>Put a perimeter fence around the central market, which can be locked at night.</i></b> Stall owners may support this as a way of keeping their stalls safe and clean.	Perimeter fences will need to have a sufficient number of wide gates in order to permit safe entry and possible evacuation during daytime use. <i>Make sure that there is at least one gate per road approaching the market.</i>
<b><i>Make sure that corridors or walkways within the central market are wide enough for everyone to shop and walk through, without the risk of harassment from anonymous hands.</i></b> Make sure that this width also takes into account women with small children, or large bags.	Stall owners may still want to maximize the amount of stalls in a market, or the amount of space given to each stall. <i>Consider using drainage channels as a way of giving clear visual indications of the boundaries of the walkways.</i>
<b><i>Clearly demarcate boundaries for local markets or groups of stalls in shelter sections.</i></b> Make sure that they do not block the pathways and reduce the safety of women and girls at those points.	Stall owners may still have a tendency to encroach upon open ground. <i>Consider planting trees, or installing other shade structures, as a natural 'magnet' to draw stalls back to the edges of the space.</i>

**WHAT MAY CHANGE:** Both central markets and local markets become larger, and more congested, with pathways within the market becoming encroached upon and narrower, increasing the risk of harassment for women and girls in large crowds.

Mitigation Actions	Key Considerations
<b><i>Negotiate with stall or shop owners, to trade stronger, more secure frontages for their shops (constructed from metal or blocks), in return for respected boundaries for walkways.</i></b> This increased sense of security for shop owners, especially women shop owners, may also increase the amount of evening hours which they are open, and so lengthen the amount of time in the evening that there are watchful eyes in the neighbourhood.	Stall owners in the central market may still want to maximize the amount of stalls in a market, or the amount of space given to each stall. <i>Consider inserting or upgrading drainage channels as a way of giving clear visual indications of the boundaries of the walkways.</i>
	Stall owners in local markets may still have a tendency to encroach upon open ground. <i>Consider planting trees, or installing other shade structures, as a natural 'magnet' to draw stalls back to the edges of the space.</i>

## SECTION B: EXPANSIONS

### B1: WHEN TO EXPAND?

Ideally, planning for expansion of camps should be done as part of the initial site planning at the start of the lifespan of the camp (see [A.1] above). Section [A.5.3] also gives some suggestions for how to reduce over-densification in older shelter clusters, through relocating families out of those clusters.

Expansion of camps or sites is usually undertaken under one of three main scenarios:

1. There are significant new arrivals of people into the camp.
2. The camp is already over-crowded, and some people will move into the new expansion sections in order to decongest the old sections
3. The camp is not overcrowded, but part of the camp has become dangerous or unusable, e.g. due to flooding, landslide, or lack of water

*There are many new people coming – where can they stay?*



*My son got married and has new children, and my wife's brother moved in to join us last month.*



*Every time it rains, my shelter floods, and we have to sleep in the same shelter with my neighbour.*



A number of smaller camps can be less overwhelming for host communities, and have a less intensive impact upon resources and the environment, than making an existing camp larger.

If a new expansion section is being created solely for new arrivals, then the guidance on the construction of new sites in section [A] of this booklet can be relevant.

*Longer distances to walk to those facilities for those in the new expansion sections can create physical hardship, increase the risk of exposure to GBV, and increase the likelihood that eventually those new expansion sections will become depopulated (with people moving spontaneously to squeeze into the better serviced shelter clusters in the old sections instead), and then become problem sections, with the risk of GBV inside those sections increased overall.*

Install as many services, per number of population in the new sections as has been present in the old section. Consider other locations, such as formal markets, which can also act as major social focal points, and livelihoods strengtheners, for the new expansion sections. For those facilities which can not be copied into the new expansion areas, such as central distribution centres, then ensure at a minimum that there are wide, straight main roads within the camp, clearly connecting the expansion sections to these facilities. Ensure that any security lighting, or security posts also continue along these main road expansions, from the old sections into the new sections.

In cases where the expansion is being undertaken in order to relieve already existing over-crowding, or to remove people from hazardous or unliveable areas of the old camp, then there are two general options available:

## B2: EXPANSION OPTIONS

### B2.1 Option 1: A New Site

If there is enough land available, moving everyone to an entirely new site can simplify the different phases of movement, be quicker, and reduce stress for individual families by removing the possibility of multiple moves.

*a. Getting off the vehicle:*  
Ensure enough room for the vehicles to turn around and leave the camp again

*b. Information updates:*  
Have access to the information billboards for women and men

*c. Registration in the camp:* Have clear waiting lines in front of the registration facilities with a shaded area for documents and equipment



Image 30.1: To receive large influx of new arrivals, clearly marked designated spaces are vital

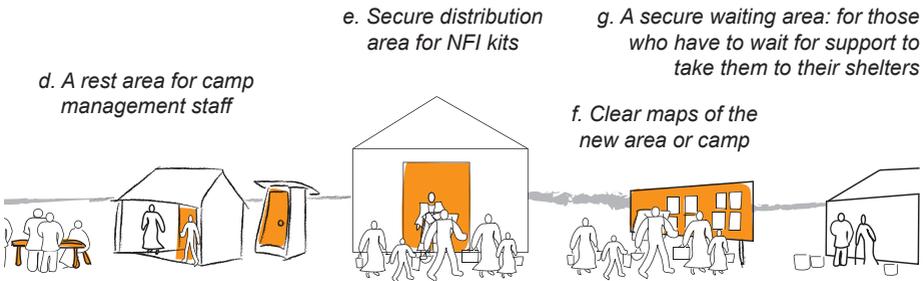


Image 30.2: It is best to plan the arrival process as a single line of activities

For large influxes of new arrivals, have sufficient clearly designated space at the entrance of the new camp, for each part of the arrival process. For general security reasons, it is best to plan the arrival process as a single line of activities, so that each person or each household enters the process at one end, and finishes and comes out at the other end. Avoid situations where people have to double back towards the starting point, or have to go repeatedly across the same point.

*Sufficient space includes having enough room for women and girls to access latrines, handwashing stations and drinking water during the arrival process, and having enough shaded area, safely accessible for women and girls at each stage of the arrival process for resting, completing the arrival registration process or waiting for the arrival of other family members.*

### B2.2 Option 2: Existing Site

If a new site is not available, or will not have capacity for the entire camp population, then some density reduction, and rationalization of the old camp can still be achieved by having a new expansion area as the start of a rotation scheme.

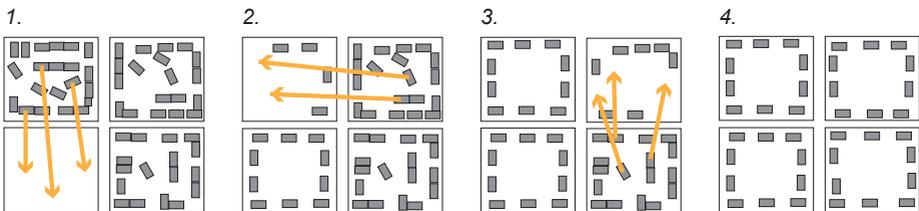


Image 31: Expansion within an existing site may be a multi-step process. This can be done using any of the standard shelter block designs in Section A.5.3.



As the aim is to reduce the number of people per square metre overall, if all of the sections in the camp are of equal area, then moving 100% of the people from Section 2 to Section 1 will have no effect upon the actual population density.

**HOW TO TALK ABOUT IT:** Choosing who should stay and who should move can be a complex and emotionally charged issue. Work closely with camp management staff, to plan the movement with the communities involved. Make sure that the community consultation process does not result in only women-headed households, unaccompanied women and girls, or other most-vulnerable households being designated as the only ones to be left behind in the old sections, as they will then be joined by strangers as new neighbours.



Plan all movements of families to expand or rationalize the camp so that families move as few times as possible. Each move will be stressful, and will have the potential to expose women and children to harassment or attack, and so make a plan to keep the number of sequential movements to an absolute minimum.

It is also possible for families to stay temporarily in a nearby collective centre as part of the move, in order to give space for the rationalization of the older camp sections. However, this is not recommended unless there is no other option, as it involves an increased number of overall moves, and should only be taken if there are guarantees that the stay in the collective centre is extremely short, and if there is a clear, agreed-upon plan in place to install the necessary facilities (including privacy barriers) and measures (security patrols, enhanced lighting) to ensure protection whilst the families are in the collective centre.

## SECTION C: CONSOLIDATION AND CLOSING DOWN

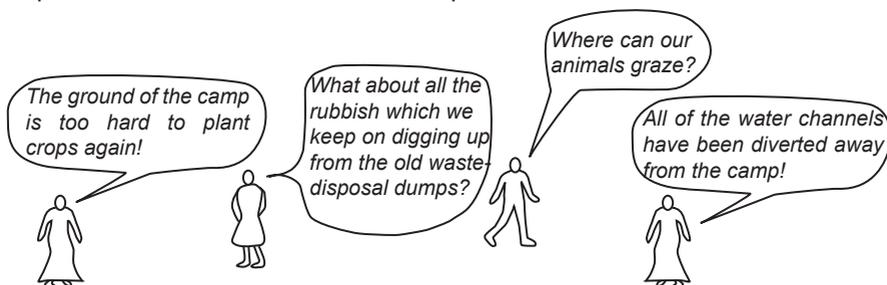
### C1: WHEN TO CONSOLIDATE OR CLOSE DOWN?

Camps are designed to be depopulated and closed down. Usually, there is a process which also involves a phase of consolidation (a planned process of gradually becoming smaller in both population and geographic area, whereby all remaining parts of the camp come closer together). At the end frequently the most vulnerable families are left – those with no other options.

- Families may split, with the men leaving the camp first, to re-establish their home elsewhere, while women, children, those with disabilities and the elderly are left behind.

*As the first families leave, shelters can become abandoned. Shelter clusters with a high proportion of abandoned shelters invite anti-social behaviour, and increase the risk of GBV not only in those clusters, but in nearby areas and pathways as well.*

**Environmental recovery** of the camp location can take years, and needs to be planned – from the start of the camp's existence.



- As the camp population decreases, resources for supporting agencies will often be reduced, and facilities may be closed, before the last families have left the camp. Not only does this deprive those families of access to basic services, but in terms of site planning also removes those public social centres, and risks turning those locations of the camp into abandoned ‘no-man’s-lands’.
- Those households with the most resources and the most capacities may be the first to be able to leave the camp, meaning that the remaining population in the camp will have a higher percentage of those who are vulnerable, or who have special needs, which will also have a possible impact upon the ability of the remaining population to self-organise, or take an active role in protection or activities which can reduce the risk of GBV.
- Depending upon the situation, those from marginalized minorities, or who may not be welcomed in new locations outside the camp, may also be the last to stay in the camp, and may then also become targets of harassment or attack from others.

 *Camp Management Toolkit* and  *CCCM Cluster Camp Closure Guidelines*: consult with all individuals before, during, and after the camp closure, ensuring that for each individual in the camp, there is a transparent consultation process, and that rights are respected at each step.

## C2: PLANNING TO CONSOLIDATE OR CLOSE DOWN

For site planning specifically, the following are key principles to managing protection risks during this phase of the camp lifespan:

- **Identify** sections of a camp which will be the first to officially close (usually already clear from the higher number of spontaneous departures of families), and those sections which will be the last to close (most likely the sections closest to the central facilities buildings, and the main entrance to the camp).

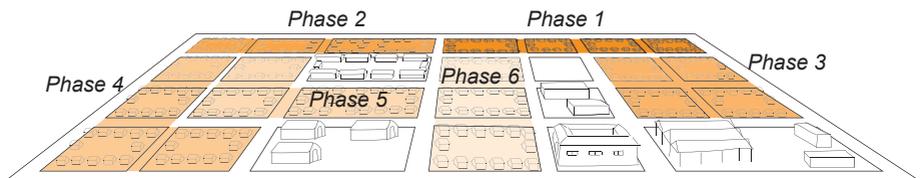


Image 32: Closing down a camp almost always has to be done in phases

- **Remove** at the earliest opportunity, any abandoned structures, whether old shelters, community centres, or facilities. The exceptions are those structures or facilities which may be re-occupied during the consolidation process, by those moving from sections of the camp which have been officially closed, to those sections which are still open and functioning.



Ensure that removing the buildings which contained health or education services does not just enable a disappearance of these vital support services themselves. Find ways that remaining services can share remaining buildings, where possible.



Special sensitivity may be needed in the removal of religious structures or buildings. Take early steps to consult with religious leaders and communities.

**FROM THE FIELD**

Planned removal of structures may not just include things above ground. In Uganda in 2008, camp managers in northern Uganda had to give extra help to families leaving camps, who had buried their dead, following local custom, under the doorsteps of their shelters.

**FROM THE FIELD**

In the shelter clusters, remember to have a plan not just for shelters, but for the latrines and shower units as well. In eastern Democratic Republic of Congo in 2009, families took all their shelter materials with them when they left the camps, but not the latrine structures. Camp management organizations formed special teams to recover the latrine structures, so that they would not be used by local militias in the area, and needed machinery to fill in the latrine pits, which had been dug into the lava-rock ground.

**HOW TO TALK ABOUT IT:** Through the process of spontaneous departure, those who have been community leaders within the camp may have already left the camp. Use previous lists of focus group discussions where the groups have represented those with special needs, most-vulnerable groups, or ethnic minorities, in order to target those most likely to be remaining in the camp.

- **Have an agreed-upon point** when a section will be closed. Don't wait until the last person has left that section, but agree with the remaining camp community representatives that a section will become officially closed when a certain percentage of families in the section have left. Typically,

this point should be between the time when 33% of people in a section have departed (meaning that on average, every family remaining has at least one abandoned shelter as an immediate neighbour) and when 50% of people have departed (meaning that on average there will be no need to construct new shelters for the consolidation into other sections or clusters, as overall the 50% who remain is the same number of people/shelters as the 50% who have already left.

-  Plan all movements of families to consolidate the camp so that **families move as few times as possible**. Each move will be stressful, and will have the potential to expose women and children to harassment or attack, and so make a plan to keep the number of sequential movements to an absolute minimum.
- **Remember to re-use** where possible not just shelter materials, but also infrastructure. If the re-planned site is over a larger area, additional infrastructure such as security lights will be required.
- If the move out of the camp is being supported by camp management organizations, don't forget to **have a plan for assembling families**, and all the goods that they need to take with them. Ensure that departure points have clear access to water and sanitation, safe access to information, and enough space for belongings as well as the people travelling.
- **Take care over the timing** of decommissioning of water points, and other infrastructure as each section is closed. No-one can be denied access to water, or forced to leave by having their only source of water turned off. But at the same time, if water points continue to function in abandoned areas, they may become magnets for non-camp residents, or anti-social activities.

## ii: ANNEX

### ii.1 Estimating Site Density

### ii.2 Local Drainage and Rainfall Calculation

#### Further Reading

Many resources available for free online, giving more in-depth information about the themes discussed in this booklet.

#### Principles and Rights

-  IASC, *Guidelines for Integrating Gender-Based Violence Interventions in Humanitarian Action*, 2015
-  OCHA, *Guiding Principles on Internal Displacement*, 1998
-  The Sphere Project, *Humanitarian Charter and Minimum Standards in Humanitarian Response*, 2011

#### Camp Management

-  CCCM Cluster, *The Camp Management Toolkit*, 2015
-  CCCM Cluster, *Camp Closure Guidelines*, 2014

#### Shelter and Settlements Programming

-  OCHA/Shelter Centre/DfID, *Transitional Settlement and Reconstruction After Disaster*, 2010
-  Urban Shelter Guidelines, 2011

#### Physical Site Planning

-  IFRC/HI/CBM, *All Under One Roof*, 2015
-  RedR, *Engineering in Emergencies*, 2002
-  Shelter Centre, *Transitional Settlements: Displaced Populations*, 2005
-  UNHCR, *Handbook for Emergencies*, 2007
-  UNHCR, *Environmental Guidelines*, 2005

## ii.1: ESTIMATING SITE DENSITY

### Estimating site densities, population sizes, and site area

Site Density (D) is the total planned Population (P) divided by the total usable Area of the site (A):

$$D = P / A$$



“Sometimes the minimum standards may exceed everyday living conditions for the surrounding population. Adhering to the standards for disaster-affected populations remains essential. But such situations may also indicate the need for action in support of the surrounding population and for dialogue with community leaders. What is appropriate and feasible will depend on the context.”

 *Sphere Handbook 2011, 'Conforming With The Sphere Minimum Standards'*

### Calculating the total area of a camp

1. Calculate the perimeter
  - a. Define the perimeter.
  - b. Draw the perimeter (use a scale drawing – on squared paper, a mapping application or CAD/GIS system). You may use a GPS to help input perimeter points.
  - c. Divide the area into smaller squares and calculate the area (illustration as below).

Alternatively most GPS units have the function of allowing you to walk a perimeter and calculate the internal area. All CAD and GIS applications will also allow you to measure the area contained within a line.



Image 33: Most sites come in irregular shapes, it is important to first mark the perimeter



Image 34: Dividing the site into rectangles and squares help ease the calculation

2. Remove unusable areas

- a. Map unusable areas such as swamps or rocky areas
- b. Calculate the area of such unusable areas
- c. Subtract them from the total area above

However, not all land sites available for camps are of regular lengths and widths. In this case, the easiest way is to use a map and divide the entire area into smaller squares or rectangles.



*Image 35: Unsuitable sections can be removed, but using the rectangles will still make it easier to calculate usable land*

With this approach, the area of each square or rectangle can first be calculated, and then the areas of all the squares or rectangles together can be added up. If all the residential clusters are of uniform dimensions, then this can provide easy blocks to add up, in order to help make the total calculation. Do not forget to include the area of the streets or pathways in between and around the shelter clusters, as well! This approach also provides an easy way to map and monitor which shelter clusters are already over-densified, and which are under-densified, or are even losing population.

**Calculating the total current population:**

When the population living in a camp has been registered, the number of people living in the camp will be easy to confirm. In spontaneous sites, camps where there are continued new arrivals, or where the registration process is not complete, or questionable, triangulated data from different sources will give better estimates of the overall population:

Household assessment: this is the most complete method, but is time-consuming, and requires large staffing resources. Agencies have sometimes undertaken these assessments at night, to have greater assurance that they are assessing everyone who is living in the camp, but this is often a contested methodology, with risks of invasion of privacy.

Spot checks: to verify site populations in certain sectors or in smaller sites, spot checks may be conducted to verify who is present. In some cases this may be combined with removal of shelters that are known to be unoccupied.

Estimates from water usage: water engineers can indicate the total amount of water used by the camp on a daily basis. With an estimate of the average number of litres used per person per day, a calculation can be made for the total population. This calculation is very culturally specific, and may depend upon whether families are using water for other purposes than cooking, personal hygiene and household cleaning.

Estimates from distributions: if there are regular blanket distributions of food (or other items) in the camp, then the number of portions distributed – or the number of portions left over from a stockpile after distribution – can provide a population estimate. Spot-checks on the ground may be necessary to monitor whether food is being thrown away – or whether people are claiming extra portions in order to store for later, or re-sell. Note that in situations where people visit or register at sites only to receive distributions, distribution data may provide inflated figures for the population actually living at the site.

Estimates from aerial photography: in more dispersed camps, aerial photography can provide a quick means to count the number of shelters, and from this a rough calculation can be made by counting the number of shelters (S) and using the average household size (AHS):  $P = S \times AHS$ .

Spot-checks on the ground may be necessary to be able to identify aerial images of occupied versus abandoned shelters.

Lists from the authorities: where available, these have the advantage of being official, but may be outdated or at risk of manipulation for political purposes.

Lists from block leaders: where well-established site management is in place, block leaders may maintain lists of population present. These can be used to give a total site population estimate.

Flow data: in the sites where population movements into the site are monitored, review flow data to see how populations change by day and night.

**NOTE: Locally high densities.** As density can vary across a site, local density calculations may help. Areas of high density can often be identified by walking around the site, or from aerial and satellite images. In some cases, a density calculation per sector may be helpful.

## ii.2: LOCAL DRAINAGE AND RAINFALL CALCULATION

Local drainage calculations are intended to keep a site free of water during rainfall. This section does not take into account the overall conditions for the area and will not predict or guard against flooding from existing rivers or canals. See [A.1] and [A.4] for further guidance on identifying hazards in and around camps.

### GET A CIVIL ENGINEER (with drainage experience):

- If there is a risk of flooding from nearby rivers or drainage canals. Ask local people if nearby rivers and canals have a history of flooding. Try and determine from a variety of sources the extent and the depth of flooding in the area of intervention.
- If the drainage requires deep cuts into the ground in order to maintain a slope in the drainage channel.
- If permanent structures, such as culverts, bridges, etc., are required.
- If the ditching / water management is intended for a long term or permanent site.
- If the total catchment area is very large for a section, over 1,000,000m<sup>2</sup>, or if the catchment area is poorly defined or complex.

**NOTE:** If the camp or site is on a slope, then the calculations will have to be made to include all the water which will flow into the camp from the ground outside the camp, from above. This is called the catchment area. If possible, create larger perimeter ditches around the highest borders of the camp, to divert surface water, so that the water from above the camp never enters the camp in the first place.



Always calculate the needs for drainage based upon a worst-case scenario – remembering that the heaviest rain may not come every year, but every two or three years in some cases. For local drainage considerations, think of the 10-year return period. Extremely heavy or intense rains can come at longer return periods of 10, 25 or 100 years.

The rate at which rainwater can drain from the surfaces of a camp is influenced by many location specific factors. In exceptional circumstances, in very loose, sandy soil, much of the rainwater may disappear into the ground. However, in camps the ground becomes compacted by feet and vehicles, and will absorb relatively little of the rainwater. As much of these details will be unknown without expert consultation, it is always best to work with the maximum possible needs, rather than assuming that factors such as soil type or vegetation will take care of any significant volume. Always use a worst-case scenario!

### Step 1: Identify where the water will go and draw a basic drainage plan

Whatever the calculated volume of water coming out of the camp through the drainage channels, it will have to go somewhere – either a nearby river or lake, or into local host-community irrigation channels or municipal drainage-pipe systems. Ensure that there is a plan, agreed upon with the relevant authorities and the host community, for how to do so. Water can be very destructive, but is also a valuable resource. Find ways that the drained water can be used – by both the camp inhabitants and the host community – where possible.

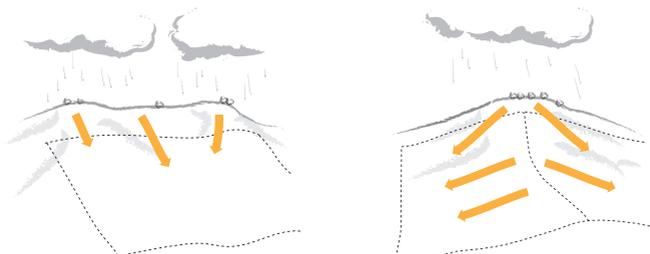


Image 36: The first step is to identify where the water will go

In order to start calculating the drainage needs, a basic plan should be drawn showing where the ditches will be, where the water will be directed and the respective catchment areas for the ditches. Note that the catchment areas can extend beyond the borders of the camp, depending on the topography.

### Step 2: Calculate the catchment areas

A. Break the site up into differently directed slopes. These can later be joined to form catchment areas. Contour maps can be used to determine catchment areas, considering that the water flows perpendicular to the contour lines. Slopes can be defined by site visits, maps or GIS software.

B. Divide the catchment area into regular squares or rectangles on the map (using the same methodology outlined in [ii.1]).

C. Combine the surface areas to get a total for each catchment area. Consider whether it is possible for drainage water from different blocks to go in different directions, rather than all through the same single channel.

### Step 3: Identify the rainfall

Find the highest amount of water which has historically fallen in one hour in the location of the camp. Much of this information is now online, but other potential sources include the national meteorological offices, army engineers, or national

roads authorities. Note that this information is most likely available nationally in terms of one-hour periods. Rainfall intensities for 2 and 3 hours would be critical for larger drainage projects, which this booklet does not address. Also note that the longer the measuring period, the lower the intensity.

**Step 4:** Calculate the total volume of water falling in the catchment area

Use the calculations for total surface of the catchment area of water draining into and through the camp (see [ii.1]), to then make the following multiplication:

$$\text{Volume [litres]} = \text{Catchment area [m}^2\text{]} \times \text{Maximum rainfall [mm/hr]} \text{ (*)}$$

**Step 5:** Calculate the flow rate of the channel

The drainage channel at the lowest part of the camp needs to be able to carry the total volume of water. The volume needs to be divided by 3,600 to get the per-second flow rate (there are  $60 \times 60 = 3,600$  seconds in an hour):

$$\text{Flow rate [m}^3\text{/sec]} = \text{Volume [m}^3\text{]} / 3,600 \text{ [sec]} \text{ (**)}$$

**Step 6:** Calculate the slope of the ground

The drainage capacity of the channel is dependent on the slope along which the channel will travel. Use survey instruments or some other method to make sure that the slope is correct. Ditches with low or no slopes allow water to pool, creating breeding grounds for mosquitoes or other disease carriers. When slopes are shallow, making estimates by eye is impossible!

To calculate the slope (s), divide the vertical drop of the ditch (v) by the horizontal length of the ditch (h):  $s = v / h$

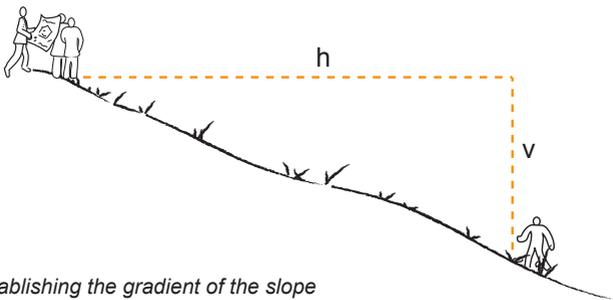


Image 37: Establishing the gradient of the slope

(\*) The rainfall values are often given as millimetres per hour (mm/hr). This is the same as litres per square metre (l/m<sup>2</sup>) per hour.

(\*\*) In standard engineering calculations, the volume is more commonly expressed in cubic metres per second (1m<sup>3</sup> = 1,000 litres).

The longer the distance used for calculating the slope, the more accurate the calculation will be. If there are significant areas that are flat, then they should be calculated separately and not combined into an average calculation for the slope.

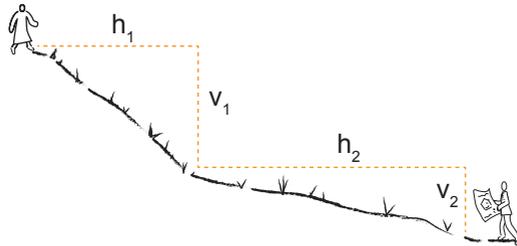


Image 38: Significant change in gradients on site will requires multiple slope calculations

If a channel has a stretch with a relatively flat slope, it will need a larger cross-sectional area to maintain the same flow capacity because the water will be moving slower.

### Step 7: Calculate the volume of the largest drainage channel required

The following page has tables showing main standard channel dimensions, a range of slopes which might be typically found in a camp (if the slope is less than the range in the tables, then it is unlikely that water will drain out. If the slope is steeper than the range in the tables, then the site may not be usable for either shelter or other buildings.)

The first table set gives tables with slopes and flow capacities for standard-dimension channels which are un-lined. The second set, gives the slopes and flow capacities for the same standard-dimension channels which are lined with concrete.

Identify first the slope(s) from the survey of the camp site. Then use the calculation process in Steps 1 through 5 to find the maximum flow capacity needed. Using the tables on the next page, match the slope with the flow capacity, and this match will provide the channel dimension necessary.

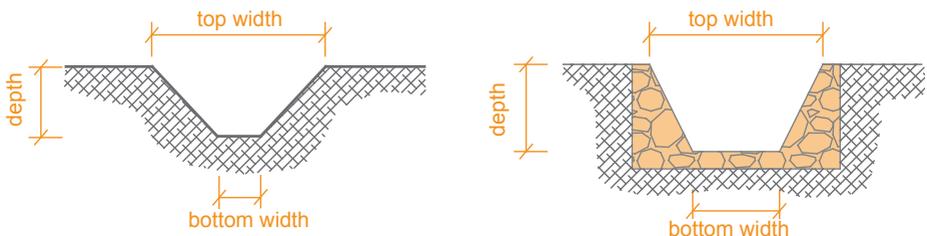


Image 40: Section of two sample drainage channels, unlined (left) and concrete lined (right). Refer to this drawing to read the tables in the next page

**Tables Set 1 – Unlined ditches**

*Note that sides in unlined ditches must be sloped at a 45 degree slope or shallower.*

*Channel size (mm): 1,000 top, 200 bottom, 400 deep.*

Slope	Flow Capacity (m <sup>3</sup> /s)
0.005	0.18
0.01	0.26
0.02	0.36
0.03	0.44
0.04	0.51
0.05	0.57
0.06	0.63
0.07	0.68
0.08	0.72
0.09	0.77
0.1	0.81

*Channel size (mm): 750 top, 150 bottom, 300 deep.*

Slope	Flow Capacity (m <sup>3</sup> /s)
0.005	0.08
0.01	0.12
0.02	0.17
0.03	0.21
0.04	0.24
0.05	0.27
0.06	0.29
0.07	0.31
0.08	0.34
0.09	0.36
0.1	0.37

*Channel size (mm): 500 top, 100 bottom, 200 deep.*

Slope	Flow Capacity (m <sup>3</sup> /s)
0.005	0.03
0.01	0.04
0.02	0.06
0.03	0.07
0.04	0.08
0.05	0.09
0.06	0.10
0.07	0.11
0.08	0.11
0.09	0.12
0.1	0.13

**Tables Set 2 – Concrete lined**

*Note that sides in concrete-lined ditches are at roughly 65 degree slope. They must be built on compacted soil and with a minimum 100mm thickness masonry at base and top.*

*Channel size (mm): 1,000 top, 600 bottom, 400 deep.*

Slope	Flow Capacity (m <sup>3</sup> /s)
0.005	0.41
0.01	0.57
0.02	0.81
0.03	0.99
0.04	1.15
0.05	1.28
0.06	1.40
0.07	1.52
0.08	1.62
0.09	1.72
0.1	1.81

*Channel size (mm): 750 top, 450 bottom, 300 deep.*

Slope	Flow Capacity (m <sup>3</sup> /s)
0.005	0.19
0.01	0.27
0.02	0.38
0.03	0.46
0.04	0.53
0.05	0.59
0.06	0.65
0.07	0.70
0.08	0.75
0.09	0.80
0.1	0.84

*Channel size (mm): 500 top, 250 bottom, 250 deep.*

Slope	Flow Capacity (m <sup>3</sup> /s)
0.005	0.08
0.01	0.11
0.02	0.16
0.03	0.19
0.04	0.22
0.05	0.25
0.06	0.27
0.07	0.30
0.08	0.32
0.09	0.33
0.1	0.35

**NOTE:** These tables assume some meander in the calculations. For channels with sharp turns, the capacity will be reduced. The calculations are set for when the channel is running full to the brim.

Ditches should be made larger if they have to make sharp turns and at abrupt changes in direction. Also, the drainage channel will need to have the same flow capacity all the way until it is split into the incoming drainage channels from a number of sources higher up on the camp ground.

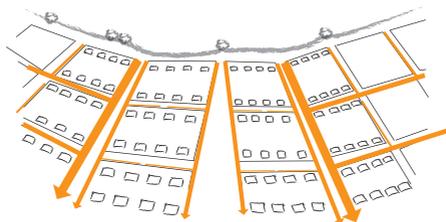


Image 41: Drainage system in a camp: main channels and subsidiary channels

### Step 8: calculate area and number of subsidiary channels

For the subsidiary channels, which drain water into the lower section main channel, the same calculations need to be repeated, but this time just for the single block, section or area which will feed water into this channel. Note that subsidiary channels need to be appropriately sized depending on the water they bring into the main channel – don't just make each junction a 50-50 split.

**PROS AND CONS:** Ask for expert advice, where possible, about alternatives for choosing a smaller number of larger and deeper surface drainage channels, or choosing a larger number of narrower, shallow channels.

**GET AN EXPERT:** Road crossings for ditches will require culverts – which in turn require expert calculations so that the culverts can bear the weight of all traffic going over them and so that they are sized correctly.

-  In existing camps, ditching must be worked around the infrastructure already in place and the design will need to consider the existing interferences. Also, note that ditches maintenance is essential!
-  Don't rely only on tools: the site should always be reviewed in person to ensure that every aspect is considered. Aerial photos or GIS are useful, but site verification is necessary. In urban settings for instance, fencing, buildings and existing drainage can change flow patterns!

#### FROM THE FIELD

In Haiti since 2010, training has been needed to support communities in checking for and removing any obstructions, and to ensure that ditches are not used as informal rubbish dumps. Shelters or market stalls placed over drainage channels can also result in large areas being flooded.



Always remember to include from the beginning drainage calculations for future expansions of a camp, in the site plan for the overall camp.

**EXAMPLE:**

**Steps 1, 2 and 3:** let's take for example a camp where the catchment area (the total area from which water is draining into or through the camp) is 200m x 250m = 50,000m<sup>2</sup> and has a maximum rainfall of 7 mm/hr.

**Step 4:** the volume of water falling per hour in this catchment area can be calculated as:

$$\text{Volume} = 50,000\text{m}^2 \times 7\text{mm} = 350,000\text{l}$$

So if the camp is to be successfully drained of all the water which falls on the catchment area surface within one hour, then within that hour 350,000 litres of water need to be drained away.

**Step 5:** this means that the drainage channel at the lowest part of the camp needs to be able to pass through 350 cubic meters (m<sup>3</sup>) in an hour (1m<sup>3</sup> = 1000l). This then needs to be divided by 3,600 to get the per-second volume:

$$350\text{m}^3 / 3,600\text{sec} = 0.097\text{m}^3/\text{sec}.$$

This would be the quantity of water which needs to be carried by the drainage channel in our example.

**Step 6:** we calculate the slope in the ground assuming that the vertical drop is 1m per 20m of horizontal length.

$$s = v / h = 1 / 20 = 0.05$$

**Step 7:** assuming that we will build an unlined ditch, in order to identify the drainage channel required, we go to the table set 1 and pick the correct channel size by matching the slope (0.05) with the flow capacity (0.097m<sup>3</sup>/s). In this case the third table (channel size of 500mm by 250mm and 250mm deep) can carry up to 0.09m<sup>3</sup>/s, which is less than what we need. Conservatively, we can choose the wider channel size (750mm by 150mm and 300mm deep), which will ensure a flow capacity of 0.27m<sup>3</sup>/s.



# CAMPS ARE A LAST RESORT

**They can be unsustainable, can last for much longer than expected and are expensive to run and maintain.**

However, when camps do need to be built or upgraded, **planning can vastly improve the health, security, privacy and dignity of those people living within them.**

**If in doubt, hire an experienced professional site planner.**

This booklet is targeted at field practitioners. It provides basic information about site planning and gender-based violence risks. It also provides practical guidance for measures which can be taken to reduce risks to affected populations in and around camps and sites.

Digital versions of this document are available for free download at:  
[www.sheltercluster.org/gbv](http://www.sheltercluster.org/gbv)



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