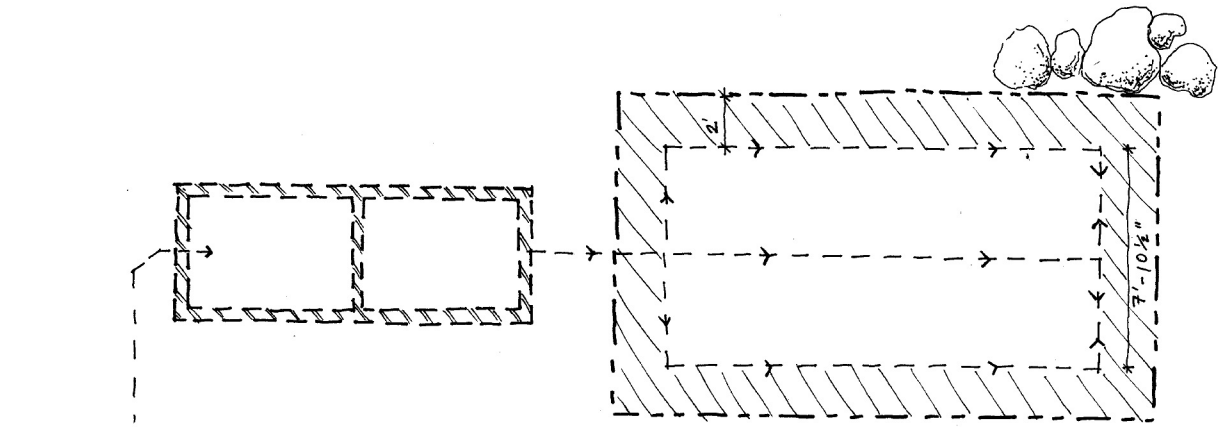

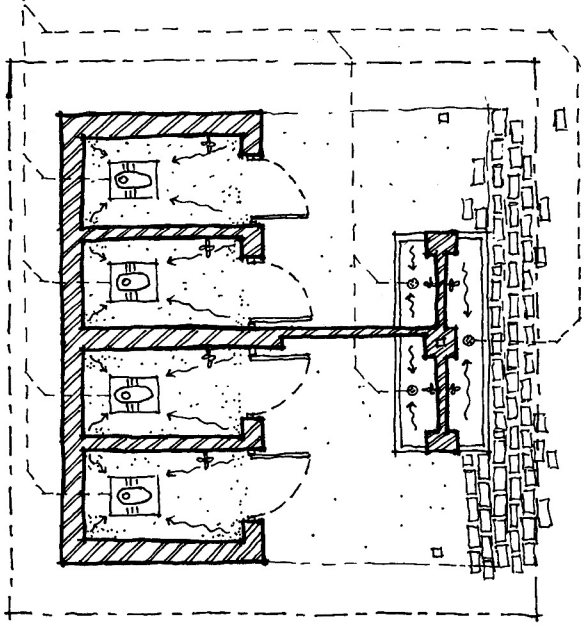

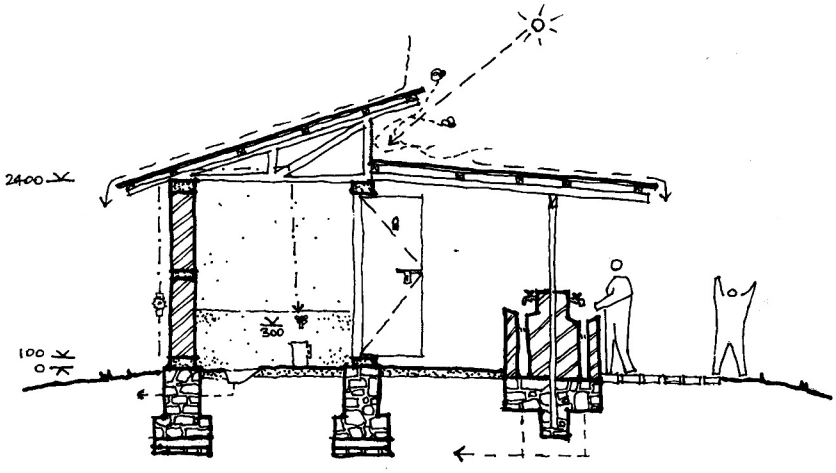

NEPAL SCHOOL TOILET DESIGN GUIDE

lessons learnt by Healthabitat from improving water supply, handwashing, teeth brushing, toilets and waste water removal for Nepalese school students

This information, including design and construction details and specifications, is documented here to serve as a guide only. Project-specific certified documentation and details must be obtained by relevant professionals for all projects in any location. Healthabitat accepts no responsibility for any information provided in this document.

Healthabitat would like to thank all of the donors, trade supporters and students who have partnered with us throughout our work in Nepal. Most importantly we would like to thank Bishnu Ji Shrestha, Sandra Meihubers AM and all of the communities we have worked with in Nepal.

We would like to thank all of the volunteers who have assisted in compiling this resource, including former Sanitation Studio students, tradespeople, and general Healthabitat supporters. In particular: Deb & Russel Brown, Georgia Browning, Hannah Byrne, Emma Gaal, Sahibajot Kaur, Jake Kellow, Steph Palmer, Emerson Sims, Hayley Skelton, Kalyna Sparks, Tom Studholme, Courtney White, Jye Whyte and Sam Wigman.

Special thanks to Bobbie Bayley, Dave Donald, Heleana Genaus, Owen Kelly, Justine Playle, Karin Richards, Maria Roberts and Grant Stewart and for their time and knowledge, and for sharing their global experiences.

We acknowledge the legacy that the late Paul Pholeros AM carries globally and, crucially, the role Australian Aboriginal and Torres Strait Islander communities have played in the development of Healthabitat and its work.

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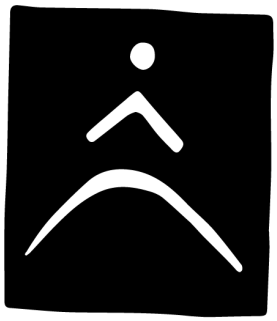
September 2022



HEALTHABITAT

Housing for health

Healthabitat works with local communities to improve the health of people living in poverty by improving their living environments.

Healthabitat is an Australian-based not-for-profit company that started in 1989 working to improve the health of Aboriginal people by improving housing in Australia. As time went on it became clear that environmental health issues affect many nations and so the methodology has been applied and successfully practised worldwide, including in Nepal.

Safety and the 9 Healthy Living Practices form the framework that Healthabitat projects follow globally to create measurable improvements to health through targeted improvements in people's living environments.

AIM OF THE GUIDE

The purpose of this guide is to put in one place all the work, lessons and thinking accumulated by Healthabitat in Nepal since 2007.

Over this period of time, the work, ideas and expertise of dozens of students, plumbers, other trades and local communities have helped to create a successful and robust toilet design. This includes aspects such as the sizing of septic systems, local adaptations for soakage trenches and the modular sizing of toilet cubicles.

WHO IS THIS GUIDE FOR?

This guide is open source and intended for:

- Healthabitat to use as a comprehensive reference document in future projects
- Nepalese or international NGOs working in schools and communities in Nepal
- International NGOs working in other countries to learn about the Healthabitat process
- Students and volunteers to understand the complex parts that make up a 'simple' design to improve health.

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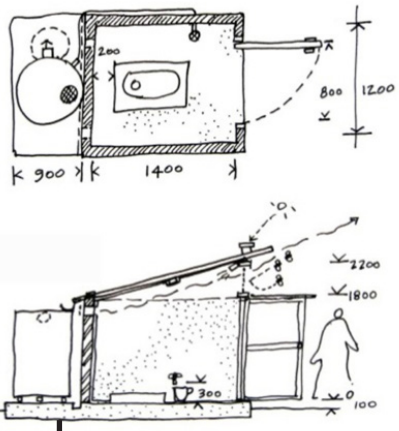
TIMELINE *of* HEALTHABITAT WORKING IN NEPAL



It begins with 2 toilets
Healthabitat starts work in a small village building toilets with the community identifying key design criteria and testing these in real life with careful monitoring.

"Sanitation Studios" commence with university students, plumbers, local trades and community members collaborating on refining the design of toilets and waste systems.
Here, a siting kit is rolled out at 1:1 scale.

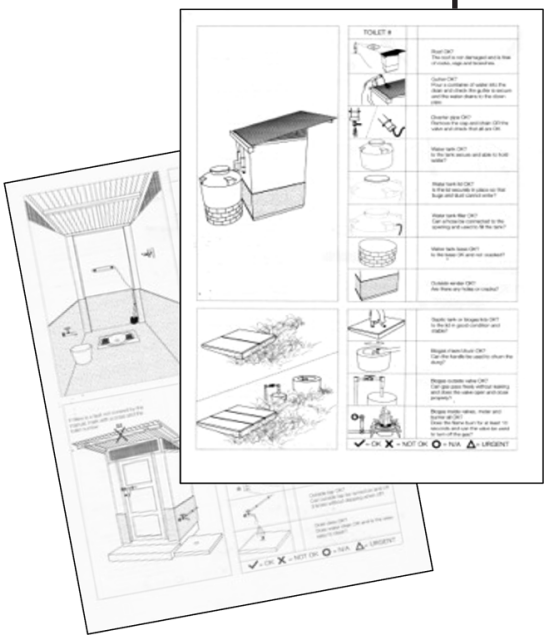
2007 — 2008 — 2009 — 2010 — 2011 — 2012 — 2013 — 2014

TIMELINE

From single village toilets to school toilet blocks

After the careful evaluation of the first 30 or so toilets, 58 toilets and waste disposal systems are completed in one village.

'How a Septic Tank Works' YouTube animation story created



The Sanitation Studio produces a maintenance checklist for toilets based on community knowledge and careful monitoring.

After the earthquake in 2015, an earthquake banding system was developed to aid in the rebuilding of houses in communities to make them safer in the future. This system was adapted and used within school toilets.

School toilets continue to be constructed as part of sanitation projects, leading to over 2500 people getting access to functioning toilets, handwashing and waste disposal.
A maintenance manual, toolkit and training package is developed and delivered to schools, with training, to ensure ongoing function for sanitation facilities in Nepal.

2015 — 2016 — 2017 — 2018 — 2019 — 2020 — 2021 — 2022

Devastating earthquake and aftershocks - All toilets survive

The first school Sanitation Studio, leading to the design and construction of a new water supply and handwashing facilities, toilets and waste disposal system.

Sanitation Studios continue, leading to the design and construction of several more sanitation facilities for Nepalese schools.

“

Diarrhoeal and respiratory diseases, in particular, are the major causes of illness among Indigenous children and also play a major role in malnutrition in the first three years of life.

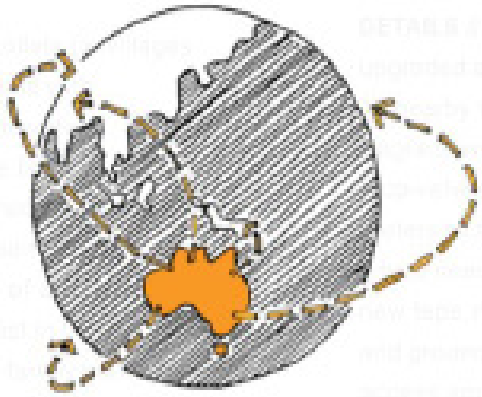
Skin infection is one of the most common problems of Indigenous children...persistent skin infection is known to increase the risk of developing kidney disease and rheumatic fever.

All these illnesses are commonly linked to poverty.

- Housng for Health:The Guide

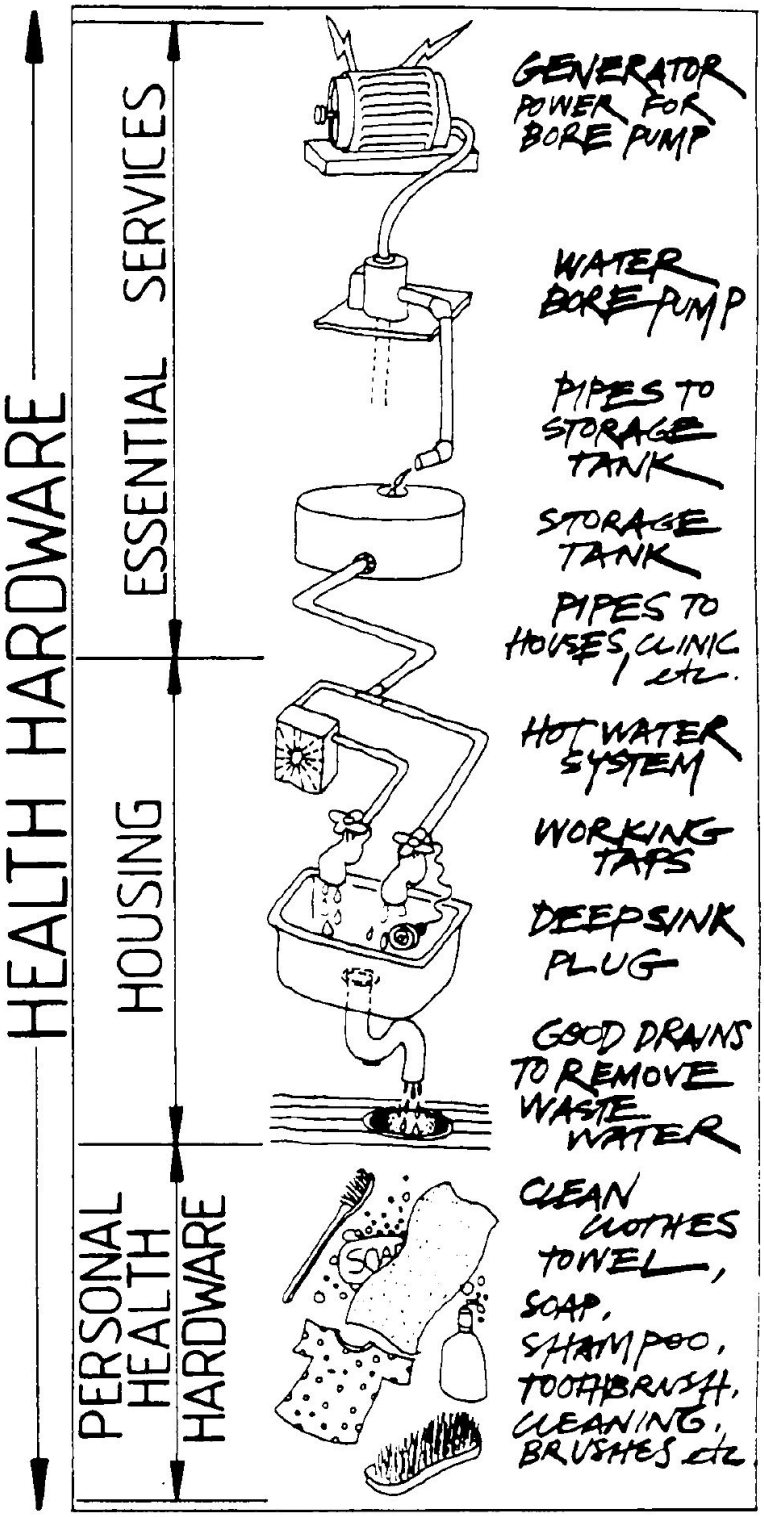
”

CHAPTER 01



01 Healthabitat & Projects Overview

An overview of Healthabitat, their worldwide projects and the focus of improving health through the HLPs



- Health Hardware: Image from 'AP Design Guide' explaining what 'health hardware' is

HEALTHABITAT
Housing for health

WHO ARE HEALTHABITAT ?

Healthabitat is an Australian-based not-for-profit company governed by a board of directors who draw upon the experience of a dedicated team who have worked on Healthabitat projects over many years. It is a multidisciplinary team of architects, environmental health officers, plumbers and other professionals.

They work with local communities to improve the health of people living in poverty around the world by improving the living environment.

Healthabitat has a clear methodology: Safety and the 9 Healthy Living Practices. Healthabitat projects follow this methodology globally to create measurable improvements to health through targeted improvements in the living environment.

HOW DOES THE LIVING ENVIRONMENT IMPACT HEALTH?

More buildings or toilet blocks in communities will not guarantee better health outcomes.

Poor housing conditions in places of poverty are associated with a wide range of health conditions. For example:

- Persistent scabies infections can lead to an increased risk of infection by bacteria (especially Group A streptococcus). These infections are most effectively treated by frequent washing and this will also help to reduce the consequent high rates of renal disease, rheumatic fever and rheumatic heart disease.
- In many regions, Indigenous children have high rates of trachoma and bacterial eye infections. Studies have shown regular face washing can reduce the amount of eye infection.
- Washing hands after using the toilet can significantly reduce the transmission of hepatitis.
- Waste water in the living environment can make people sick. If people come into direct contact with waste water, or if their water supply is contaminated with waste water, there is a greater risk of transmitting bacteria and viruses that cause disease. These risks are also increased if animals, vermin or insects have been in direct contact with waste water, which can pass bacteria on to people.

What is Health Hardware & Why is it Important?

'health hardware' is the term used to describe the physical equipment needed to give people access to the health-giving services in a house, including items such as a:

- toilet
- waste drain
- sewage system
- tap
- spout
- shower rose.

Research has shown that improving essential health hardware (electrical repairs, fixing a leaking toilet and having properly functioning sewage systems and waste treatment, sufficient hot water, and a place to wash hands and face and somewhere to wash a baby or child, etc.) can lead to improvements in health status and reduce the risk of disease and injury.

WHAT ARE 'HEALTHY LIVING PRACTICES' (HLPs) ?

S

- Safety and life-threatening issues.

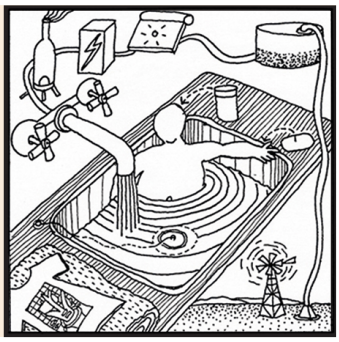
Safety and the 9 Healthy Living Practices (HLPs) are based on best-practice public health knowledge and apply globally.

They identify elements of the living environment that can compromise safety and/or health. The HLPs are a series of practical considerations to better inform the design and maintenance process.

Life-threatening issues have the highest priority, followed by washing people, especially children 0-5 years old.

Safety and the 9 HLPs were developed in 1989 to "stop people getting sick". They are the key focus of every Healthabitat project, in the order shown in the diagrams on this page.

1

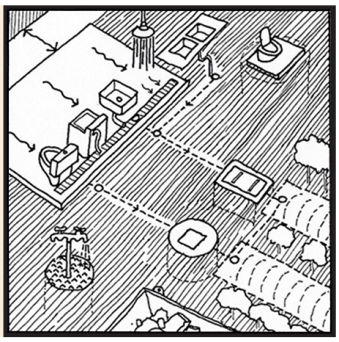


- HLP 1. Washing people.

2

- HLP 2. Washing clothes and bedding.

3



- HLP 3. Removing waste water safely.

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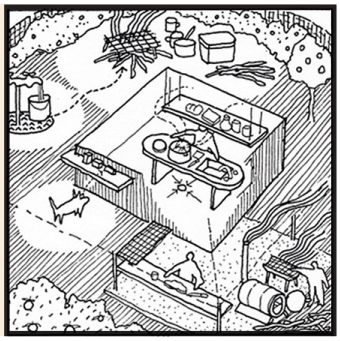
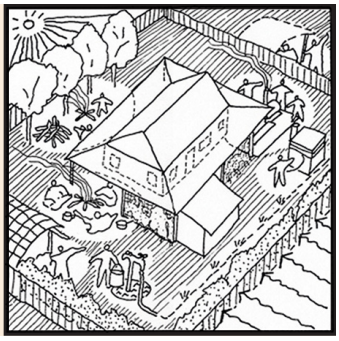


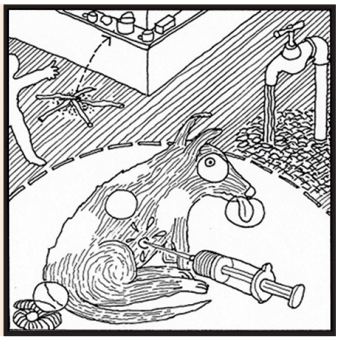
- HLP 4. Improving nutrition, the ability to store, prepare and cook food.

5



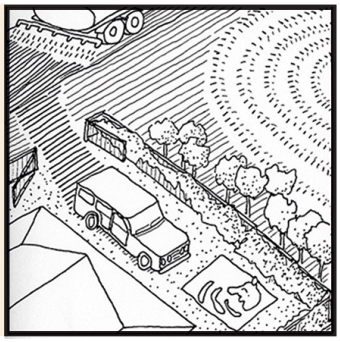
- HLP 5. Reducing the negative impacts of over-crowding.

6



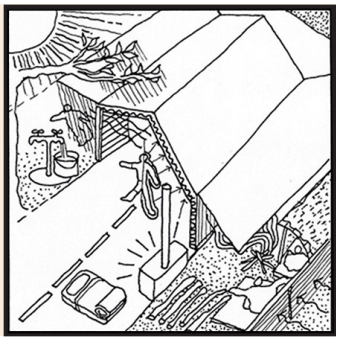
- HLP 6. Reducing the negative effects of animals, insects and vermin.

7



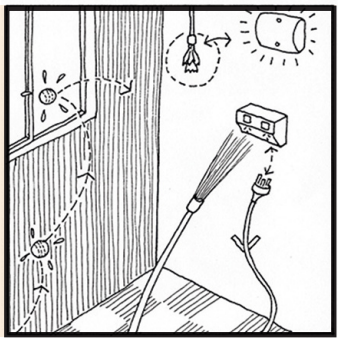
- HLP 7. Reducing the health impacts of dust.

8



- HLP 8. Controlling the temperature of the living environment.

9



- HLP 9. Reducing hazards that cause trauma.

HEALTHABITAT'S METHODOLOGY

Healthabitat's main program of work is called 'Housing for Health'. The program has a clear 7 stage methodology that is followed for each project which begins and ends with the community.

Alongside the 7 stage methodology, Healthabitat uses the HLPs and certain priorities as a clear framework for every project to ensure health is being improved. These priorities include:

Local Teams & Community Engagement

- The project has to come from community groups or organisations already working with the community, as they have the greatest vested interest in improving their communities and know what the local people want and need.
- Local people bring important local expertise to a project, whilst also remaining within the community to maintain the environment when other project team members have left.
- Local people are engaged in active roles in all aspects of the work, providing training and skill sharing to train local teams.
- Local teams undertake much of the on-the-ground work.

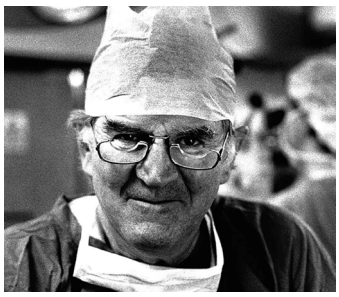
- Image: Community team members review completed work

Partnerships with Professional Trades

- Bring highly trained people with skills and expertise to all projects
- Ensure projects are carried out to industry standards
- Play a large role in providing training and facilitating skill sharing with local community members.

- Image: A trade professional teaching skills to community members

'No Survey Without Service'



- The late eye surgeon Professor Fred Hollows coined the phrase 'no survey without service', insisting that his teams make a tangible difference on day one of any project.
- Skilled local teams and professional trades are engaged to deliver a project and are integral to the success of the 'no survey without service' methodology, making a difference from the very beginning of each project.

- Image: Professor Fred Hollows in action

Data Collection & Reports

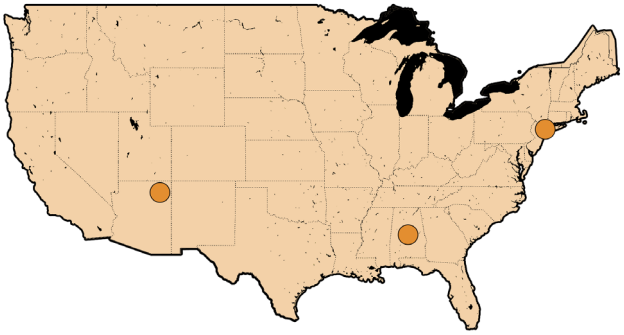
- Data is recognised as an important resource and is used to measure and compare the function rates of homes before and after the work.
- Analysis of water usage data can be a useful way to inform the size and design of systems and health hardware.

- Image: Community team member filling out Housing for Health survey sheets

HEALTHABITAT PROJECTS

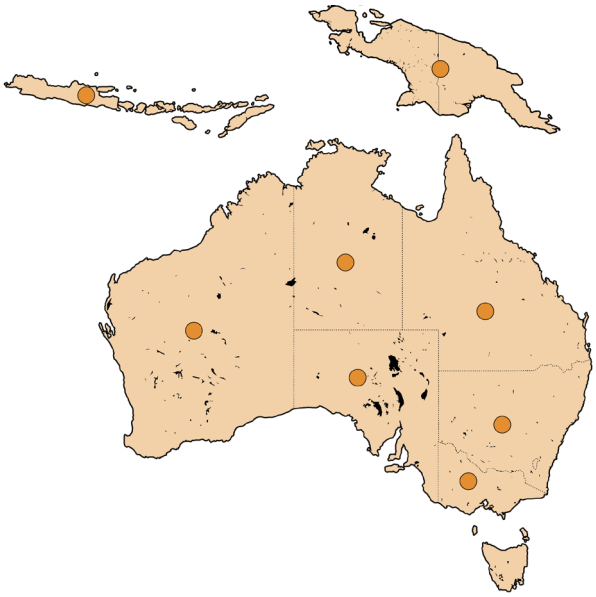
Heathabitat has engaged with communities globally by applying the HLPs to improve health outcomes.

Nepal - Sanitation
Bangladesh - Water and Sanitation
India - Water & Sanitation



Navajo Nation - Housing for Health
New York - Housing for Health
Alabama - Housing for Health

South Africa - Sanitation
Ethiopia - Reducing Trachoma



Australia - Housing for Health
Indonesia - Community Plumbing Challenge
PNG - Sanitation with SAGO Network

PROJECT OVERVIEW

AUSTRALIA | HOUSING FOR HEALTH

- Map: Project locations in Aboriginal & Torres Strait Islander communities across Australia

Location

Housing for Health projects are located largely in indigenous communities in regional and remote areas of Australia.

Beneficiaries

- Over 59,000 people living in these houses
- Local teams trained and employed to work on project teams

Aim

The aim of the Housing for Health projects is to work with local communities to provide a healthy living environment and better health outcomes.

Partners and Donors

- Federal and state government departments
- The Fred Hollows Foundation
- Industry partners
- Individual Indigenous communities
- Volunteers working on projects

Detail

The Housing for Health program has conducted survey-fix work, research and development and maintenance on over 9,600 existing houses in 252 communities as of February 2022.

Impact

- Over 305,000 items fixed or inspected in houses
- Over 2,500 local staff trained and employed
- 40% reduction in hospitalisations from illnesses associated with the living environment

TARGETED HEALTHY LIVING PRACTICES

- Targeted Healthy Living Practices: The Australian projects target Safety and all 9 HLPs

- Image: Tap heights are tested on school children of all ages during construction to ensure they are suitable

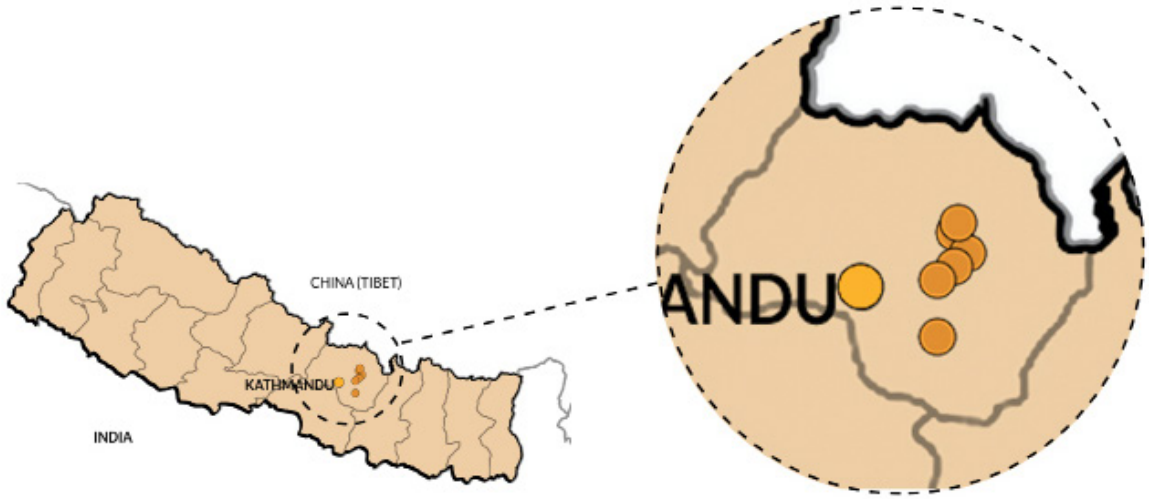
CHAPTER 02

02 Nepal, School Sanitation & The HLPs

An overview of school sanitation Healthabitat projects in Nepal and improving health through targeted HLPs

PROJECT OVERVIEW

NEPAL | SCHOOL SANITATION



- Map: Project locations in communities across Nepal

Location

School sanitation projects have been located at five participating schools in the Bagmati Zone of central Nepal.

Beneficiaries

- Over 1500 school students and teachers

Aims

The aim of the projects is to improve sanitation to reduce gut infections, respiratory illness and improve dental health, as well as improve the structural integrity of buildings against future earthquakes to improve safety.

Better toilet facilities are also known to improve school attendance, especially for girls experiencing menstruation.

Partners and Donors

- WorldSkills Australia
- The International Association of Plumbing and Mechanical Officials (IAPMO)
- Reece Plumbing

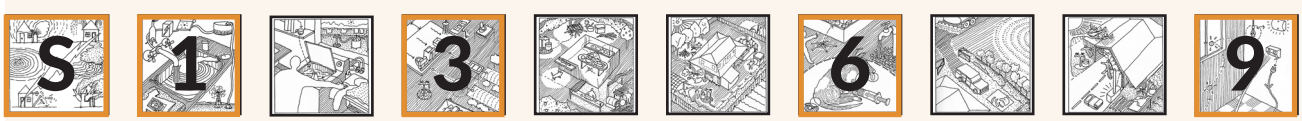
Details

The projects involve the design and building of toilet facilities with handwashing facilities, waste water treatment and water storage facilities.

Impact

- Functioning toilets, waste water treatment systems and handwashing facilities
- Safer buildings for future earthquakes
- Local staff trained and employed

TARGETED HEALTHY LIVING PRACTICES



- Targeted Healthy Living Practices: The Nepal school sanitation projects target S, HLP1, HLP3, HLP6 & HLP9.

SCHOOL SANITATION & THE TARGETED HLPs

Healthabitat's work in Nepal targets Safety, HLP1, HLP3, HLP6 and HLP9.

The health research that underpins the 9 HLPs tells us that a toilet is not as effective at improving health unless there is also handwashing available. Therefore, handwashing is a critical part of the toilet design.

Safety

When designing, upgrading or maintaining sanitation structures, immediate and life-threatening dangers are given the highest priority.

The design of sanitation structures in Nepal should provide earthquake-resilient walls and roofs. While it is common in Nepal to see roof sheeting held down with rocks, these structures are susceptible to collapse during high wind or earthquakes. Falling rocks can also be a danger to people.

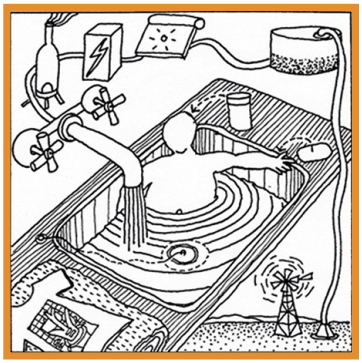
- Images: Devastation caused by the 2015 earthquake shows the importance of structural safety

HLP 1 - Washing People

In Nepal, many schools lack basic or well-maintained washing and toilet facilities.

Being able to use functioning washing facilities reduces the spread of diseases, including diarrhoea, respiratory disease, hepatitis and infections. These diseases can have lifelong negative effects on people.

Handwashing facilities can assist in improving dental hygiene, tooth brushing and reducing dental diseases.



- Images: Examples of existing poor water supply, washing facilities and waste water removal at project sites

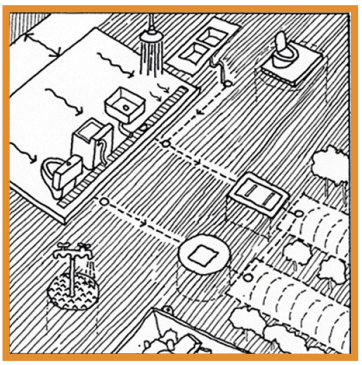
HLP 3 - Removing Waste water

Waste water in the living environment can make people sick.

If people come into direct contact with human waste, or if their water supply is contaminated with waste, there is a greater risk of transmitting bacteria and viruses that cause diseases, specifically gut and bowel problems.

The lack of toilet facilities within schools and communities means that human waste and waste water is commonly found on the ground, which increases the risk of foot and skin infections.

Removing the waste safely requires toilet facilities that are adequately built and maintained.

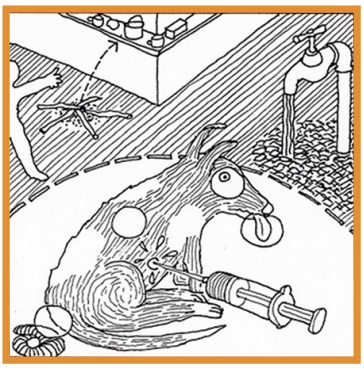


HLP 6 - Reducing Negative Effects of Animals, Insects, and Vermin

People's health can be affected by contact with animals, vermin and insects in the living environment, as they can carry a variety of diseases.

Mosquitoes and flies transmit diseases such as trachoma, malaria, Japanese encephalitis, and dengue fever.

These risks are also increased if animals, vermin or insects have been in direct contact with waste or waste water, which can pass bacteria on to people.

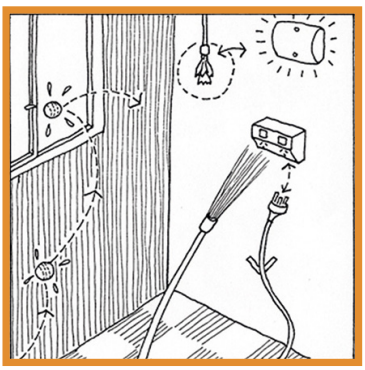


HLP 9 - Reducing Hazards that Cause Trauma

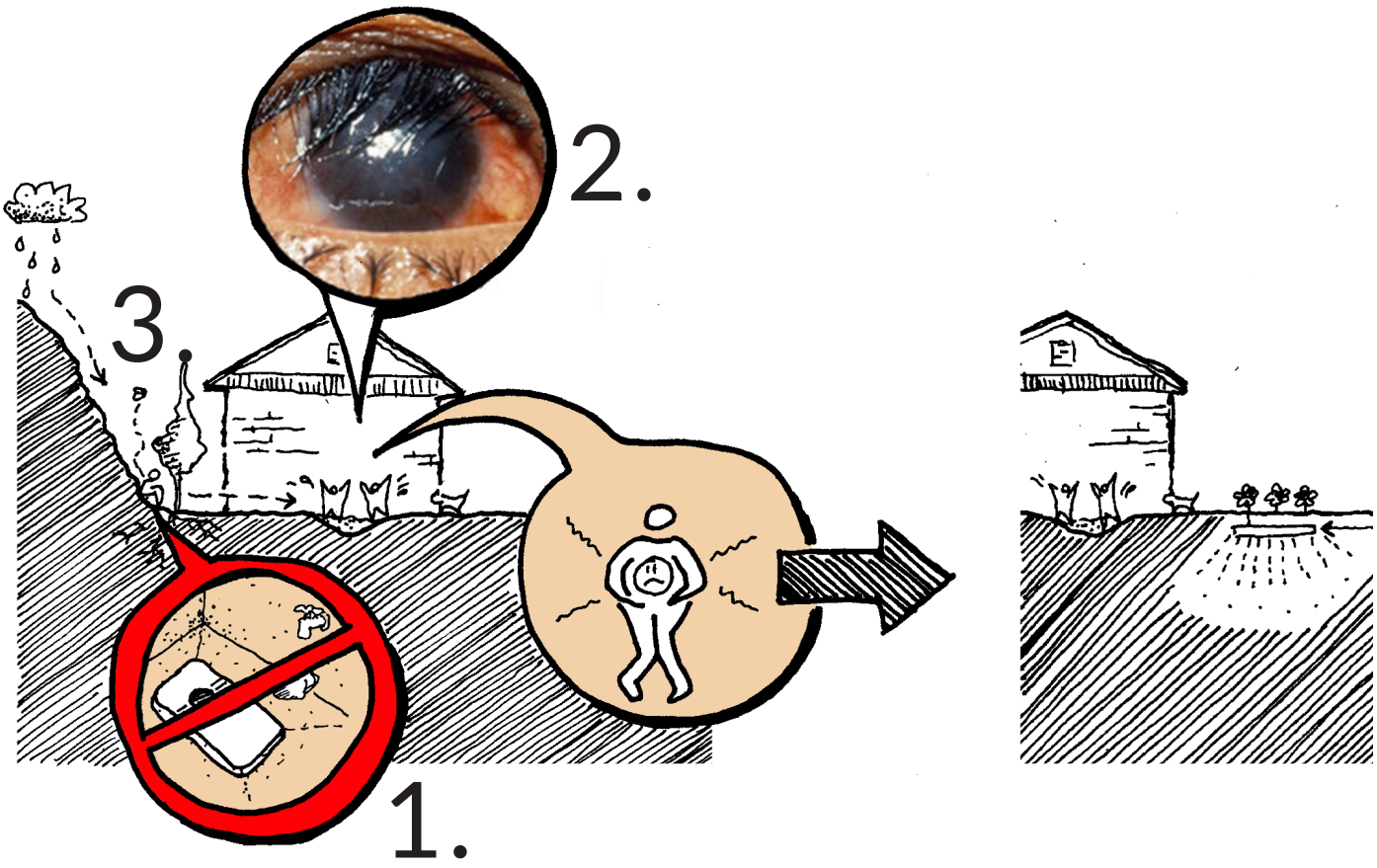
If sanitation facilities are poorly designed and constructed, or not well maintained, there is an increased risk that people may be injured.

Hazardous or broken materials causing cuts and abrasions, trips or falls are typical hazards and should be prevented.

Personal security is also an issue, especially for women, due to a lack of privacy within the toilet facilities, or lack of toilet facilities.

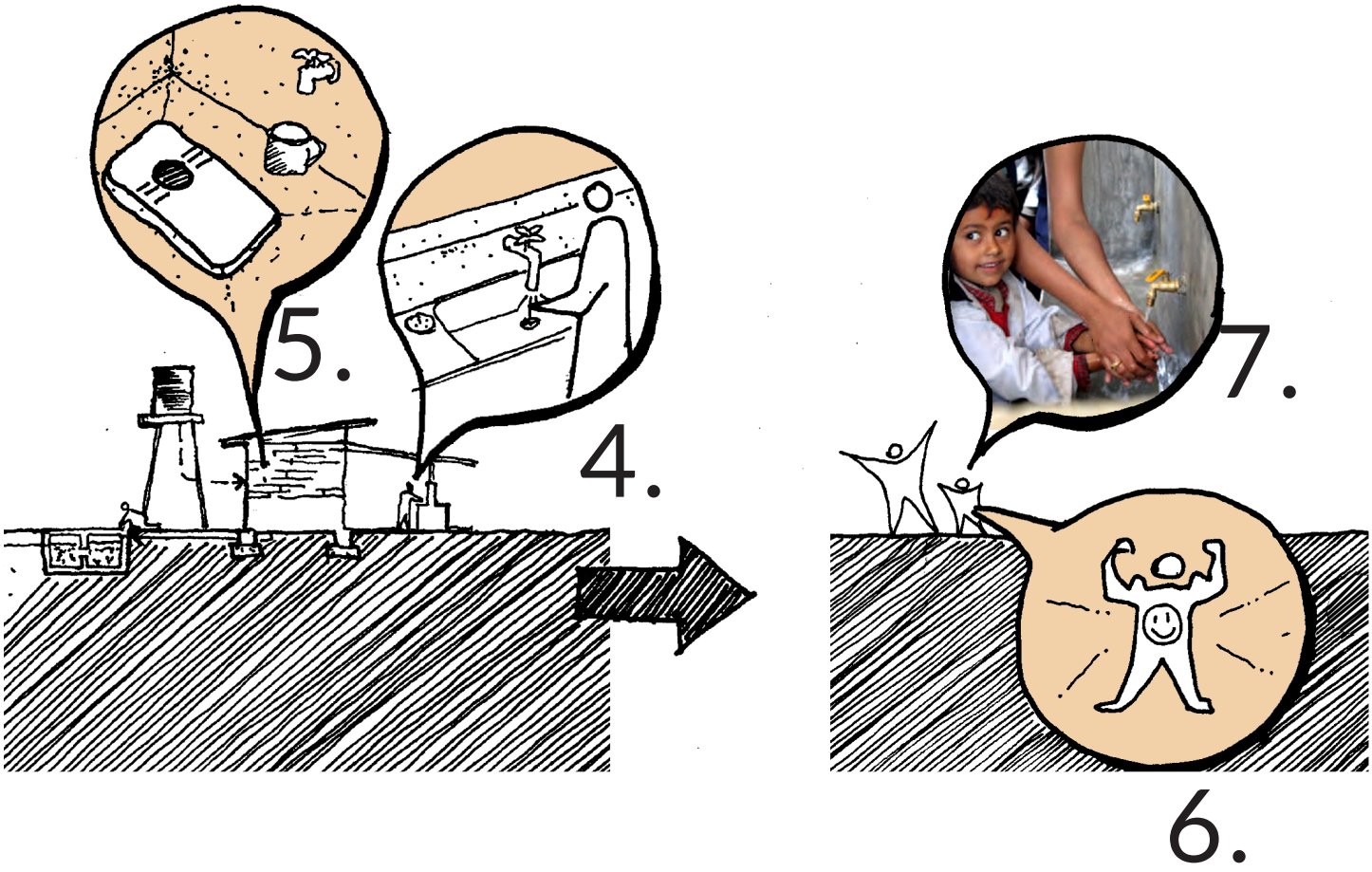


SCHOOL SANITATION - THE HEALTH STORY



The Health Issue

1. Human waste and contaminated waste water create a greater risk of transmitting bacteria and viruses that cause disease.
2. Having nowhere to wash hands after using the toilet increases the transmission of hepatitis and diarrhoea.
3. Personal security is also an issue, especially for women, due to a lack of privacy within the toilet facilities, or lack of toilet facilities.



The Environmental Solution

4. A secure, well-built toilet, made by local trades with a place for handwashing and teeth cleaning, can address these issues.
5. Safe collection and treatment of human waste and water takes faeces off the ground, reducing the risk of transmitting bacteria and viruses that cause disease.

The Health Outcome

6. Less faeces on the ground will lead to better gut health, less diarrhoea especially in children, and improved dental health.
7. Young women are also more empowered, leading to better, more confident and safe school attendance.

- Image: 2019 University of Newcastle Architecture Sanitation Studio with two Australian and North American IAPMO funded project plumbers - a thank you ceremony from the school before leaving

CHAPTER 03

03 Nepal Projects: Method & Process

An overview of the established method and process used for all Nepal-based school sanitation projects. A method that can be replicated in any part of the world, yet must be tailored to suit the community needs, context and site location

KEY PEOPLE

The key people in the project team during the design and construction phases include both local Nepali and international contributors. Each group plays a specific role in the project development, drawing on their expertise and experiences, which include:

Client

The local school that requires the project for improved healthy living practices is the client.

The client is responsible for guiding the project brief, location, requirements and ongoing maintenance.

Local staff can speak the local language and liaise between the community and work teams employed.

- A local school group in their new toilet block

Designers & Engineers

Designers, such as architects, collate the information collected from the project brief, client discussions and site analysis to find the best design solution.

Their goal is to problem-solve and provide a design relevant to available local materials, local techniques of construction and local building standards.

The engineer reviews the design and specifies requirements, such as size of structural members, tie down details and earthquake banding requirements.

The designer and engineer collaborate to produce a finished documentation package of the design and specifications ready for construction.

The engineer should continue to be engaged, providing site inspections throughout the project construction, similar to the role of a 'building certifier' in Australia.

- University architecture students collating ideas

Project Manager

Project managers are of Nepali origin and come from the local communities or central towns. They are accredited and contracted by Healthabitat to run Nepal sanitation projects.

They are responsible for all stages of the project and report at regular, specified intervals to Healthabitat on project progress.

Project managers are the most experienced members of the Healthabitat team and bring decades of knowledge to each project.

- Nepali Project Manager and dentist, Bishnu, addresses the local community about a project

Trade Experts

International trade volunteers are supported by organisations that have a broad charter aimed at using trade skills to improve living conditions and assist the training of people in developing countries.

Trade experts range from plumbers, carpenters, engineers and architects to environmental health officers.

The organisations that have supported Healthabitat projects include IAPMO (International Association of Plumbing and Mechanical Officials), World Skills and Reece Plumbing.

- IAPMO Australia plumber Grant teaches local plumber and workers new methods

Environmental Health Workers

International health workers assist with solutions for a sanitary environment. The outcome should meet the standard list of the healthy living practices and be easily maintained in this condition.

Alongside this are dental camps that are part of the Teeth and Toilets (TT) program, providing critical dental care for villages in addition to teaching young people about the importance of oral health.

- A young school child washes their hands in the finished handwashing station

Local Teams

The local team are responsible for building all elements.

Throughout this process they work in collaboration with the project manager and international trade experts, learning new skills and techniques.

The local team carries out all the site works and builds the required structures to the required design and specifications.

They may also be responsible for maintaining the structures at project completion, working on other projects nearby and educating others.

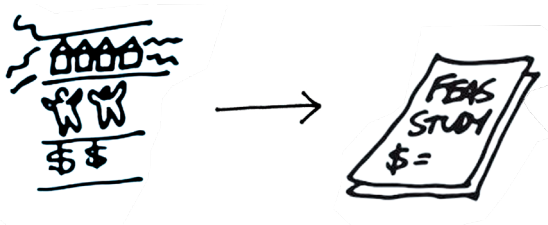
- Trained builders constructing the roof for a project and local labourers excavating the soakage trenches for septic tanks

PROCESS OVERVIEW

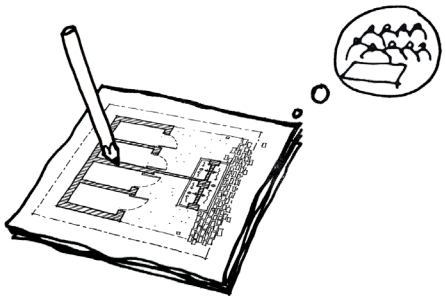
Healthabitat utilises a staged methodology, inspired by their Housing for Health projects in Australia. Beginning and ending with direct community involvement, the process follows these 6 stages:

STAGE 1: PROJECT INITIATION

STAGE 2: PROJECT FEASIBILITY



STAGE 3: DESIGN



STAGE 4: CONSTRUCTION

STAGE 5: MAINTENANCE

STAGE 6: COMMUNITY FEEDBACK