

9. How do I build a WELL SERVICED home?



Do you want to plan services for an efficient water supply and sewage system?
Do you want to ensure a safe and affordable electric system in your home?

This toolkit shares easy -to-follow tips to identify and select good materials.

Why is it important to install and maintain all the services in the beginning?

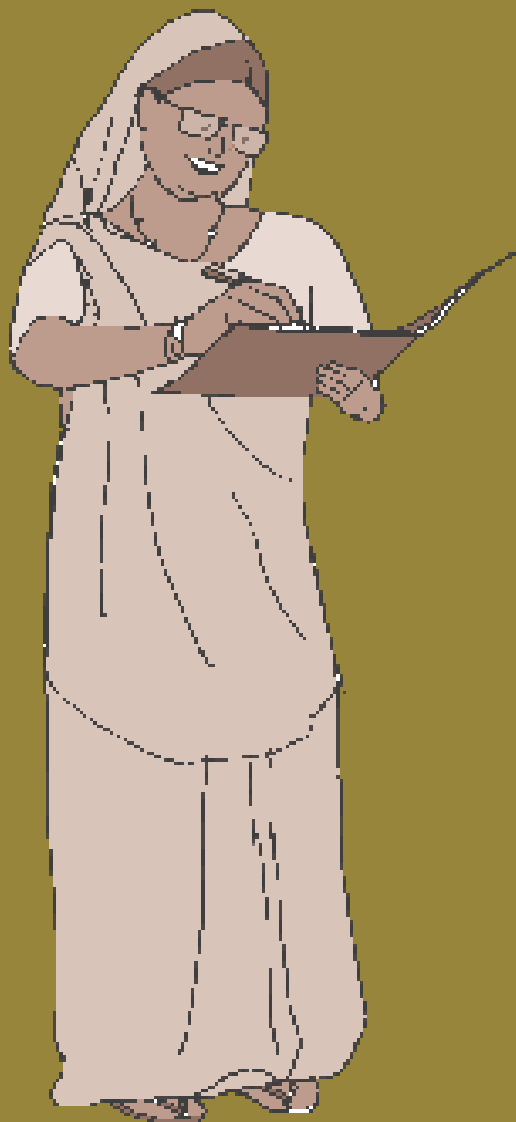
If water, electricity, or toilets are not installed or maintained well in your home, they often stop working. This makes life difficult for families and can harm the house over time. Without enough skilled workers or regular care, small problems turn into bigger ones and be more expensive to fix.

This handbook gives easy steps to make sure all services in your home are set up and maintained well.



Tips for Installing

SERVICES



1. Consult the contractor well in advance to install all services - plumbing, electrical lines, and sanitary ware.
2. Use good quality pipes and wires for installation.
3. Make sure the water supply to the house is of good quality.
4. Make sure that you have a system for sewage disposal. Avoid manual scavenging at all costs.
5. Main all services regularly.

What is the best option for you to access portable water?

A. WATER SUPPLY

Buildings services refer to systems installed in a building for utilities like water, drainage, electricity, ventilation, etc. They make the building functional and efficient, and if not installed properly they can be expensive to repair.

Water supply deals with the delivering of fresh, potable water from water source to the water fixtures in our house.

1. Clean water resource

Make sure you have access to clean drinking water, either from the government, wells, or tankers, to avoid dangerous water-borne diseases.



Get Govt assistance in testing water!

Take help of the nearest 'PHE' department or Public Health Engineering department of the Government to get water tested from common sources like wells, hand-pumps etc. **It is not expensive!**



Points to note!

- ✓ *Check the quality of water coming out of borewells.*
- ✓ *It is a smart decision to collect rainwater falling on our roofs, specially in water scarce regions. It will prepare you for events of droughts.*
- ✓ *It saves taxes/cost spent on water.*

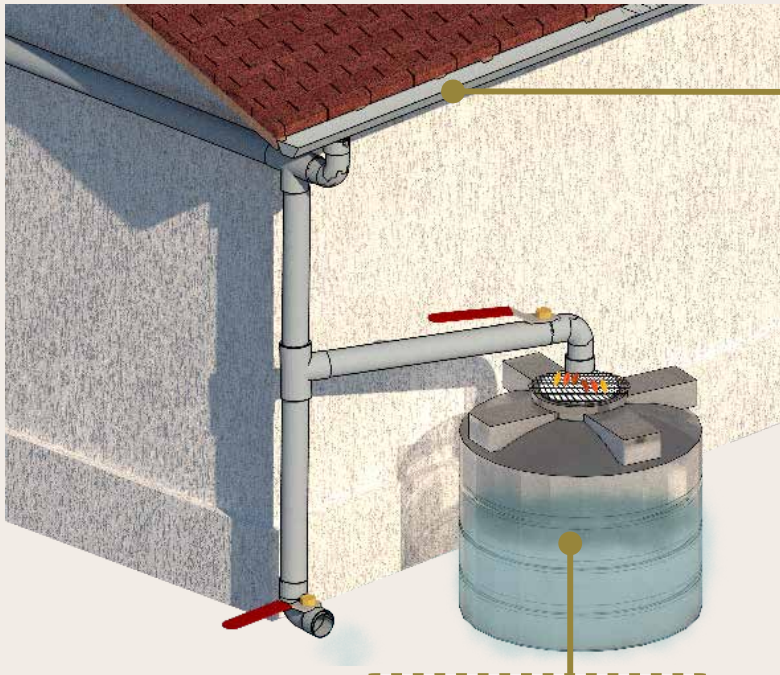
Harvested rainwater can be used for toilet flushing, gardening, bathing. It is not for drinking without proper filter unit & water quality testing system.



How to use rainwater for drinking purposes?

Rainwater falling on our rooftops can be collected and stored for non-potable purposes-

2. Storage in Drums or Underground Tanks



Connect all the gutters along sloping roofs and flat slab to a drain pipe.



Plastic drums or underground water tanks can be used to collect the water.

Locate underground water tanks away from foundations, and near to common drains in case of overflow.

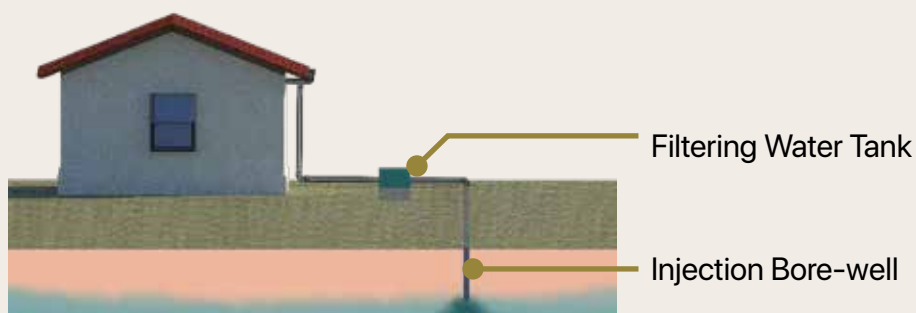
3. Recharging Ground Water



If you cannot buy a tank or it often overflows, you can also put a pipe and direct the water back into the ground water.



This will replenish the ground water and can be used later from wells and bore-wells.



Filtering Water Tank

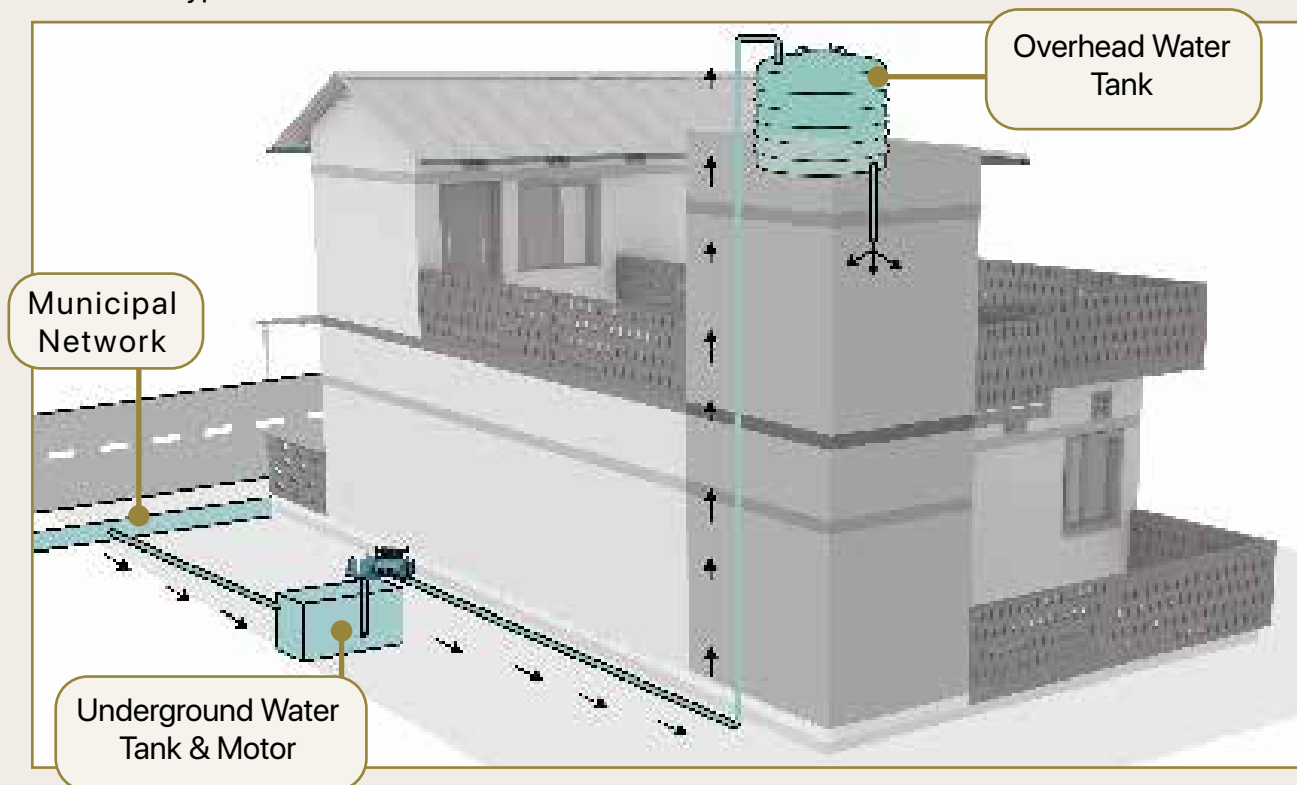
Injection Bore-well

Want to know the key components of installing water supply in your home?

B. WATER SUPPLY INSTALLATION

1. Tank Installation

For houses sourcing water from the municipal supply, water storage inside the building premises needs to be done in two types of tanks-



Underground Water Tank & Motor

1. This tank is directly connected to main municipal supply. In the case of private bore wells or traditional wells, underground water tank is not needed.
2. Install the underground water storage tank near the road, so water connection from the main supply is easier.
3. To avoid contamination, never situate underground water tank near septic tanks or sewer lines.
4. Attaching a motor to the municipal lines directly is prohibited and harmful.
5. The motor pumps water from the underground water tank, bore wells or wells to the overhead water tank.
6. Invest in a good quality pipes and motor.

Overhead Water Tank

1. This tank supplies water to our taps at sufficient pressure, irrespective of the water source.
2. Position the overhead tank above the highest tap in the house.
3. In case the overhead tank is on stilts, make sure the stilt legs align well with the columns & beams under them.
4. This water tank should be accompanied by a water tap.



2. Water Supply Fixtures

- ✓ Ensure that water closet/ urinals / hot water systems get the supply only from feed cisterns and not directly from service pipe.
- ✓ Ensure that the water seal of floor traps are adequate.

It is advised to hire a skilled plumber for all water and sanitation services in your house.



3. Water Supply Maintenance

- ✓ Ensure that the water tanks are cleaned regularly.
- ✓ Maintain your water fixtures by repairing leakages timely.
- ✓ Ensure that the piping installations are easily accessible for maintenance.
- ✓ Use water tanks of materials that are easy to clean.

What are the different types of waste water to manage in your home?

C. TYPES OF WASTE WATER

There are mainly two types of used water that needs to be removed from the house -

1. Grey Water

- Used water from kitchen, bathing, cleaning etc. i.e. water which is not infected with human excreta.
- This water is carried by 'Waste pipes'.
- Grey Water can be discharged directly into public sewage.
- It is recommended to be reused in gardening & in toilets after adequate treatment.

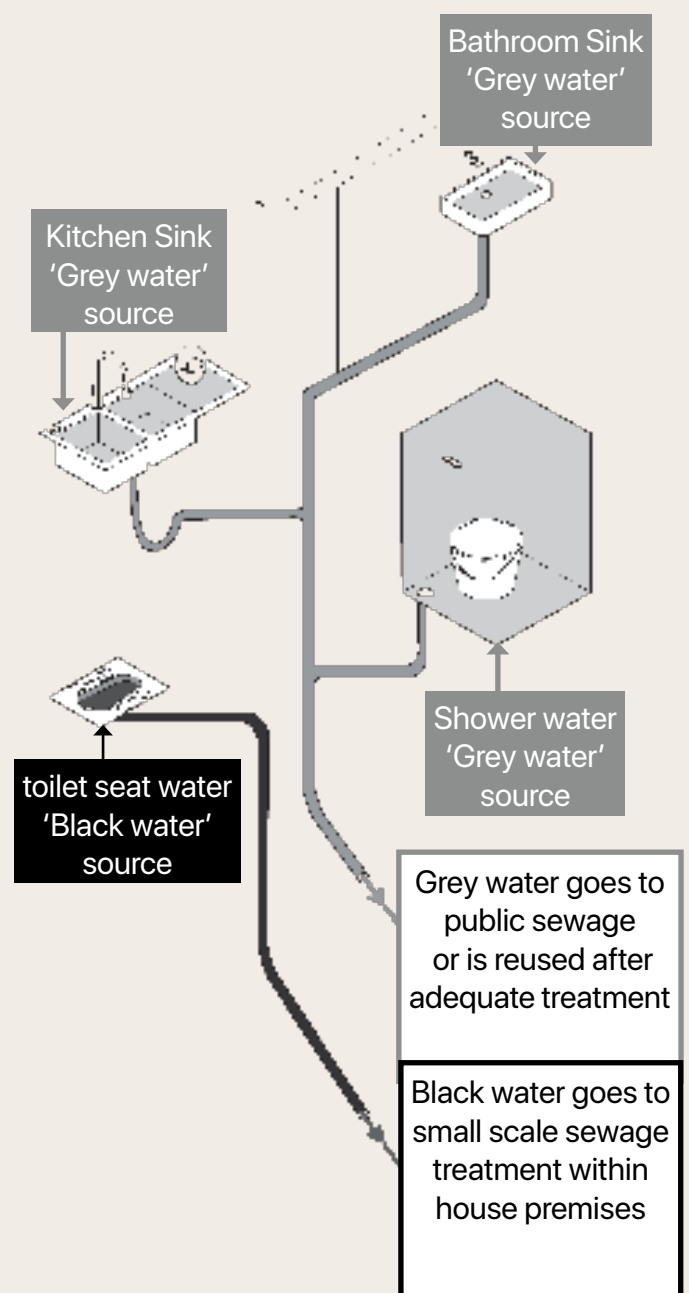
2. Black Water

- Discharge from toilets & urinals, containing fecal matter.
- This water is carried by 'Soil pipes'.
- This type of water should never be discharged without treatment, as that can lead to spread of dangerous diseases in your locality.
- Discharge after treatment should also be cautious, not to be brought in contact with humans.
- For discharge of black water, one of these should be used: septic tanks, leech pits, municipal sewers.

Black and grey water pipes should be located away from drinking water supply pipes and structures.



Schematic diagram showing different origin & destinations of Grey water & Black water



What are the main types of sewage systems to install in your home?

D. SEWAGE TREATMENT STRUCTURES

1. Location of sewage treatment structures

- Locate septic tanks away from all water sources and tanks. Ideally, place them in the corner of the site.
- Connect pipes to the septic tank in a straight line, which is easier to clean.

2. Types of small scale sewerage treatment system

The type of system depends on the existing conditions of your site, like availability of piped municipal sewer, frequent water scarcity, etc.

Maintenance of all systems should be done by machinery. Do not use labour to clean sewage systems.

A. Soak Pits

A soak pit, also known as a soak-away or leach pit. It is a covered, porous-walled chamber that allows water to slowly soak into the ground.

1. A soak pit is simply a hole in the ground that has been filled with coarse stones and rubble.
2. This combination of stones and rubble enables surface water to disperse into the earth rather than sitting on top of the ground.

Reinforced Concrete Soak Pit:
Circular pits made with concrete rings fabricated on site are stronger and easy to build.



Ask your Sarpanch if the manual labour cost for building a soak pit can be covered under MGNREGA Scheme.

2. Septic Tanks

A septic tank is an underground chamber made of concrete, fiberglass, or plastic through which domestic wastewater (sewage) flows for basic treatment.

Size of Septic Tank

Create a septic tank big enough so that cleaning is only required once in 2 to 3 years!



Material of Septic Tank

Can be good quality bricks & cement
'Prefabricated or 'pre-fab', ready made
Septic tanks bought from market.

1. It is expensive to construct a septic tank. Pre-fab ones are available in the market these days.
2. It is long lasting option and can be reused.
3. Suitable for house near water body, site in heavy monsoon area, low lying site.



Points to note!

- ✓ *The design of the sewage system should be based on the family size, infrastructure around the house, availability of water, depth of the ground water table, and cost of construction.*
- ✓ *Consult with your local contractor on which sewage treatment system to install.*
- ✓ *Install the sewage system in your first phase of construction.*

NEVER Allow Manual Scavenging

The Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013 prohibits manual cleaning of human excreta in insanitary latrines.

Only use mechanical devices for clearing of sewers and septic tanks.



What alternative Sewage systems can you choose from?

F. OTHER TYPES OF SEWAGE SYSTEMS

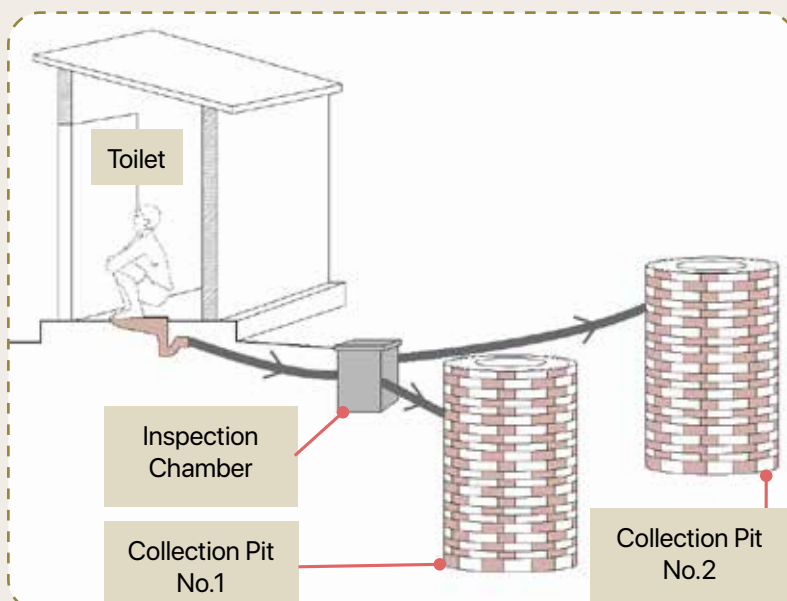
In case you are unable to install a septic tank or a soak pit on your site, here are some alternative technologies, some of which are more ecofriendly and low-cost.

1. Alternating Twin Pit Toilet System

1. It should be located as to avoid contamination of water resources or underground water supply lines.
2. This system is not advisable for black cotton or clay soil



How does a Twin Pit Toilet work?



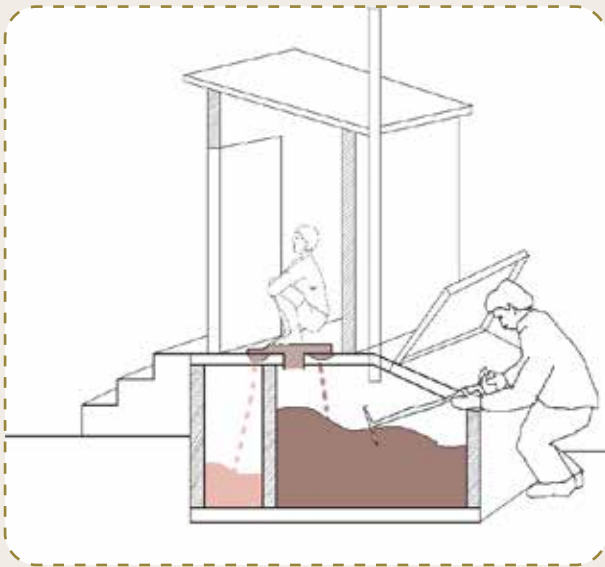
Schematic Diagram of an Alternating Twin Pit Type Toilet System

1. This method consists of two alternating pits connected to a pour flush toilet.
2. The Black-water is collected in the pits and allowed to slowly infiltrate into the surrounding soil.
3. Over time, the solids are sufficiently dewatered and can be manually removed with a shovel and reused like compost.
4. This compost is helpful in improving soil fertility and for fertilizing crops.
5. Because double pits are used alternately, their life is virtually unlimited.

What alternative Sewage systems can you choose from?

2. EcoSan Toilet and Fighting Water Scarcity

'EcoSan' Toilets are used in places where water is scarce, does not need external sewage system, and can convert human waste into manure.

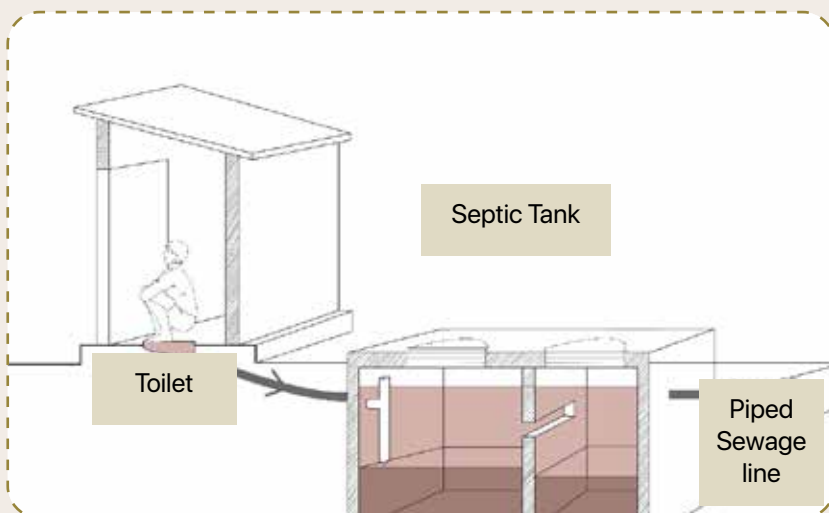


The EcoSan Toilet

- EcoSan is a dry toilet, with limited or no use of water. It is ideal for water-scarce areas and areas with shallow water-table.
- Excreta and urine are collected and treated separately, and there is no odour.
- The solid waste takes a few weeks to decompose and become odour free.
- After treatment, the solids can be easily removed and used as manure for agriculture.

3. Septic Tank & Piped Sewage Line

If it is possible to connect to a pipe sewage line near your house location, you can connect & pass on your waste to it after it goes through a Septic Tank.



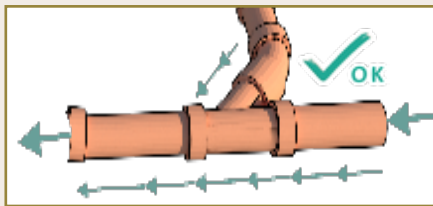
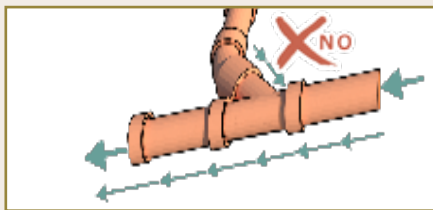
- A Septic tank provides the necessary primary treatment to the effluents from our toilets.
- It decomposes solid waste into less harmful liquid form, which can be sent to the municipal treatment via municipal sewers.

What do you need to know before laying the pipes?

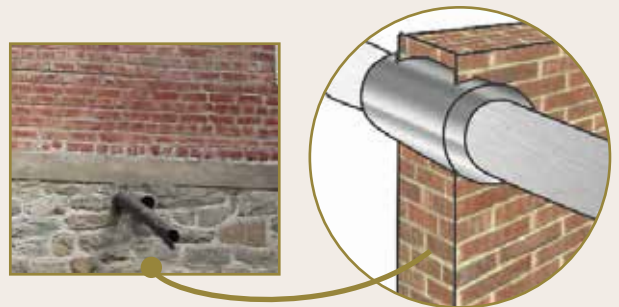
G. PIPE INSTALLATION

The following aspects help avoid faulty pipelines. These apply to both water supply & water drainage pipes:

1. Planning the Pipe



1. Ensure that change in diameter or direction of pipe is gradual.
2. Provide size and slopes based on local Municipal bylaws.



1. Install pipes while laying the foundation and the plinth.
2. Ensure that pipe passing through a wall or floor is protected by a sleeve to allow free movement.
3. Lay underground pipes deep enough for protection from traffic loads and vibrations, specially when it is crossing roads.

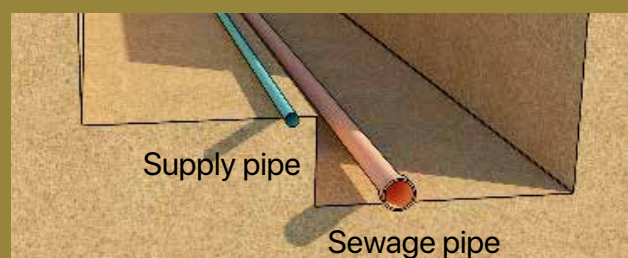
Points to note!



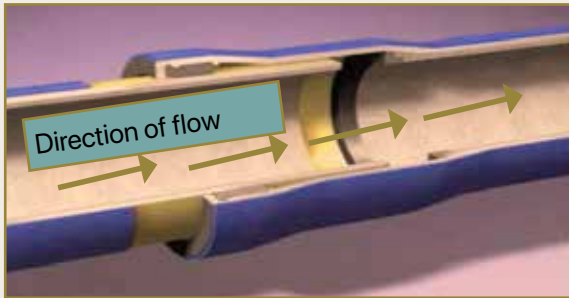
Separate drinking water supply lines from sewage line by laying water line at a level above the sewage lines.



Where the water pipe has to pass through foul soil, protect the pipe by an exterior CI pipe or other means.



2. Joinery & Workmanship



- Ensure that mortar joints have been provided properly and cured for 7 days.
- Ensure that Socket end of pipe is against the direction of flow in case of Spigot and Socket type pipe (as shown in image).
- Workmanship of pipe line work should be fully water tight.
- Pipes to be lifted and lowered and not slid into trenches.

3. Special guidelines for sewerage pipes

Minimum Size

1. The inside diameter of sanitary sewer pipes must measure at least 3 inch.
2. A 4-inch pipe is used as the building drain under floors or to transport all the wastewater from a home out to the septic tank or sewer. The 4 inch pipe may also be used in a home if it's capturing two or more bathrooms.

Slope

1. Should be laid at a slope not steeper than 1: 50
2. Ensure that the gradient of sewer falls within the range as per specifications.

Points to note!

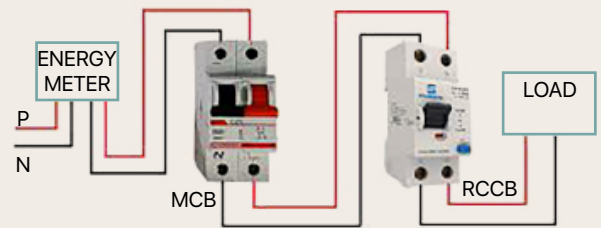
- ✓ *Avoid cross connections to mitigate contamination.*
- ✓ *Use Traps and Seals to manage smells.*
- ✓ *Regularly clean and maintain the system.*
- ✓ *Do not use rusted pipes to avoid breakage and leakage.*

How to plan your electric works?

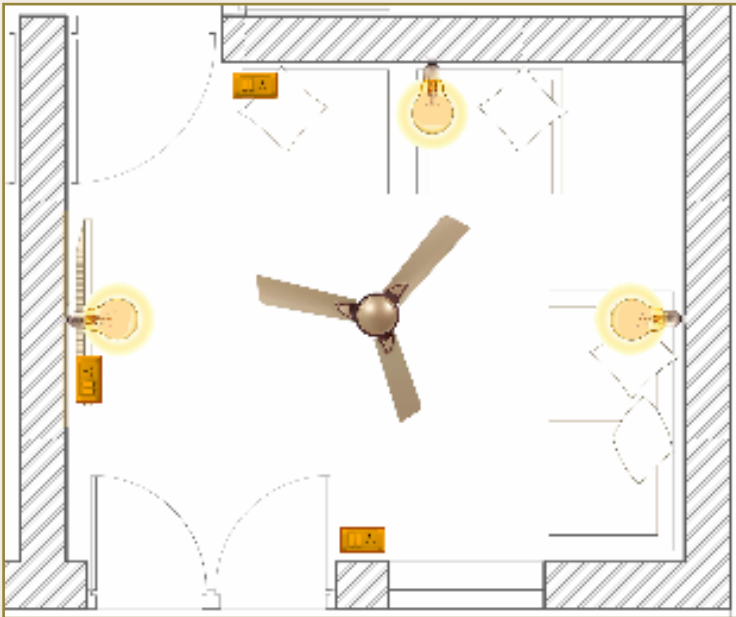
H. ELECTRICAL WORKS

Electrical works should take care of all the power supply needs of the house in a safe & efficient way.

- Install circuit breakers or fuses to secure your electric connection at home.
- Miniature Circuit Breakers (MCBs) and Residual Current Circuit Breakers (RCCBs) can prevent major accidents by interrupting current flow during electrical overloads and surges.



1. Planning electrical works



- Before construction, fix all the locations of electrical outlets.
- Mark these on the house plan drawings
- Keep in mind furniture placement
- Do not have a water source near a power outlet.
- Use this 'electrical plan' for accommodating electrical services during construction

2. Accommodating electrical services



Electrical conduits and sleeves should be laid timely, along with casting of ceiling slabs, making floors & construction of walls.

Ensure Safety of Users

1. Use good quality wires and insulation coating
2. Make sure that the uncovered power outlets in your home are out of the reach for children and pets.
3. Do not engage if you see a wire emitting sparks or an electrical fire. Contact a professional electrician instead.

Looking to install solar energy for your home?

I. HARNESSING SOLAR ENERGY

- Using Solar panels for electricity can lead to long-term savings
- While the cost of installation is high, there are government subsidies available. Ask your panchayat.
- Call a local electrician to install the solar panel.
- Make sure the direction of the solar panel is in line with the direction of the sun.



Remember this before installation

Before installation, there should be careful vendor selection-

1. Discuss the amount of power needs of your house with vendors.
2. Get detailed, competitive estimates from 3-4 vendors.
3. Inquire about type of solar panels, company of batteries & inverters mentioned in the estimate are of good quality.
4. Inquire about future servicing & customer care facilities of the company.

Points to note!

- *Any leakage in the walls near power outlets must be immediately fixed.*
- *Keep switches in appliances off when not in use to save electricity bills.*
- *Do not plug several appliances into one power outlet, or overload it beyond the rated capacity.*
- *Get your appliances and electrical circuits checked by a professional from time to time. Such timely inspections can save you from a lot of hazards and expenses later.*



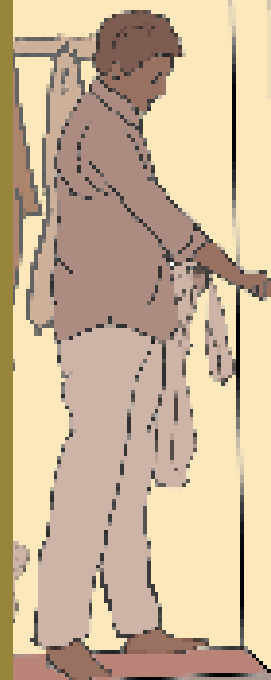


Explore other Durable Homes Toolkits by Lokal Habitat Labs:

1. How do I heatproof my home?
2. How do I waterproof my home?
3. How do I select the right materials?
4. How do I select the right construction team and supervise the work?
5. How to develop the site and construct a strong foundation?
6. How to build strong walls and design windows?
7. How to build a strong roof?
8. How to choose the structural system for your home?
9. How to build a well-serviced home?
10. What are the tips for good RCC construction?
11. How do I maintain my home after construction?
12. How do I design my home?

Disclaimer:

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