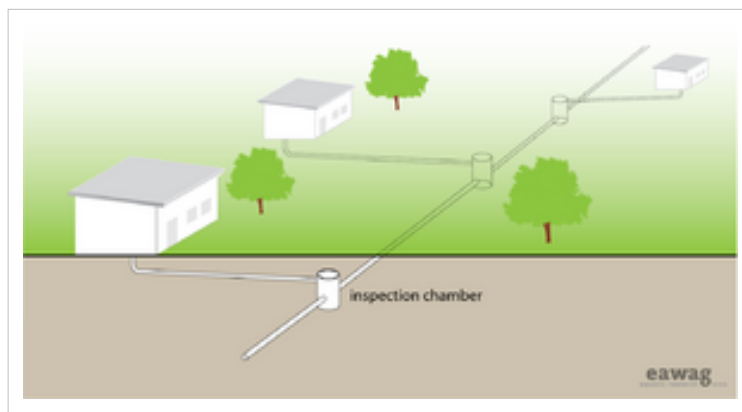


# Simplified\_Sewers

Application level		Management level	
Household		Household	XX
Neighbourhood	XX	Shared	XX
City	X	Public	XX



Applicable to systems:	Languages / langues / idiomas
6, 7, 8	  

Inputs: Blackwater , Greywater

Outputs: Blackwater , Greywater

**Simplified Sewers describe a sewerage network that is constructed using smaller diameter pipes laid at a shallower depth and at a flatter gradient than conventional sewers. The Simplified Sewer allows for amore flexible design associated with lower costs and a higher number of connected households.**

Expensive manholes are replaced with simple inspection chambers. Each discharge point is connected to an interceptor tank to prevent settleable solids and trash from entering the sewer. As well, each household should have a grease trap before the sewer connection.

Another key design feature is that the sewers are laid within the property boundaries, rather than beneath the central road. Because the sewers are more communal, they are often referred to as condominial sewers. Oftentimes, the community will purchase, and connect to, a single legal connection to the main sewer; the combined effluent of the condominial sewer network flows into the main sewer line.

Because simplified sewers are laid on or around the property of the users, higher connection rates can be achieved, fewer and shorter pipes can be used and less excavation is required as the pipes will not be subjected to heavy traffic loads. However, this type of Conveyance technology requires careful negotiation between stakeholders since design and maintenance must be jointly coordinated.

All greywater should be connected to the Simplified Sewer to ensure adequate hydraulic loading. Inspection chambers also function to attenuate peak discharges into the system. For example, a 100mm diameter sewer laid at a gradient of 1m in 200m (0.5%) will serve around 200 households of 5 people (10,000 users) with a wastewater flow of 80L/person/day.

Although watertight sewers are the ideal, they may be difficult to achieve, and therefore the sewers should be designed to take into account the extra flow that may result from stormwater infiltration.

Blocks of community-based Simplified Sewers are connected to an existing Conventional Gravity Sewer or routed to a Simplified Sewer main constructed with pipes of a larger diameter. A Simplified Sewer main can still be placed at a shallow depth providing it is placed away from traffic.



Advantages	Disadvantages/limitations
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<ul style="list-style-type: none"> <li>- Can be built and repaired with locally available materials.</li> <li>- Construction can provide short-term employment to local labourers.</li> <li>- Capital costs are between 50 and 80% less than Conventional Gravity Sewer; operating costs are low.</li> <li>- Can be extended as a community changes and grows.</li> </ul>	<ul style="list-style-type: none"> <li>- Requires expert design and construction supervision.</li> <li>- Requires repairs and removals of blockages more frequently than a Conventional Gravity Sewer.</li> <li>- Effluent and sludge (from interceptors) requires secondary treatment and/or appropriate discharge.</li> </ul>
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## Adequacy

Where the ground is rocky or the groundwater table is high, the excavation of trenches for pipes may be difficult. Under these circumstances, the cost of installing sewers is significantly higher than in favourable conditions. Regardless, Simplified Sewerage is less expensive than Conventional Gravity Sewerage because of its shallow installation depth.

Simplified Sewers can be installed in almost all types of settlements and are especially appropriate for dense, urban settlements. To prevent clogging and maintain the sewers, good pre-treatment is required. It is recommended that the scum from greywater, heavy solids and garbage be removed from the wastewater prior to entering the sewer.

## Health Aspects/Acceptance

If constructed and maintained well, sewers are a safe and hygienic means of transporting wastewater. Users must be well educated about the health risks associated with maintaining/ cleaning blockages and inspection chambers.

## Upgrading

Household inspection chambers can be upgraded to septic tanks so that fewer solids enter the Simplified Sewer network, but this will increase maintenance costs associated with emptying the septic tank.

## Maintenance

Pre-treatment with interceptor tanks and a grease trap is essential. The homeowner must maintain the interceptor tanks and the grease trap. Ideally, households will also be responsible for the maintenance of the sewers, however in practice this may not be feasible. Alternatively, a private contractor or users committee can be hired to assume responsibility for the maintenance as inexperienced users may not detect problems before they become severe, and therefore, more costly to repair. A related problem is that households may drain stormwater into the sewer. This practice should be discouraged whenever possible. Blockages can usually be removed by opening the sewer and forcing a length of rigid wire through the sewer. Inspection chambers must be emptied periodically to prevent grit overflowing into the system.

## Acknowledgements

The material on this page was adapted from: Tilley, E. et al. (2008). Compendium of Sanitation Systems and Technologies <sup>[2]</sup>, published by Sandec <sup>[3]</sup>, the Department of Water and Sanitation in Developing Countries of Eawag <sup>[4]</sup>, the Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland. The publication is available in English, French, and will be made available in Spanish. Available in the IRC Digital Library <sup>[5]</sup>

## References and external links

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## References

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- [3] [http://www.eawag.ch/organisation/abteilungen/sandec/index\\_EN](http://www.eawag.ch/organisation/abteilungen/sandec/index_EN)
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- [5] <http://www.irc.nl/docsearch/title/163208>



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