

# Water for the World



## Operating and Maintaining Sewer Systems Technical Note No. SAN. 2.O.4

A sewer system is a self-operating network of underground pipes that carries sewage by gravity flow from a number of dwellings. The sewage may be a direct flow of wastewater or the effluent after settling in septic tanks or aqua privies. It flows to a stabilization pond or other central treatment facility. Maintaining a sewer system requires the services of an experienced operator. Maintenance involves routinely inspecting the system for blockage or damage and making repairs.

This technical note describes the elements involved in maintaining a sewer system. It does not attempt to explain everything you need to know to operate and maintain a sewer system.

### Useful Definitions

**BRANCH LINE** - A sewer line that carries sewage from one or more house laterals and empties it into the main sewer.

**EFFLUENT** - Settled sewage.

**GRAVITY FLOW** - Flow of water from high ground to low by natural forces.

**HOUSE LATERAL** - A sewer line that carries sewage from a house or septic tank to a branch sewer.

**MAIN LINE** - A sewer line that carries sewage from one or more branch sewers and empties it into a stabilization pond or other treatment unit.

### Materials Needed

For all maintenance and repair of sewers:

(1) a master sewer system map similar to Figure 1 showing the entire sewer network; (2) detailed section maps similar to Figure 2 and profile drawings of all portions of the sewer system.

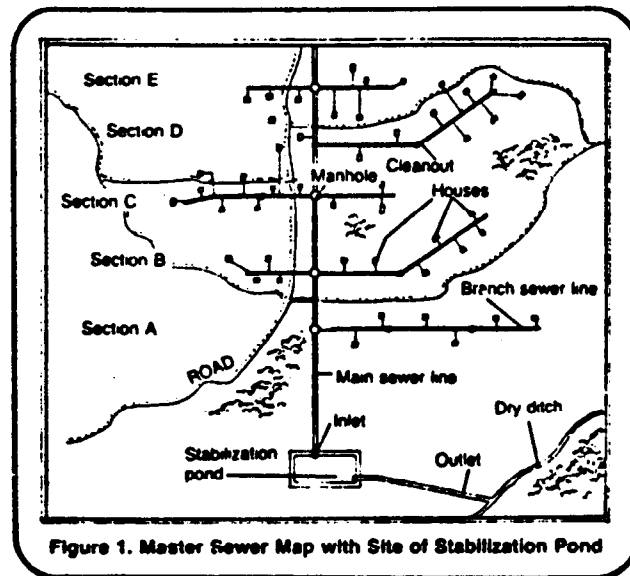


Figure 1. Master Sewer Map with Site of Stabilization Pond

For sewer pipe clean-out and removal of blockage:

(1) 100-300m of flexible steel tape, cable, or jointed sewer rods; (2) an assortment of cleaning and root-cutting attachments; (3) portable, hand-operated winch; (4) 100-300m of

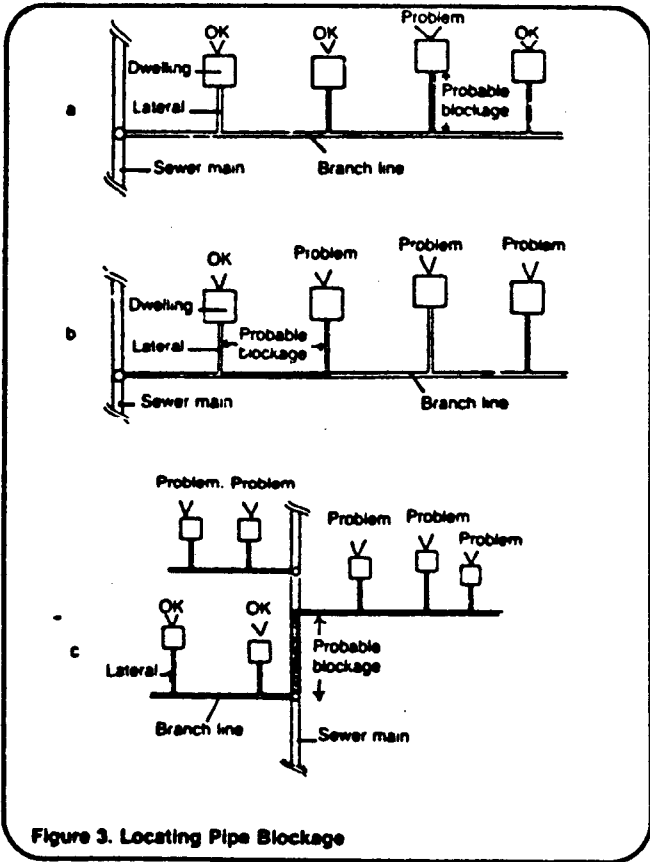


Figure 3. Locating Pipe Blockage

flexible steel tape, steel cable or jointed sewer rods with cutting attachments into the sewer pipe. See Figure 4. Once the blockage has been penetrated or cut, the material will usually flow freely downstream through the system. If it does not, the area of the blockage will have to be excavated as described in the following section.

### Repairing the Sewer

If there is a known break in the sewer line, or if your inspection tour indicates that there is a break, or if a blockage of the line cannot be removed by clean-out equipment, a portion of the sewer line will have to be excavated.

1. Barricade the area to be excavated and instruct all residents upstream to stop using the system until repairs are completed.
2. Excavate the area in question, making the trench as narrow as conveniently possible.

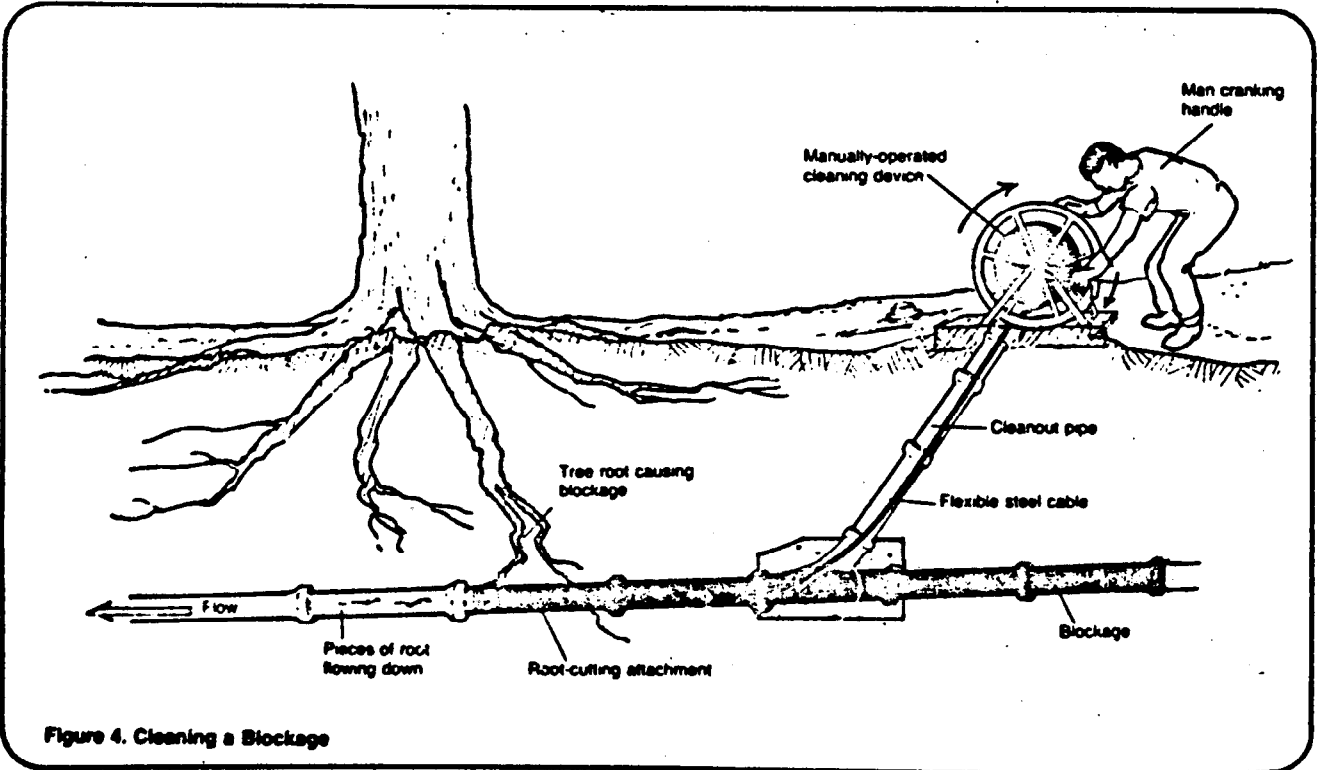


Figure 4. Cleaning a Blockage

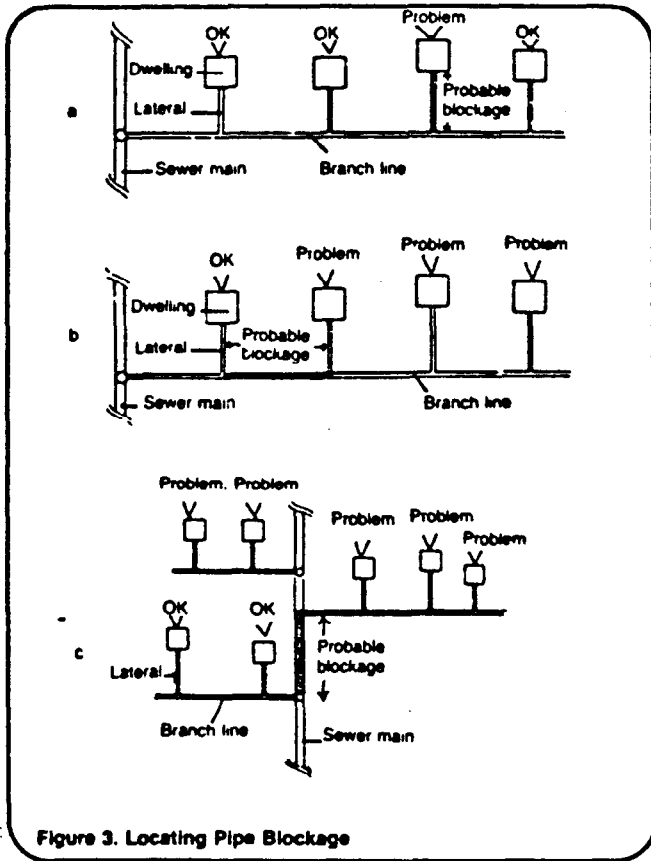


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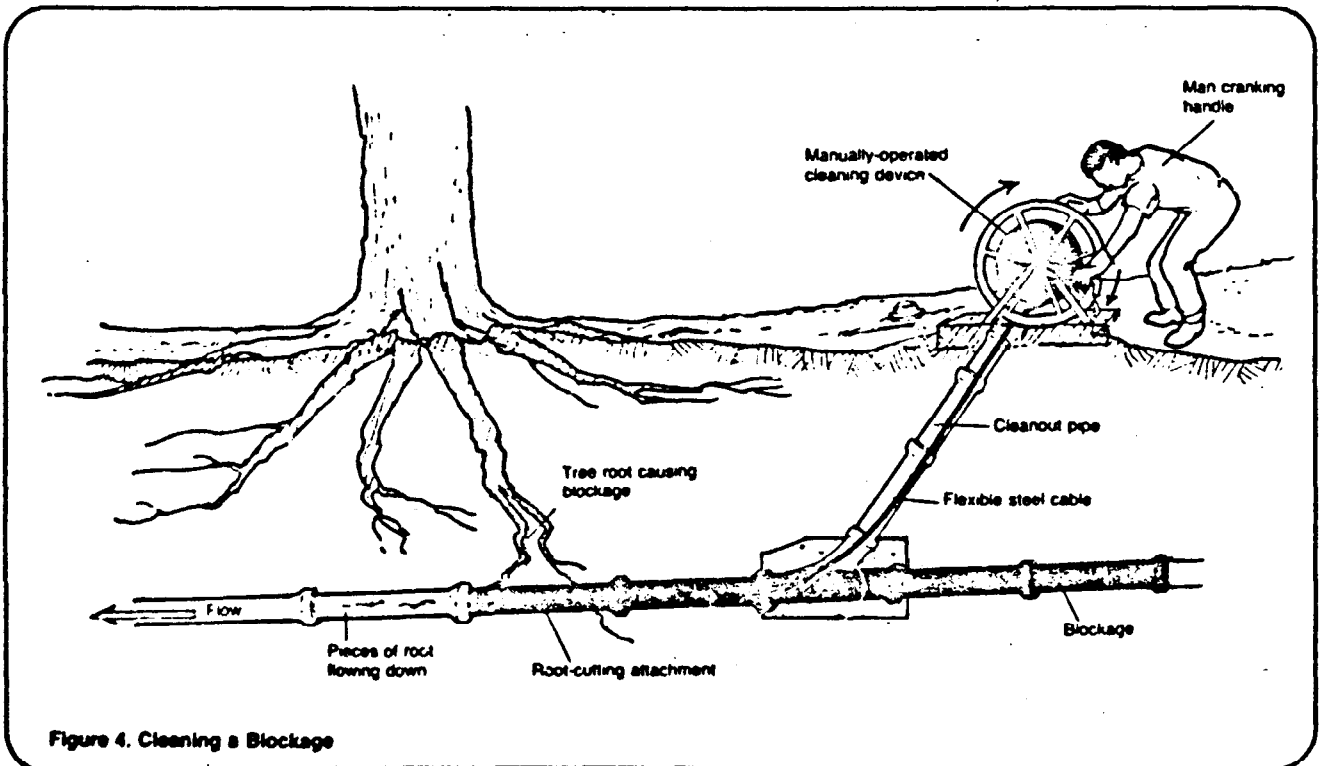


Figure 4. Cleaning a Blockage

3. Shore the sides of the trench with sheeting and braces.

4. Remove the damaged or clogged sewer pipe in the following manner: first chisel out sections of the bell-ends of the pipe to be removed and of the adjacent downstream pipe; second, rotate the pipe to be removed so that the chiseled out section of bell-end is on the bottom; third, lift out the damaged or clogged pipe. See Figure 5.

5. Clean out the clogged pipe and replace it, or set a new pipe in place in the following manner: first, chisel out a section on the bell-end of the new pipe; lower it in place; rotate the new pipe so that the chiseled out portion of the bell is on top; repair the chiseled out bell-ends of the new pipe and the adjacent downstream pipe with cement mortar; and thoroughly seal the joints.

6. Remove sheeting and braces and backfill the trench with soil, carefully but firmly tamping as the trench is filled.

### Caution!

Sewer gas will be present when the system is opened. Allow a few hours for it to air out. Be certain workers in the trench wear safety ropes held by workers outside the trench.

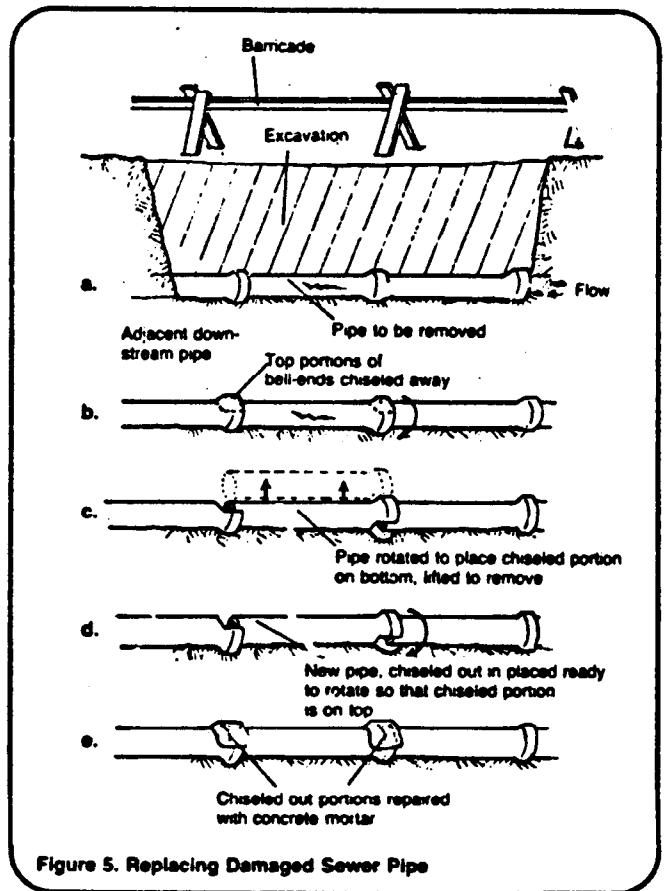
Sewage will be in the pipes. Workers must wear protective boots and gloves and thoroughly wash themselves when the work is complete. Disease-causing organisms may be in fresh, raw sewage.

### Preventive Measures

The following steps can prevent blockage of or damage to sewer pipes:

1. Instruct users not to put cloth, bones, or other material that may clog pipes into the sewer system. Pay particular attention to homes with recurrent problems.

2. If standpipes, fire hoses, and clean-out ports are available, period-



ically flush out the system with water. A portable pump and water tank can be used.

3. Remove trees and large shrubs within 5m of sewer lines to prevent root entry into the system.

4. Closely supervise construction or excavation near the sewer system to avoid damage to pipes.

5. Open and inspect manholes and clean them out every six months. Air out the manholes before entering. Workers entering the manholes should wear safety ropes.

Keep a record similar to Table 1 showing all work done to the sewer system.

Table 1. Sample Maintenance Record

Date	Task
11/7/82	Inspection thru gastrons A-E. Okay.
11/9/82	Inspection thru gastrons F-J. Okay.
12/1/82	Checked lower compartment - down thru. Reported upper case; needs cleaning. Burns will do.
1/9/83	Inspection thru of entire system (gastrons A-J) okay.
1/15/83	Checked components - 3 magnets being removed section C - 2 other known, 1 checked up. Grand rls n-out part C-2. need still ctdl with next run; glueside must wait. Home okay.