



GRAY WATER SYSTEMS

(Reference California Plumbing Code Chapter 16)

Revised: 10/14/08

GENERAL

The provisions of this information sheet apply to the construction, installation, alteration and repair of Gray Water Systems for underground landscape irrigation in single-family dwellings. This is intended as a simplified version of what is described in California Plumbing Code Chapter 16. For more detailed information or if your situation isn't addressed here, please refer to CPC Chapter 16. Figures and tables referenced herein are available within the CPC and also on the town web site (www.townofsan-anselmo.org).

The system shall consist of a holding tank or tanks that discharge into subsurface irrigation/disposal fields. The type of system shall be determined on the basis of location, soil type, and groundwater level, and shall be designed to accept all gray water connected to the system from the residential building.

A Plumbing Permit is required to be obtained and all work inspected by the Building Division. Submit 3 sets of plans and 2 sets of soil test data. Plans must be drawn on 11"x17" or 24"x36" paper. Refer to the town web site for drawing standards.

LIMITATIONS

Gray water disposal systems require a relatively flat area. The minimum horizontal distance between any part of the distribution system and the ground surface must be 15'. Also, irrigation/disposal fields require the perforated pipes to be level or slope a maximum of 3" in 100'.

The system shall not be connected to any potable water system and shall not result in any surfacing of gray water.

No gray water system or part thereof shall be located on any lot other than the lot that is the site of the building or structure that discharges the gray water, nor shall any gray water system or part thereof be located at any point having less than the minimum distances indicated in Table 16-1.

No permit for a gray water system shall be issued until a plot plan with appropriate data has been submitted and approved by the Building Official. When there is insufficient lot area or inappropriate soil conditions for adequate absorption of the gray water, as determined by the Building Official, no gray water system shall be permitted.

DEFINITIONS

Gray water is untreated household wastewater which has not come into contact with toilet waste. Gray water includes used water from bathtubs, showers, bathroom wash basins, clothes washing machines and laundry tubs or an equivalent discharge as defined by the Building Official. It does not include waste water from kitchen sinks or dishwashers.

Surfacing of gray water means the ponding, running off or other release of gray water above the land surface.

DRAWINGS AND DATA TO BE SUBMITTED

PLOT/SITE PLAN - drawn to scale (1/8" per ft) and completely dimensioned, showing:

- Property lines
- all structures on the property (including retaining walls and fences)
- paved areas
- direction and approximate slope of ground surface
- drainage channels
- water supply lines and wells
- sewer connection to the public sewer
- layout of the proposed gray water system
- locations of soil test sites
- Data Table listing: number of bedrooms and list of all plumbing fixtures in each structure; design number of occupants; estimated gray water volume; soil type and absorption capacity per Table 16-2 or from percolation tests.

DETAIL DRAWINGS - Drawn to ¼"/ft to ½"/ft scale showing all construction information necessary to ensure compliance with the requirements of the California Plumbing Code Chapter 16. Include a full description of installation describing methods and materials. Provide the manufacturer of components.

SOIL DATA - a log of soil formations at depths and groundwater level as determined by test holes dug in proximity to proposed irrigation area. Provide a statement of water absorption characteristics of the soil at the proposed disposal site as determined by percolation tests. Provide a copy of the test results.

ESTIMATING GRAY WATER DISCHARGE

Calculate the volume of gray water discharge by using the following information:

The number of occupants of each dwelling unit shall be assumed as:

First bedroom 2 occupants

Each additional bedroom 1 occupant

Estimated gray water volume from fixtures attached to the gray water system for total occupant load:

Showers, bathtubs & wash basins 25 gallons per day/occupant

Laundry 15 gallons per day/occupant

MAXIMUM ABSORPTION CAPACITY

Refer to Table 16-2 for the absorption values for the soils at your proposed site. If unsure of the type of soil or if the soil is not listed in the table, a percolation test by a soil testing company will be required.

AREA OF DISPOSAL FIELD

Determine the width of the field which is essentially the width of the trench and controlled backfill material.

HOLDING TANKS

Holding tanks must be steel that is both externally and internally coated to resist corrosion. The tank must be certified for use in gray water systems. Tanks must have the capacity permanently marked on the exterior along with a sign stating "GRAY WATER IRRIGATION SYSEYEM, DANGER – UNSAFE WATER". Tanks must be vented and have a locking cap. A minimum capacity of 50 gallons is required.

Tanks shall be installed on dry, level, well-compacted soil if underground or on a level concrete slab at least 3" thick if above ground. Tanks must be secured against overturning.

Tanks installed above ground must have an overflow drain and an emergency drain separate from the drain to the disposal field. The emergency drain and overflow drains shall have permanent connections to the building drain. The overflow drain must not have a shutoff valve.

If installed underground, the tank must be designed so that the tank overflow will gravity drain to the existing sewer system. There shall be a backflow valve at the connection of the tank overflow and building sewer line. Underground tanks must be structurally designed to withstand all anticipated earth loads. Covers shall be capable of supporting earth loads of not less than 300psf.

CONNECTION TO THE BUILDING SEWER

A waterseal-type trap is required downstream of the connection of the gray water line and building sewer line. All gray water piping and valves must be permanently labeled with the words "DANGER - UNSAFE WATER".

IRRIGATION/DISPOSAL FIELD

Drain field pipes must be 3" diameter perforated high-density polyethylene, ABS, or PVC pipe.

Filter material to be placed around the perforated pipe shall be clean stone, gravel or slag varying in size from ¾" to 2½".

Filter fabric is used to line the trench and wrap around the filter material to keep dirt and roots from clogging the filter material.

GRAY WATER SYSTEM TABLES

TABLE 16-1
Location of Gray Water System

Minimum Horizontal Distance in Clear Required From:	Holding Tank		Irrigation/ Disposal Field	
	Feet	(mm)	Feet	(mm)
Building structures ¹	5 ²	(1,524 mm)	2 ³	(610 mm)
Property line adjoining private property	5	(1,524 mm)	5	(1,524 mm)
Water supply wells ⁴	50	(15,240 mm)	100	(30,480 mm)
Streams and lakes ⁴	50	(15,240 mm)	50 ⁵	(15,240 mm)
Sewage pits or cesspools	5	(1,524 mm)	5	(1,524 mm)
Disposal field and 100% expansion area	5	(1,524 mm)	4 ⁶	(1,219 mm)
Septic tank	0	(0)	5	(1,524 mm)
On-site domestic water service line	5	(1,524 mm)	5	(1,524 mm)
Pressurized public water main	10	(3,048 mm)	10 ⁷	(3,048 mm)

Note: When irrigation/disposal fields are installed in sloping ground, the minimum horizontal distance between any part of the distribution system and the ground surface shall be fifteen (15) feet (4,572 mm).

- ¹ Including porches and steps, whether covered or uncovered, breezeways, roofed porte cocheres, roofed patios, carports, covered walks, covered driveways, and similar structures or appurtenances.
- ² The distance may be reduced to zero feet for aboveground tanks when first approved by the Authority Having Jurisdiction.
- ³ Assumes a 45-degree (0.79 rad) angle from foundation.
- ⁴ Where special hazards are involved, the distance required shall be increased as may be directed by the Authority Having Jurisdiction.
- ⁵ These minimum clear horizontal distances shall also apply between the irrigation/disposal field and the ocean mean higher high tide line.
- ⁶ Plus two (2) feet (610 mm) for each additional foot of depth in excess of one (1) foot (305 mm) below the bottom of the drain line.
- ⁷ For parallel construction/for crossings, approval by the Authority Having Jurisdiction shall be required.

TABLE 16-2
Design Criteria of Six Typical Soils

Type of Soil	Minimum square feet of irrigation/leaching area per 100 gallons of estimated gray water discharge per day	Maximum absorption capacity in gallons per square foot of irrigation/leaching area for a 24-hour period
Coarse sand or gravel	20	5.0
Fine sand	25	4.0
Sandy loam	40	2.5
Sandy clay	60	1.7
Clay with considerable sand or gravel	90	1.1
Clay with small amounts of sand or gravel	120	0.8

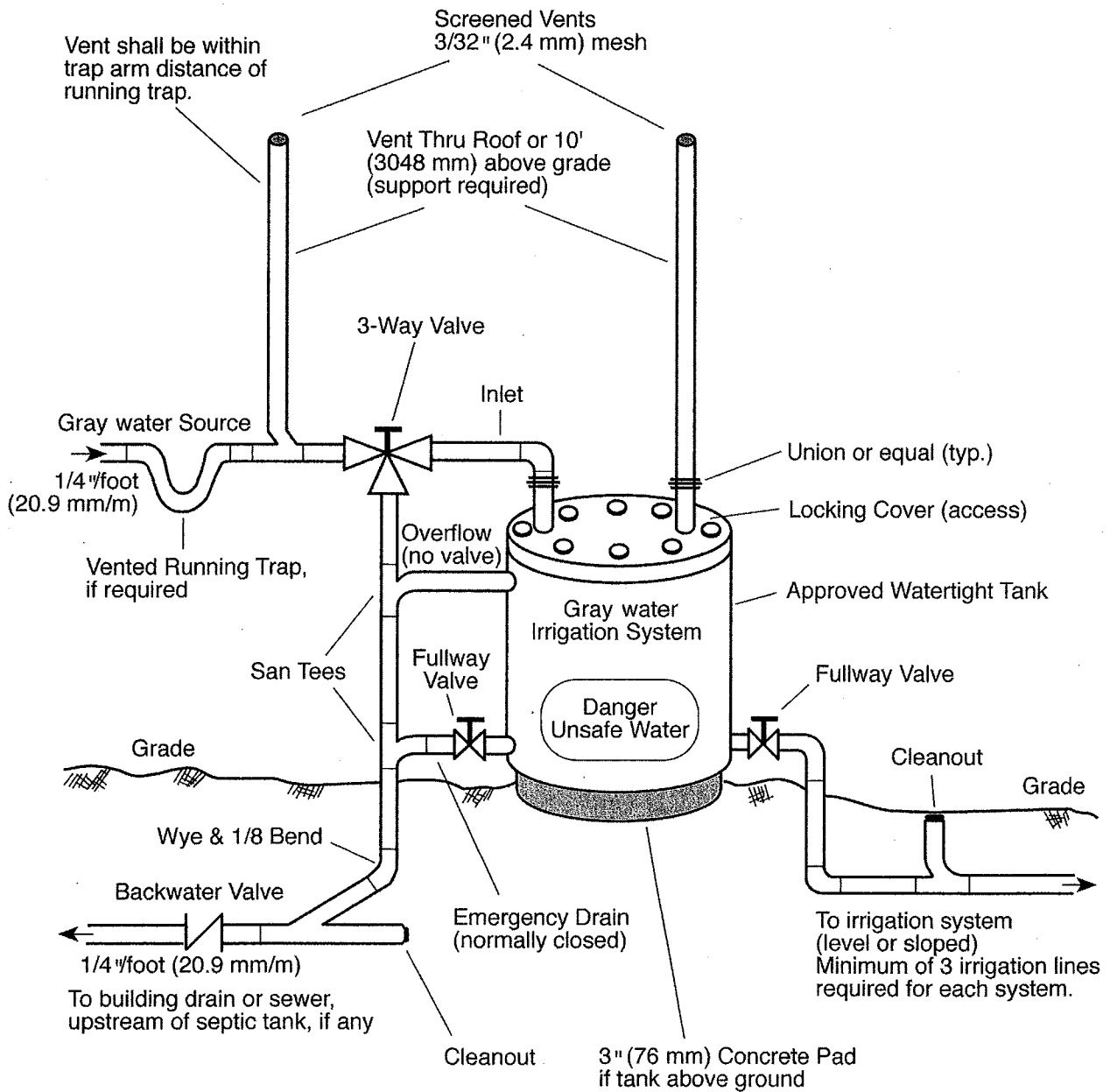
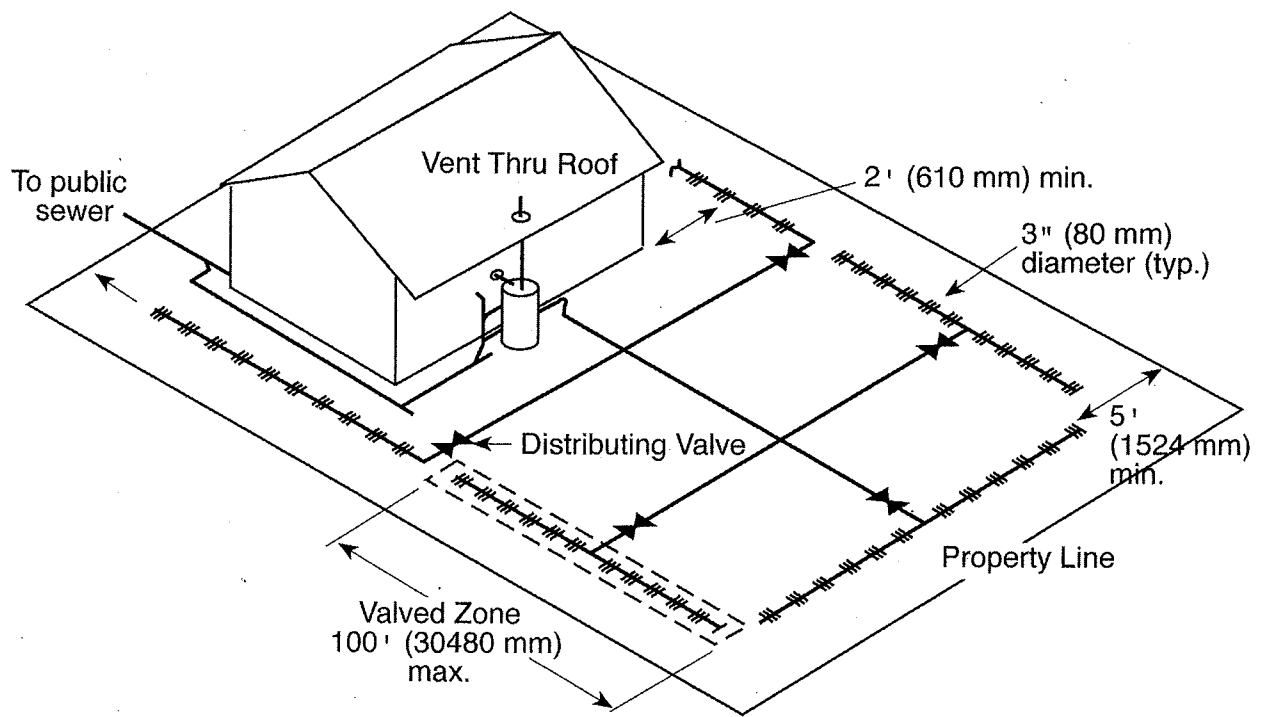


FIGURE 16-1 Gray Water System Tank – Gravity.



Note: Each valved zone shall have a minimum effective absorption/irrigation area in square feet predicated on the estimated graywater discharge in gallons per day and on the type of soil found in the area. The area of the field shall be equal to the aggregate length of perforated pipe sections within the valved zone times the width of the proposed field.

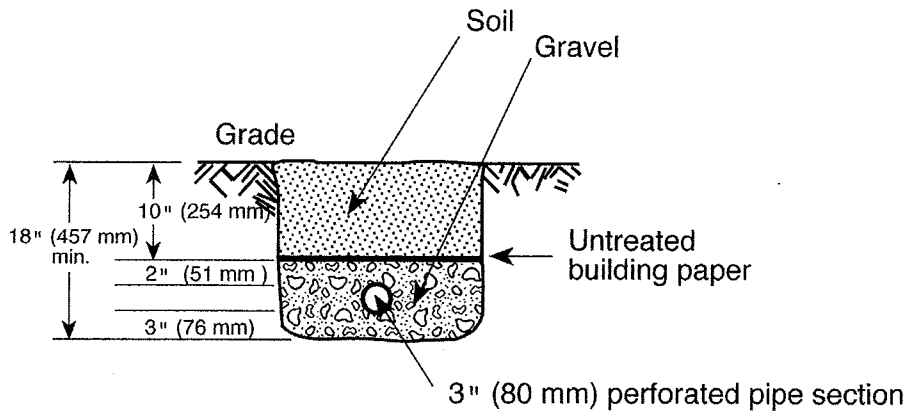


FIGURE 16-5 Gray Water System Typical Irrigation Layout.