

The 2007 triennial edition of the California Code of Regulations, Title 24 (California Building Standards Code) applies to all occupancies that applied for a building permit on or after January 1, 2008, and remains in effect until the effective date of the next triennial edition. The following errata items will be officially published and distributed by ICC and IAPMO prior to the Jan. 1, 2008 effective date. (Note: Items shown underlined denote the errata item that was revised)

**Errata for the 2007 Triennial Edition of Title 24, Part 2, 2007 California Building Code**

**(Updated on 11-14-07)**

• **Part 2 - California Building Code**

Chapter 4, Section 430.1 (Revise Article reference)

**430.1** For automatic sprinklers and fire alarm system requirements applying to each building, barn or structure which is used by an association regulated by the California Horse Racing Board for the stabling of horses or human habitation, and the stable area grounds, including any additional location where any excess horses are stabled, see Title 4, Division 4, Article 17, Section 1927.

Chapter 5, Table 503 (Missing table from July Publication)

**TABLE 503 ALLOWABLE HEIGHT AND BUILDING AREAS<sup>a</sup>**

Height limitations shown as stories and feet above grade plane.

Area limitations as determined by the definition of "Area, building," per story

GROUP	HGT(feet) HGT(S)	TYPE OF CONSTRUCTION								
		TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
		A	B	A	B	A	B	HT	A	B
		UL	160	65	55	65	55	65	50	40
A-1	S	UL	5	3	2	3	2	3	2	1
	A	UL	UL	15,500	8,500	14,000	8,500	15,000	11,500	5,500
A-2	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-3	S	UL	11	3	2	3	2	3	2	1
	A	UL	UL	15,500	9,500	14,000	9,500	15,000	11,500	6,000
A-4	S	UL	11	<u>3</u>	<u>2</u>	<u>3</u>	<u>2</u>	<u>3</u>	2	1
	A	UL	UL	<u>15,500</u>	<u>9,500</u>	<u>14,000</u>	<u>9,500</u>	<u>15,000</u>	11,500	6,000
A-5	S	UL	UL	UL	UL	UL	UL	UL	UL	UL
	A	UL	UL	UL	UL	UL	UL	UL	UL	UL
B	S	UL	11	5	4	5	4	5	3	<u>2</u>
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	<u>9,000</u>
E	S	UL	5	3	2	3	2	3	1	1
	A	UL	UL	26,500	14,500	23,500	14,500	25,500	18,500	9,500
F-1	S	UL	11	4	2	3	2	4	2	1
	A	UL	UL	25,000	15,500	19,000	12,000	33,500	14,000	8,500
F-2	S	UL	11	5	3	4	3	5	3	2
	A	UL	UL	37,500	23,000	28,500	18,000	50,500	21,000	13,000
H-1	S	1	1	1	1	1	1	1	1	NP
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	NP
H-2 <sup>d</sup>	S	UL	3	2	1	2	1	2	1	1
	A	21,000	16,500	11,000	7,000	9,500	7,000	10,500	7,500	3,000
H-3 <sup>d</sup>	S	UL	6	<u>4</u>	<u>2</u>	<u>4</u>	<u>2</u>	<u>4</u>	2	1
	A	UL	60,000	<u>26,500</u>	<u>14,000</u>	<u>17,500</u>	<u>13,000</u>	<u>25,500</u>	10,000	5,000
H-4	S	UL	7	5	3	5	3	5	3	2
	A	UL	UL	37,500	17,500	28,500	17,500	36,000	18,000	6,500
H-5	S	4	4	3	3	3	3	3	3	2
	A	UL	UL	37,500	23,000	28,500	19,000	36,000	18,000	9,000
I-1	S	UL	9	4	3	4	3	4	3	2
	A	UL	55,000	19,000	10,000	16,500	10,000	18,000	10,500	4,500
I-2/I-2.1	S	UL	4	2	1	1	NP	1	1	NP
	A	UL	UL	15,000	11,000	12,000	NP	12,000	9,500	NP
I-3 <sup>e</sup>	S	UL	2	NP	NP	NP	NP	NP	NP	NP
	A	UL	15,100	NP	NP	NP	NP	NP	NP	NP
I-4	S	UL	5	3	2	3	2	3	1	1

	A	UL	60,500	26,500	13,000	23,500	13,000	25,500	18,500	9,000
<u>L</u>	<u>S</u> A	<u>10</u> UUL	<u>3</u> 39,900	<u>3</u> 18,000	<u>2</u> 12,000	<u>3</u> 18,000	<u>2</u> 12,000	<u>3</u> 18,000	<u>3</u> 14,000	<u>1</u> 8,000
M	S A	UL UL	11 UL	4 21,500	4 12,500	4 18,500	4 12,500	4 20,500	3 14,000	1 9,000
R-1	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
R-2	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
R-3/R-3.1	S A	UL UL	11 UL	4 UL	4 UL	4 UL	4 UL	4 UL	3 UL	3 UL
R-4	S A	UL UL	11 UL	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
S-1	S A	UL UL	11 48,000	4 26,000	3 17,500	3 26,000	3 17,500	4 25,500	3 14,000	1 9,000
S-2 <sup>b, c</sup>	S A	UL UL	11 79,000	5 39,000	4 26,000	4 39,000	4 26,000	5 38,500	4 21,000	2 13,500
U <sup>c</sup>	S A	UL UL	5 35,500	4 19,000	2 8,500	3 14,000	2 8,500	4 18,000	2 9,000	1 5,500

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929m<sup>2</sup>.

UL = Unlimited, NP = Not permitted.

a. See the following sections for general exceptions to Table 503:

1. Section 504.2, Allowable height increase due to automatic sprinkler system installation.
2. Section 506.2, Allowable area increase due to street frontage.
3. Section 506.3, Allowable area increase due to automatic sprinkler system installation.
4. Section 507, Unlimited area buildings.

b. For open parking structures, see Section 406.3.

c. For private garages, see Section 406.1.

d. See Section 415.5 for limitations.

e. [SFM] See Section 408.1.1 for specific exceptions for one-story Type IIA, Type IIIA or Type VA construction.

- o Chapter 15, Section 1511.1 (Revise metric conversion number)

**1511.1 Fasteners.** Nails shall be long enough to penetrate into the sheathing  $\frac{3}{4}$  inch (19mm). Where sheathing is less than  $\frac{3}{4}$  inch (19mm) in thickness, nails shall be driven into supports, unless nails with ring shanks are used.

All fasteners shall be corrosion resistant and fabricated of copper, stainless steel, or brass, or shall have a hot dipped galvanized coating not less than 1.0 ounce of zinc per square foot (305 gm/m<sup>2</sup>).

Nails for slate shingles and clay or concrete tile shall be copper, brass or stainless steel with gage and length per common ferrous nails.

- o Chapter 29, Table 2902.1 (Missing table from the July publication)

#### **Table 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES**

Please visit the International Code Council web site for a downloadable fixture table. [www.iccsafe.org](http://www.iccsafe.org)

- o Chapter 31A (Missing from July publication)

#### **Chapter 31A**

#### **SYSTEMS FOR WINDOW CLEANING OR EXTERIOR BUILDING MAINTENANCE**

See Title 8, California Code of Regulations, Division 1, Chapter 4, Subchapter 7, General Industry Safety Orders, Group 1, Articles 5 and 6.

- o Chapter 35 (Amended language missing from July publication)

**\*NFPA 13, Amended Sections as follows:**

**Add a sentence to the beginning of Section 9.3.5.8.9 as follows:**

Where pipe is used for sway bracing, it shall have a wall thickness of not less than Schedule 40.

**Replace Section 9.3.5.9.4 as follows:**

Lag screws or power-driven fasteners shall not be used to attach braces to the building structure.

- **Part 4 - California Mechanical Code**

- Chapter 4, Table 4-4 Minimum Exhaust Rates (Add Table to Chapter 4 of the 2007 California Mechanical Code)

**TABLE 4-4 Minimum Exhaust Rates**

[ASHRAE 62.1:Table 6-4]

<u>Occupancy Category</u>	<u>Exhaust Rate</u>	<u>Exhaust Rate</u>	<u>Exhaust Rate</u>	<u>Exhaust Rate</u>
	<u>cfm/unit</u>	<u>cfm/ft2</u>	<u>L/s-unit</u>	<u>L/s-m2</u>
Art classrooms	-	0.70	-	3.5
Auto repair rooms 1	-	1.50	-	7.5
Barber shop	-	0.50	-	2.5
Beauty and nail salons	-	0.60	-	3.0
Cell with toilet	-	1.00	-	5.0
Darkrooms	-	1.00	-	5.0
Arena 2	-	0.50	-	2.5
Kitchen – commercial	-	0.70	-	3.5
Kitchenettes	-	0.30	-	1.5
Locker rooms	-	0.50	-	2.5
Locker/dressing rooms	-	0.25	-	1.25
Parking garages 3	-	0.75	-	3.7
Janitor, trash, recycle	-	1.00	-	5.0
Pet shops (animal areas)	-	0.90	-	4.5
Copy, printing rooms	-	0.50	-	2.5
Science lab classrooms	-	1.00	-	5.0
Toilets – public 4	50/70	-	25/35	-
Toilet – private 5	25/50	-	12.5/25	-
Woodwork shop/classroom	-	0.50	-	2.5

Notes For Table 4-4

1 Stands where engines are run shall have exhaust systems that directly connect to the engine exhaust and prevent escape of fumes.

2 The rates do not include exhaust from vehicles or equipment with internal combustion engines.

3 Exhaust not required if two or more sides comprise walls that are at least 50% open to the outside.

4 Rate is per water closet or urinal. Provide the higher rate where periods of heavy use are expected to occur, e.g., toilets in theatres, schools, and sports facilities.

5 Rate is for a toilet room intended to be occupied by one person at a time. For continuous system operation during normal hours of use, the lower rate may be used. Otherwise use the higher rate.

- Chapter 5, Section 505.12.2 (Add missing section 505.12.2 for the Board of Pharmacy, regulated by Consumer Affairs after existing section 505.12.1)

**505.12.2 Pharmacies Compounding Parenteral Solutions from One or More Nonsterile**

**Ingredients.** Any pharmacy that compounds sterile injectable products from one or more nonsterile must compound the medication in one of the following environments:

(a) An ISO class 5 laminar airflow hood within an ISO class 7 cleanroom. The cleanroom must have a positive air pressure differential relative to adjacent areas.

(b) An ISO class 5 cleanroom.

(c) A barrier isolator that provides an ISO class 5 environment for compounding.

- Chapter 7, Section 701.4.2 (Revise sub item #1 formula from 1 in.2/3,000 Btu/h (700MM<sup>2</sup> / kW) to formula shown below:

**701.4.2 One Permanent Opening Method.** One permanent opening, commencing within...

... have a minimum free area of [NFPA 54: 9.3.3.2]:

- (1) ~~1 in.2/3,000 Btu/h~~ 1 in<sup>2</sup> /3,000 Btu/h (700MM<sup>2</sup> / kW) of the total input rating of all equipment located in the enclosure and,

(2) Not less than the sum of the areas of all vent connectors in the space. [NFPA 54: 9.3.3.2]

- o Chapter 17, Standards (Revise year of referenced standard for NFPA 54)

NFPA 54-~~2005~~ / ANSI Z223.1

NFPA 54-2002 / ANSI Z223.1

- **Part 5 - California Plumbing Code**

- o Chapter 3, Matrix Adoption Table (Amend table to replace 'X's for sections 316.1.8 and 316.1.9 with obelisks.
- o Chapter 4, Table 4-3 (Amend exception to footnote #8, Table reference, as follows)

8 *Twenty-four linear inches of wash sink or 18 inches of circular basin, when provided with water outlets for such space, shall be considered equivalent to the lavatory.*

*Exception: The requirements of Table 4-3 do not apply to mobile crews or to normally unattended work locations provided employees at these locations have immediately available transportation to nearby toilet facilities which meet the requirements of Table 4-3.*

- o Chapter 6, Sections 613 & 614 (Insert missing text into Chapter 6 for OSHPD)

#### **613.0 Dialysis Water-distribution Systems**

**613.1 [For OSHPD 1, 2, 3 & 4]** *Dialysis water feedlines shall be PVC (polyvinyl chloride), glass or stainless steel and sized to provide a minimum velocity of 1.5 feet per second (0.46 m/s). The piping shall be a singleloop system with or without recirculation. Branches to dialysis machines shall be 1/4 inch (6.4 mm) inside dimension and take off from the bottom of the main feedline.*

**613.2** *All piping for multistation or central dialysis units shall be rigid where possible. All piping and tubing shall be in a neat arrangement. The placement of piping or tubing on the floor is not permitted.*

**613.3** *All valves shall be located in accessible locations.*

**613.4** *Piping and valves shall be identified according to their function.*

**613.5** *A means of preventing backwashing or flushing of the system when one or more stations are in operation shall be provided.*

**613.6** *A continuous audible alarm shall sound at the nurses' station and remote equipment rooms when the minimum velocity is not maintained, or if backwashing or flushing is attempted while one or more stations are in operation.*

**613.7** *Dialysis water is the water used for dialysis treatment and which meets the standards established by the American Association of Medical Instrumentation, 1992, or the Recommended Interim Products Water Standard for Hemodialysis, as established by the United States Food and Drug Administration, 1980.*

**613.8** *A diagram of all piping as installed shall be posted at the nurses' station and equipment room of all multistation or central dialysis units.*

#### **614.0 Identification of Potable and Nonpotable Water Lines**

##### **614.1 Uses Not Permitted.**

**614.1.1 [For OSHPD 1, 2, 3 & 4]** *Nonpotable water shall not be piped for drinking, washing or bathing, washing of clothing, cooking, washing of food, washing of cooking or eating utensils, washing of food preparation or processing premises, or other personal service rooms.*

**614.2 [For OSHPD 1, 2, 3 & 4]** *Nonpotable water systems or systems carrying any other nonpotable substance shall be installed so as to prevent backflow or backsiphonage into a potable water system.*

**614.3 [For OSHPD 1, 2, 3 & 4]** *Outlets for nonpotable water, such as water for industrial or fire-fighting*

purposes, shall be posted in a manner understandable to all employees to indicate that the water is unsafe and shall not be used for drinking, washing, cooking or other personal service purposes.

**614.4 [For OSHPD 1] Emergency Water Supply**

**614.4.1** For acute care hospital facilities required to meet NPC-5, an on site water supply of 150 gallons (567.9 L) (based on 50 gallons/day/bed for 72 hours) of potable water per licensed bed shall be provided. The emergency supply shall have fittings to allow for replenishment of the water supply from transportable water sources and a means to collect water in portable containers in the event that normal water supply becomes unavailable.

- Exceptions:**
1. With the licensing agency approval of a water rationing plan, the emergency water storage capacity may be computed based on the approved water rationing plan to provide for 72 hours of operation
  2. With the approval of the Office and the licensing agency, hook-ups that allow for the use of transportable sources of potable water may be provided in lieu of on-site storage.

**614.4.2** The emergency supply of water shall be provided at adequate pressure using gravity, pressure tanks or booster pumps. Pumps used for this purpose shall be provided with electrical power from the on site emergency system.

- o Chapter 12 – Fuel Piping (Relocate SFM's adoption 'X' to "Adopt Entire Chapter". Also remove 'X's from Section 1211.13.5 and 1211.16.
- o Appendix G [DWR] (Insert missing Appendix G Chapter for The DWR)

**(See end of this document for Appendix Chapter G)**

• **Part 8 - California Historical Building Code**

- o Section 8-812, Table 8-8A & Table 8-8B (Missing tables from July publication)

Chapter 8-8, Section 8-812

Table 8-8A ALLOWABLE VALUES FOR EXISTING MATERIALS

<u>EXISTING MATERIALS OR CONFIGURATIONS OF MATERIALS<sup>1</sup></u>	<u>ALLOWABLE VALUES</u>
	<u>x14.594 for N/m</u>
<u>1. Horizontal diaphragms<sup>2</sup></u>	
<u>1.1 Roofs with straight sheathing and roofing applied directly to the sheathing</u>	<u>100 lbs. Per foot for seismic shear</u>
<u>1.2 Roofs with diagonal sheathing and roofing applied directly to the sheathing</u>	<u>250 lbs. Per foot for seismic shear</u>
<u>1.3 Floors with straight tongue-and-groove sheathing</u>	<u>100 lbs. Per foot for seismic shear</u>
<u>1.4 Floors with straight sheathing and finished wood flooring with board edges offset or perpendicular</u>	<u>500 lbs. Per foot for seismic shear</u>
<u>1.5 Floors with diagonal sheathing and finished</u>	<u>600 lbs. Per foot for seismic shear</u>
<u>2. Crosswalls<sup>2,3</sup></u>	
<u>2.1 Plaster on wood or metal lath</u>	<u>Per side: 200 lbs. Per foot for seismic shear</u>
<u>2.2 Plaster on gypsum lath</u>	<u>175 lbs. Per foot for seismic shear</u>
<u>2.3 Gypsum wallboard, unblocked edges</u>	<u>75 lbs. Per foot for seismic shear</u>
<u>2.4 Gypsum wallboard, blocked edges</u>	<u>125 lbs. Per foot for seismic shear</u>
<u>Existing footings, wood framing, structural steel and reinforced steel</u>	<u>f<sub>c</sub>=1,500 psi (10.34 MPa) unless otherwise shown by tests<sup>4</sup></u>
<u>3.1 Plain concrete footings</u>	<u>Allowable stress same as D.F. No. 1<sup>4</sup></u>
<u>3.2 Douglas fir wood</u>	<u>f<sub>t</sub>=18,000 lbs. Per square inch (124.1 N/mm<sup>2</sup>) maximum</u>
<u>3.2 Reinforcing steel</u>	<u>f<sub>t</sub>=200,00 lbs. Per square inch (137.9 N/mm<sup>2</sup>) maximum<sup>4</sup></u>
<u>3.4 Structural steel</u>	

<sup>1</sup>Material must be sound and in good condition.

<sup>2</sup>A one-third increase in allowable stress is not allowed.

<sup>3</sup>Shear values of these materials may be combined, except the total combined value shall not exceed 300 pounds per foot (4380 N/m).

<sup>4</sup>Stresses given may be increased for combinations of loads as specified in the regular code.

Table 8-8B ALLOWABLE VALUES OF NEW MATERIALS USED IN CONNECTION WITH EXISTING CONSTRUCTION

NEW MATERIALS OR CONFIGURATIONS OF MATERIALS	ALLOWABLE VALUES <sup>1</sup>
<p>1. <u>Horizontal diaphragms<sup>2</sup></u>  <u>Plywood sheathing nailed directly over existing straight sheathing with ends of plywood sheets bearing on joists or rafters and edges of ply- wood located on center of individual sheathing boards</u>  <u>Plywood sheathing nailed directly over existing diagonal sheathing with ends of plywood sheets bearing on joists or rafters</u>  <u>1.3 Plywood sheathing nailed directly over existing straight or diagonal sheathing with ends of ply- wood sheets bearing on joists or rafters with edges of plywood located over new blocking and nailed to provide a minimum nail penetration into framing and blocking of 1 inches (41 mm)</u></p>	<p><u>225 lbs. Per foot (3283 N/m)</u></p> <p><u>375 lbs. Per foot (5473 N/m)</u></p> <p><u>75 percent of the values specified in the regular code</u></p>
<p><u>Shear walls: (general procedure)</u>  <u>Plywood sheathing applied directly over wood studs. No value shall be given to plywood applied over existing plaster or wood sheathing</u></p>	<p><u>100 percent of the value specified in the regular code for shear walls</u></p>
<p><u>3. Crosswalls: (special procedure only)</u>  <u>Plywood sheathing applied directly over wood studs. No value shall be given to plywood applied over existing plaster or wood sheathing</u>  <u>Drywall or plaster applied directly over wood studs</u>  <u>Drywall or plaster applied to sheathing over existing wood studs</u></p>	<p><u>133 percent of the value specified in the regular code for shear walls</u>  <u>100 percent of the values in the regular code</u>  <u>The values specified in the regular code reduced as noted.<sup>3</sup> (UBC Table 25-I, Footnote 1)</u></p>
<p><u>4. Tension bolts</u>  <u>Bolts extending entirely through unreinforced masonry walls secured with bearing plates on far side of a three-wythe-minimum wall with at least 30 square inches (19 350 mm<sup>2</sup>) of area<sup>4,5</sup></u>  <u>Bolts extending to the exterior face of the wall with a 2½-inch (63.5 mm) round plate under the head and drilled at an angle of 22½ degrees to the horizontal, installed as specified for shear bolts<sup>4,5,7</sup></u></p>	<p><u>1,800 lbs. (8006 N) per bolt<sup>6</sup></u>  <u>900 lbs. (4003 N) per bolt for two-wythe walls<sup>6</sup></u></p> <p><u>1,200 lbs. (5338 N) per bolt</u></p>
<p><u>5. Shear bolts</u>  <u>Bolts embedded a minimum of 8 inches (203 mm) into unreinforced masonry walls and centered in a 2½-inch-diameter (63.5 mm) hole filled with dry-pack or nonshrink grout. Through bolts with first 8 inches (203 mm) as noted above and embedded bolts as noted in Item 4.2<sup>5,7</sup></u></p>	<p><u>½ inch (12.7 mm) diameter = 350 lbs. (1557 N)<sup>6</sup></u>  <u>5/8 inch (15.9 mm) diameter = 500 lbs. (2224 N)<sup>6</sup></u>  <u>¾ inch (19 mm) diameter = 750 lbs. (3336 N)<sup>6</sup></u></p>
<p><u>6. Infilled walls</u>  <u>Reinforced masonry infilled openings in existing unreinforced masonry walls. Provide keys or dowels to match reinforcing</u></p>	<p><u>Same as values specified for unreinforced masonry walls</u></p>
<p><u>7. Reinforced masonry</u>  <u>Masonry piers and walls reinforced per the regular code</u></p>	<p><u>Same as values specified in the regular code</u></p>
<p><u>8. Reinforced concrete</u>  <u>Concrete footings, walls and piers reinforced as specified in the regular code and designed for tributary loads</u></p>	<p><u>Same values as specified in the regular code<sup>8</sup></u></p>

<sup>1</sup>A one-third increase in allowable stress is not allowed, except as noted.

<sup>2</sup>Values and limitations are for nailed plywood. Higher values may be used for other fastening systems such as wood screws or staples when approved by the enforcing authority.

<sup>3</sup>In addition to existing sheathing value.

<sup>4</sup>Bolts to be ½-inch (12.7 mm) minimum diameter.

<sup>5</sup>Drilling for bolts and dowels shall be done with an electric rotary drill. Impact tools shall not be used for drilling holes or tightening anchors and shear bolt nuts.

<sup>6</sup>Other bolt sizes, values and installation methods may be used provided a testing program is conducted in accordance with regular code standards. Bolt spacing shall not exceed 6 feet. (1830 mm) on center and shall not be less than 12 inches (305 mm) on center.

<sup>7</sup>Embedded bolts to be tested as specified in regular code standards.

<sup>8</sup>Stresses given may be increased for combinations of loads as specified in the regular code

# APPENDIX G [DWR]

## GRAYWATER SYSTEMS

### G 1 Graywater Systems (General)

(a) The provisions of this Appendix shall apply to the construction, installation, alteration and repair of graywater systems for subsurface landscape irrigation. The graywater system shall not be connected to any potable water system without an air gap (a space or other physical device which prevents backflow) and shall not result in any surfacing of the graywater. Except as otherwise provided for in this Appendix, the provisions of the Uniform Plumbing Code (U.P.C.) shall be applicable to graywater installations.

(b) The type of system shall be determined on the basis of location, soil type and ground water level and shall be designed to accept all graywater connected to the system from the building. The system shall discharge into subsurface irrigation fields and may include surge tank(s) and appurtenances, as required by the Administrative Authority.

(c) No graywater system, or part thereof, shall be located on any lot other than the lot which is the site of the building or structure which discharges the graywater; nor shall any graywater system or part thereof be located at any point having less than the minimum distances indicated in Table G-1.

(d) No permit for any graywater system shall be issued until a plot plan with appropriate data satisfactory to the Administrative Authority has been submitted and approved. When there is insufficient lot area or inappropriate soil conditions for adequate absorption of the graywater, as determined by the Administrative Authority, no graywater system shall be permitted. The Administrative Authority is a city or county.

(e) No permit shall be issued for a graywater system which would adversely impact a geologically sensitive area, as determined by the Administrative Authority.

(f) Private sewage disposal systems existing or to be constructed on the premises shall comply with Appendix K of this Code or applicable local ordinance. When abandoning underground tanks, Section 722.0 of the U.P.C. shall apply. Also, appropriate clearances from graywater systems shall be maintained as provided in Table G-1. The capacity of the private sewage disposal system, including required future areas, shall not be decreased by the existence or proposed installation of a graywater system servicing the premises.

(g) Installers of graywater systems shall provide an operation and maintenance manual, acceptable to the Administrative Authority, to the owner of each system. Graywater systems require regular or periodic maintenance.

(h) The Administrative Authority shall provide the applicant a copy of this Appendix.

### G 2 Definitions

Graywater is untreated waste water which has not come into contact with toilet waste. Graywater includes used water from bathtubs, showers, bathroom wash basins, clothes washing machines and laundry tubs or an equivalent discharge as approved by the Administrative Authority. It does not include waste water from kitchen sinks, photo lab sinks, dishwashers or laundry water from soiled diapers.

Surfacing of graywater means the ponding, running off or other release of graywater from the land surface.

### G 3 Permit

It shall be unlawful for any person to construct, install or alter, or cause to be constructed, installed or altered, any graywater system in a building or on a premises without first obtaining a permit to do such work from the Administrative Authority.

### G 4 Drawings and Specifications

The Administrative Authority may require any or all of the following information to be included with or in the plot plan before a permit is issued for a graywater system:

(a) Plot plan drawn to scale completely dimensioned, showing lot lines and structures, direction and approximate slope of surface, location of all present or proposed retaining walls, drainage channels, water supply lines, wells, paved areas and structures on the plot, number of bedrooms and plumbing fixtures in each structure, location of private sewage disposal system and 100 percent expansion area or building sewer connecting to public sewer, and location of the proposed graywater system.

(b) Details of construction necessary to ensure compliance with the requirements of this Appendix together with a full description of the complete installation, including installation methods, construction and materials as required by the Administrative Authority.

(c) A log of soil formations and ground water level as determined by test holes dug in close proximity to any proposed irrigation area, together with a statement of water absorption characteristics of the soil at the proposed site as determined by approved percolation tests. In lieu of percolation tests, the Administrative Authority may allow the use of Table G-2, an infiltration rate designated by the Administrative Authority, or an infiltration rate determined by a test approved by the Administrative Authority.

(d) A characterization of the graywater for commercial, industrial or institutional systems, based on existing records or testing.

**G 5 Inspection and Testing****(a) Inspection**

- (1) All applicable provisions of this Appendix and of Section 103.5 of the U.P.C. shall be complied with.
- (2) System components shall be properly identified as to manufacturer.
- (3) Surge tanks shall be installed on dry, level, well-compacted soil if in a drywell, or on a level, 3-inch (76 mm) concrete slab or equivalent, if above ground.
- (4) Surge tanks shall be anchored against overturning.
- (5) If the irrigation design is predicated on soil tests, the irrigation field shall be installed at the same location and depth as the tested area.
- (6) Installation shall conform with the equipment and installation methods identified in the approved plans.
- (7) Graywater stub-out plumbing may be allowed for future connection prior to the installation of irrigation lines and landscaping. Stub-out shall be permanently marked GRAYWATER STUB-OUT, DANGER—UNSAFE WATER.

**(b) Testing**

- (1) Surge tanks shall be filled with water to the overflow line prior to and during inspection. All seams and joints shall be left exposed and the tank shall remain watertight.
- (2) A flow test shall be performed through the system to the point of graywater irrigation. All lines and components shall be watertight.

**G 6 Procedure for Estimating Graywater Discharge****(a) Single Family Dwellings and Multifamily Dwellings**

The Administrative Authority may utilize the graywater discharge procedure listed below, water use records, or calculations of local daily per person interior water use:

1. The number of occupants of each dwelling unit shall be calculated as follows:

First bedroom	2 occupants
Each additional bedroom	1 occupant

2. The estimated graywater flows for each occupant shall be calculated as follows:

Showers, bathtubs and wash basins	25 GPD/occupant
Laundry	15 GPD/occupant

3. The total number of occupants shall be multiplied by the applicable estimated graywater discharge as provided above and the type of fixtures connected to the graywater system.

**(b) Commercial, Industrial and Institutional Projects**

The Administrative Authority may utilize the graywater discharge procedure listed below, water use records or other documentation to estimate graywater discharge:

1. The square footage of the building divided by the occupant load factor from U.B.C. Table 10-A equals the number of occupants.
2. The number of occupants times the flow rate per person (minus toilet water and other disallowed sources) from U.P.C. Table I-2 equals the estimated graywater discharge per day.

The graywater system shall be designed to distribute the total amount of estimated graywater discharged daily.

**G 7 Required Area of Subsurface Irrigation**

Each irrigation zone shall have a minimum effective irrigation area for the type of soil and infiltration rate to distribute all graywater produced daily, pursuant to Section G-6, without surfacing. The required irrigation area shall be based on the estimated graywater discharge, pursuant to Section G-6 of this Appendix, size of surge tank, or a method determined by the Administrative Authority.

If the mini-leachfield irrigation system is used, the required square footage shall be determined from Table G-2, or equivalent, for the type of soil found in the excavation. The area of the irrigation field shall be equal to the aggregate length of the perforated pipe sections within the irrigation zone times the width of the proposed mini-leachfield trench.

No irrigation point shall be within 5 vertical feet (1524 mm) of highest known seasonal groundwater nor where graywater may contaminate the ground water or ocean water. The applicant shall supply evidence of ground water depth to the satisfaction of the Administrative Authority.

**G 8 Determination of Irrigation Capacity**

(a) In order to determine the absorption quantities of questionable soils other than those listed in Table G-2, the proposed site may be subjected to percolation tests acceptable to the Administrative Authority or determined by the Administrative Authority.

(b) When a percolation test is required, no mini-leachfield system or subsurface drip irrigation system shall be permitted if the test shows the absorption capacity of the soil is less than 60 minutes/inch or more rapid than five minutes/inch, unless otherwise permitted by the Administrative Authority.

(c) The irrigation field size may be computed from Table G-2, or determined by the Administrative Authority or a designee of the Administrative Authority.

**G 9 Surge Tank Construction (Figure 1)**

(a) Plans for surge tanks shall be submitted to the Administrative Authority for approval. The plans shall show the data required by the Administrative Authority and may include dimensions, structural calculations, and bracing details.

(b) Surge tanks shall be constructed of solid, durable materials, not subject to excessive corrosion or decay, and shall be watertight.

(c) Surge tanks shall be vented as required by Chapter 5 of this Code and shall have a locking, gasketed access opening, or approved equivalent, to allow for inspection and cleaning.

(d) Surge tanks shall have the rated capacity permanently marked on the unit. In addition, GRAYWATER IRRIGATION SYSTEM, DANGER—UNSAFE WATER shall be permanently marked on the surge tank.

(e) Surge tanks installed above ground shall have an overflow, separate from the line connecting the tank with the irrigation fields. The overflow shall have a permanent connection to a sewer or to a septic tank, and shall be protected against sewer line backflow by a backwater valve. The overflow shall not be equipped with a shut-off valve.

(f) The overflow and drain pipes shall not be less in diameter than the inlet pipe. The vent size shall be based on the total graywater fixture units, as outlined in U.P.C. Table 7-5 or local equivalent. Unions or equally effective fittings shall be provided for all piping connected to the surge tank.

(g) Surge tanks shall be structurally designed to withstand anticipated loads. Surge tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (14.4 kN/m<sup>2</sup>) when the tank is designed for underground installation.

(h) Surge tanks may be installed below ground in a dry well on compacted soil, or buried if the tank design is approved by the Administrative Authority. The system shall be designed so that the tank overflow will gravity drain to a sanitary sewer line or septic tank. The tank must be protected against sewer line backflow by a backwater valve.

**(i) Materials**

(1) Surge tanks shall meet nationally recognized standards for nonpotable water and shall be approved by the Administrative Authority.

(2) Steel surge tanks shall be protected from corrosion, both externally and internally, by an approved coating or by other acceptable means.

**G 10 Valves and Piping (Figure 1)**

Graywater piping discharging into a surge tank or having a direct connection to a sanitary drain or sewer piping shall be downstream of an approved waterseal-type trap(s). If no

such trap(s) exists, an approved vented running trap shall be installed upstream of the connection to protect the building from any possible waste or sewer gases. Vents and venting shall meet the requirements in Chapter 9 of the U.P.C.

All graywater piping shall be marked or shall have a continuous tape marked with the words DANGER—UNSAFE WATER. All valves, including the three-way valve, shall be readily accessible and shall be approved by the Administrative Authority. A backwater valve, installed pursuant to this Appendix, shall be provided on all surge tank drain connections to the sanitary drain or sewer piping.

**G 11 Irrigation Field Construction**

The Administrative Authority may permit subsurface drip irrigation, mini-leachfield or other equivalent irrigation methods which discharge graywater in a manner which ensures that the graywater does not surface. Design standards for subsurface drip irrigation systems and mini-leachfield irrigation systems follow:

**(a) Standards for a subsurface drip irrigation system are:**

(1) Minimum 140 mesh (115 micron) filter with a capacity of 25 gallons (94.6 L) per minute, or equivalent, filtration, sized approximately to maintain the filtration rate, shall be used. The filter backwash and flush discharge shall be caught, contained and disposed of to the sewer system, septic tank or, with approval of the Administrative Authority, a separate mini-leachfield sized to accept all the backwash and flush discharge water. Filter backwash water and flush water shall not be used for any purpose. Sanitary procedures shall be followed when handling filter backwash and flush discharge or graywater.

(2) Emitters shall have a minimum flow path of 1,200 microns and shall have a coefficient of manufacturing variation (Cv) of no more than 7 percent. Irrigation system design shall be such that emitter flow variation shall not exceed " 10 percent. Emitters shall be recommended by the manufacturer for subsurface use and graywater use, and shall have demonstrated resistance root intrusion. For emitter ratings, refer to Irrigation Equipment Performance Report, Drip Emitters and Micro-Sprinklers, Center for Irrigation Technology, California State University, 5730 N. Chestnut Avenue, Fresno, California 93740-0018.

(3) Each irrigation zone shall be designed to include no less than the number of emitters specified in Table G-3, or through a procedure designated by the Administrative Authority. Minimum spacing between emitters is 14 inches (356 mm) in any direction.

(4) The system design shall provide user controls, such as valves, switches, timers and other controllers, as appropriate, to rotate the distribution of graywater between irrigation zones.

(5) All drip irrigation supply lines shall be polyethylene tubing or PVC Class 200 pipe or better and Schedule 40 fittings. All joints shall be properly solvent-cemented, inspected and pressure tested at 40 psi (276 kPa), and shown to be drip tight for five minutes, before burial. All supply lines will be buried at least 8 inches (203 mm) deep. Drip feeder lines can be poly or flexible PVC tubing and shall be covered to a minimum depth of 9 inches (229 mm).

(6) Where pressure at the discharge side of the pump exceeds 20 psi (138 kPa), a pressure-reducing valve able to maintain downstream pressure no greater than 20 psi (138 kPa) shall be installed downstream from the pump and before any emission device.

(7) Each irrigation zone shall include a flush valve/antisiphon valve to prevent back siphonage of water and soil.

(b) Standards for the mini-leachfield system are:

(1) Perforated sections shall be a minimum 3-inch (76 mm) diameter and shall be constructed of perforated high-density polyethylene pipe, perforated ABS pipe, perforated PVC pipe, or other approved materials, provided that sufficient openings are available for distribution of the graywater into the trench area. Material, construction and perforation of the piping shall be in compliance with the appropriate absorption field drainage piping standards and shall be approved by the Administrative Authority.

(2) Clean stone, gravel or similar filter material acceptable to the Administrative Authority, and varying in size between 3/4 inch (19 mm) to 2 1/2 inches (64 mm) shall be placed in the trench to the depth and grade required by this section. Perforated sections shall be laid on the filter material in an approved manner. The perforated sections shall then be covered with filter material to the minimum depth required by this section. The filter material shall then be covered with landscape filter fabric or similar porous material to prevent closure of voids with earth backfill. No earth backfill shall be placed over the filter material cover until after inspections and acceptance.

(3) Irrigation fields shall be constructed as follows:

	Minimum	Maximum
Number of drain lines per valved zone	1	—
Length of each perforated line	—	100 ft. (30840 m m)
Bottom width of trench	6 in. (152 mm)	18 in. (457 m m)
Total depth of trench	17 in. (432 mm)	18 in. (457 mm)
Spacing of lines, center-to-center	4 ft. (1219 mm)	—
Depth of earth cover of lines	9 in. (229 mm)	—
Depth of filter material cover of lines	2 in. (51 mm)	—
Depth of filter material beneath lines	3 in. (76 mm)	—
Grade of perforated lines	level	3 in./100 ft. (76 mm/30 480 mm)

## G 12 Special Provisions

(a) Other collection and distribution systems may be approved by the Administrative Authority as allowed by Section 310.0 of the U.P.C.

(b) Nothing contained in this Appendix shall be construed to prevent the Administrative Authority from requiring compliance with stricter requirements than those contained herein, where such stricter requirements are essential in maintaining safe and sanitary conditions or from prohibiting graywater systems. The prohibition of graywater systems or more restrictive standards may be adopted by the Administrative Authority by ordinance after a public hearing.

## G 13 Health and Safety

(a) Graywater may contain fecal matter as a result of bathing and/or washing of diapers and undergarments. Water containing fecal matter, if swallowed, can cause illness in a susceptible person.

(b) Graywater shall not include laundry water from soiled diapers.

(c) Graywater shall not be applied above the land surface or allowed to surface and shall not be discharged directly into or reach any storm sewer system or any water of the United States.

(d) Graywater shall not be contacted by humans, except as required to maintain the graywater treatment and distribution system.

(e) Graywater shall not be used for vegetable gardens.

**Table G-1 Location of Graywater System**

Minimum Horizontal Distance From	Surge Tank (feet)	Irrigation Field (feet)
	x 304.8 for mm	x 304.8 for mm
Buildings or structures <sup>1</sup>	5 <sup>2</sup>	8 <sup>3</sup>
Property line adjoining private property	5	5
Water supply wells <sup>4</sup>	50	100
Streams and lakes <sup>4</sup>	50	50
Seepage pits or cesspools	5	5
Disposal field and 100 percent expansion area	5	4 <sup>5</sup>
Septic tank	0	5 <sup>6</sup>
On-site domestic water service line	5	5 <sup>7</sup>
Pressure public water main	10	10 <sup>8</sup>
Water ditches	50	50

**Notes:** When mini-leach fields are installed in sloping ground, the minimum horizontal distance between any part of the distribution system and ground surface shall be 15 feet (4572 mm).

<sup>1</sup>Including porches and steps, whether covered or uncovered, but does not include carports, covered walks, driveways and similar structures.

<sup>2</sup>The distance may be reduced to 0 feet for aboveground tanks if approved by the Administrative Authority.

<sup>3</sup>The distance may be reduced to 2 feet (610 mm).

<sup>4</sup>For subsurface drip irrigation systems, 2 feet (610 mm) from property line.

<sup>5</sup>Where special hazards are involved, the distance may be increased by the Administrative Authority.

<sup>6</sup>Applies to the mini-leachfield type system only. Plus 2 feet (610 mm) for each additional foot of depth in excess of 1 foot (305 mm) below the bottom of the drain line.

<sup>7</sup>Applies to mini-leachfield-type system only.

<sup>8</sup>A 2-foot (610 mm) separation is required for subsurface drip systems.

<sup>9</sup>For parallel construction or for crossings, approval by the Administrative Authority shall be required.

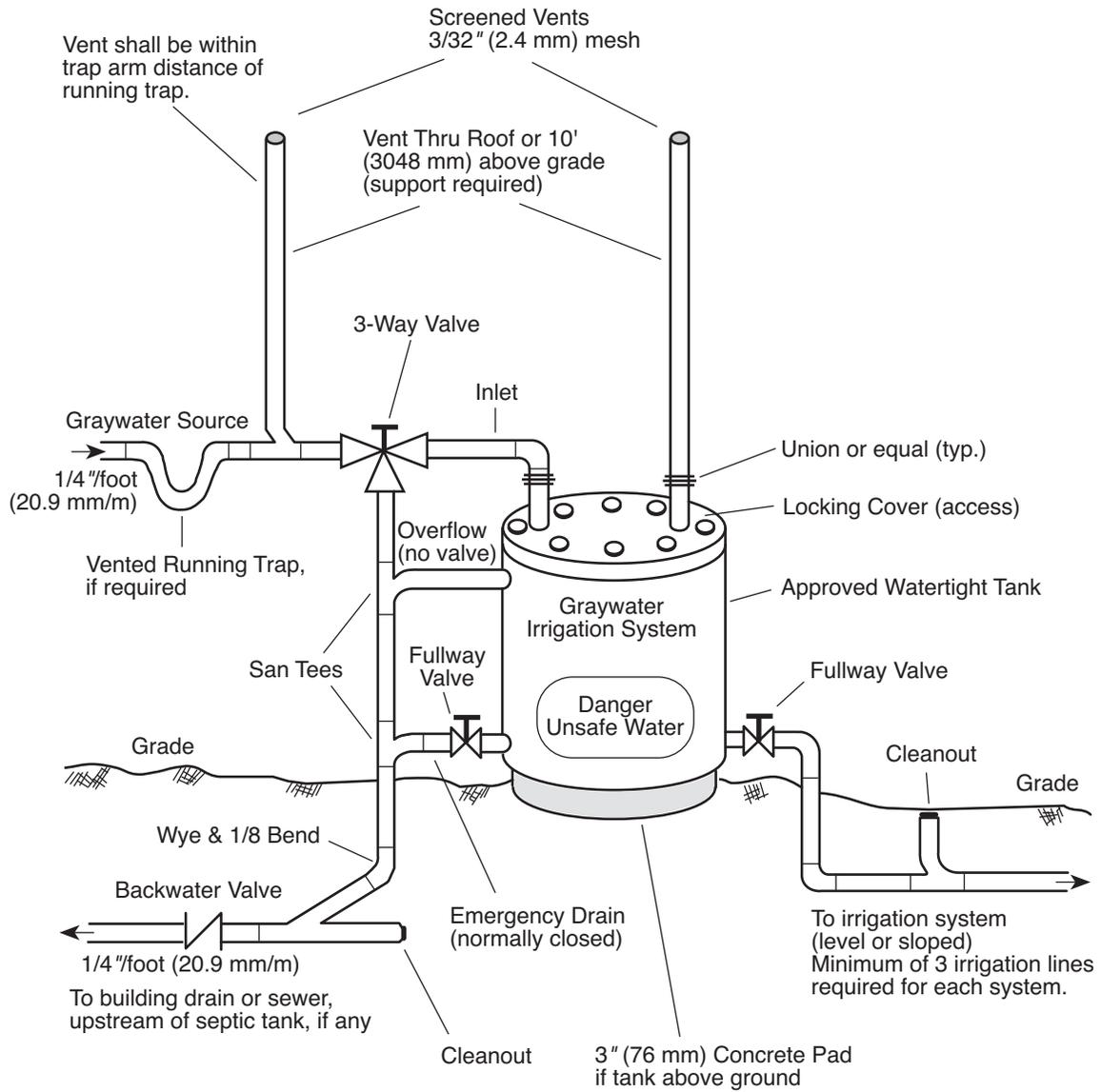
**Table G-2 Mini-Leachfield Design Criteria of Six Typical Soils**

<b>Type of Soil</b>	<b>Minimum sq. ft. of irrigation area per 100 gallons of estimated graywater discharge per day</b>	<b>Maximum absorption capacity, minutes per inch, of irrigation area for a 24-hour period</b>
1. Coarse sand or gravel	20 25	5 12
2. Fine sand	40	18
3. Sandy loam	60	24
4. Sandy clay		
5. Clay with considerable sand or gravel	90	48
6. Clay with small amount of sand or gravel	120	60

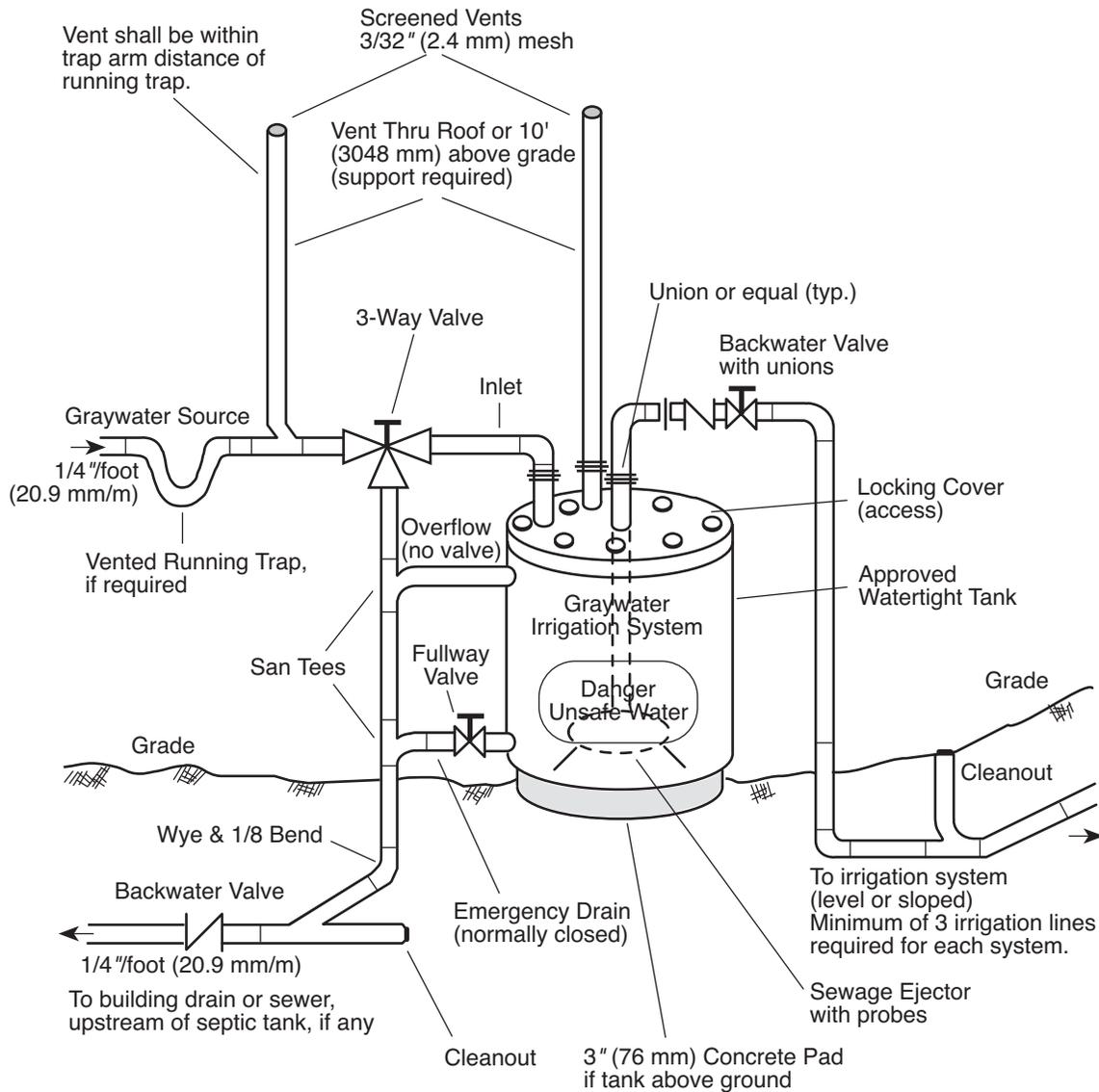
**Table G-3 Subsurface Drip Design Criteria of Six Typical Soils**

<b>Type of Soil</b>	<b>Maximum emitter discharge (gal/day)</b>	<b>Minimum number of emitters per gpd of graywater production</b>
1. Sand	1.8	0.6
2. Sandy loam	1.4	0.7
3. Loam	1.2	0.9
4. Clay loam	0.9	1.1
5. Silty clay	0.6	1.6
6. Clay	0.5	2.0

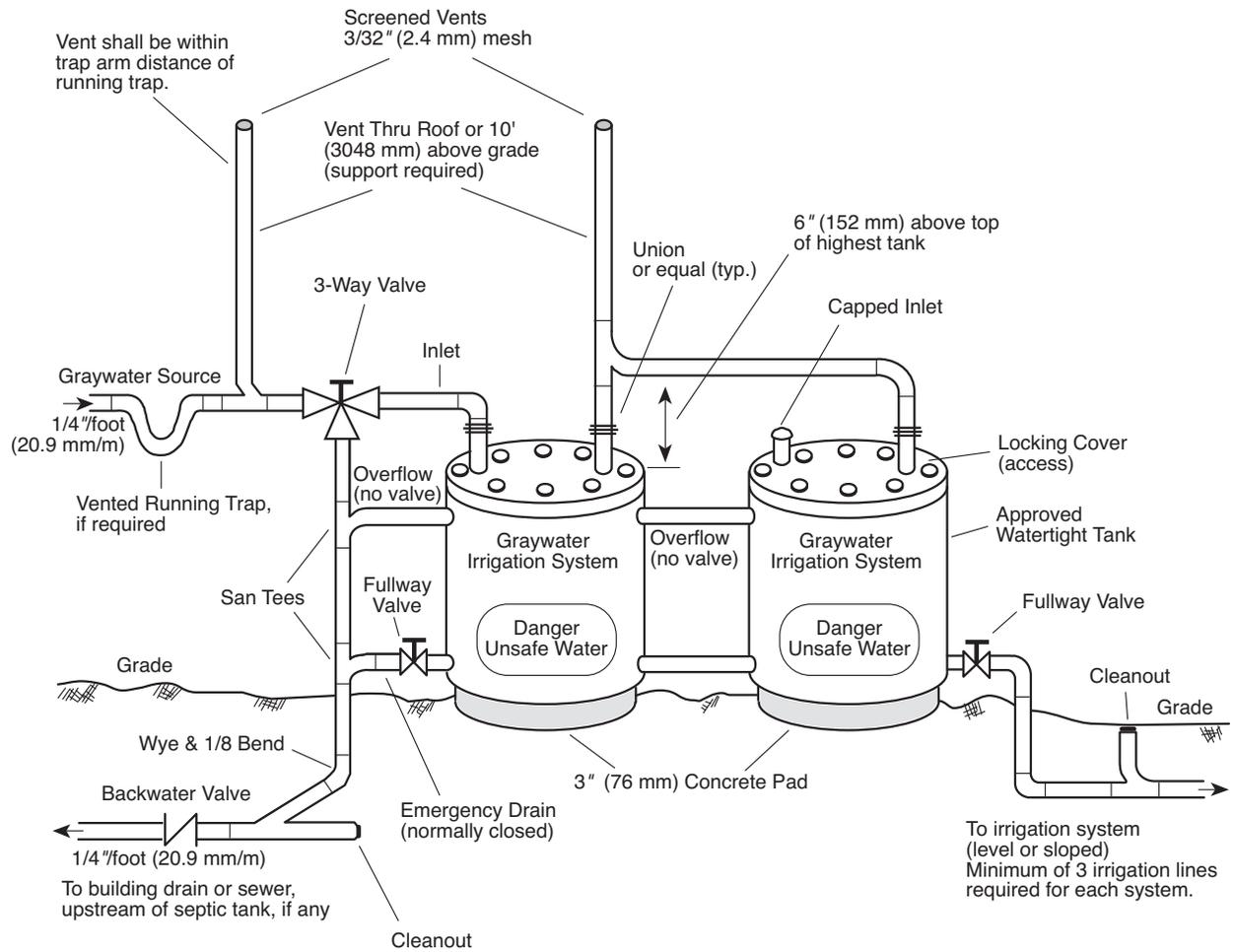
Use the daily graywater flow calculated in Section G-6 to determine the number of emitters per line.



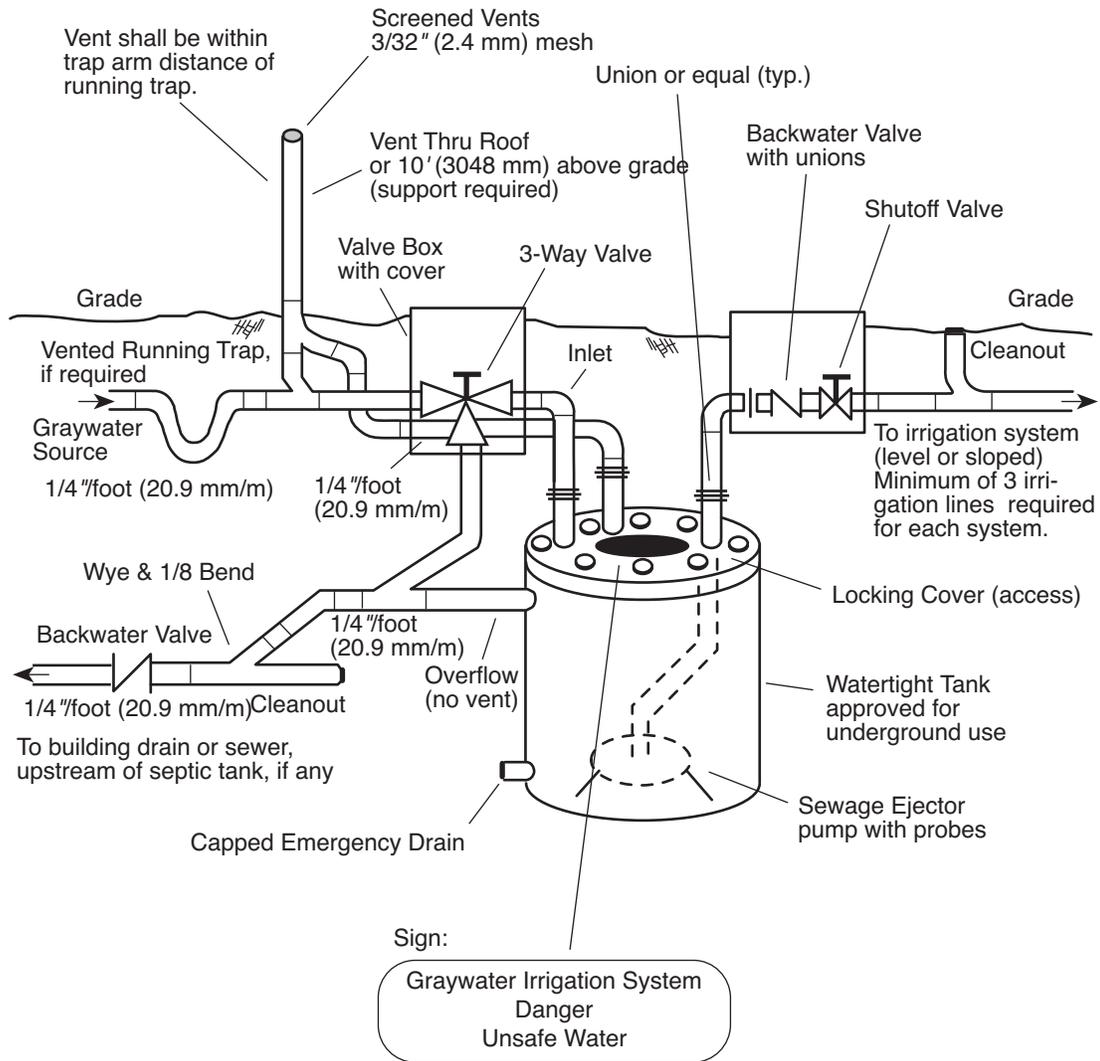
**Figure G-1**  
 Graywater System Tank – Gravity (conceptual)



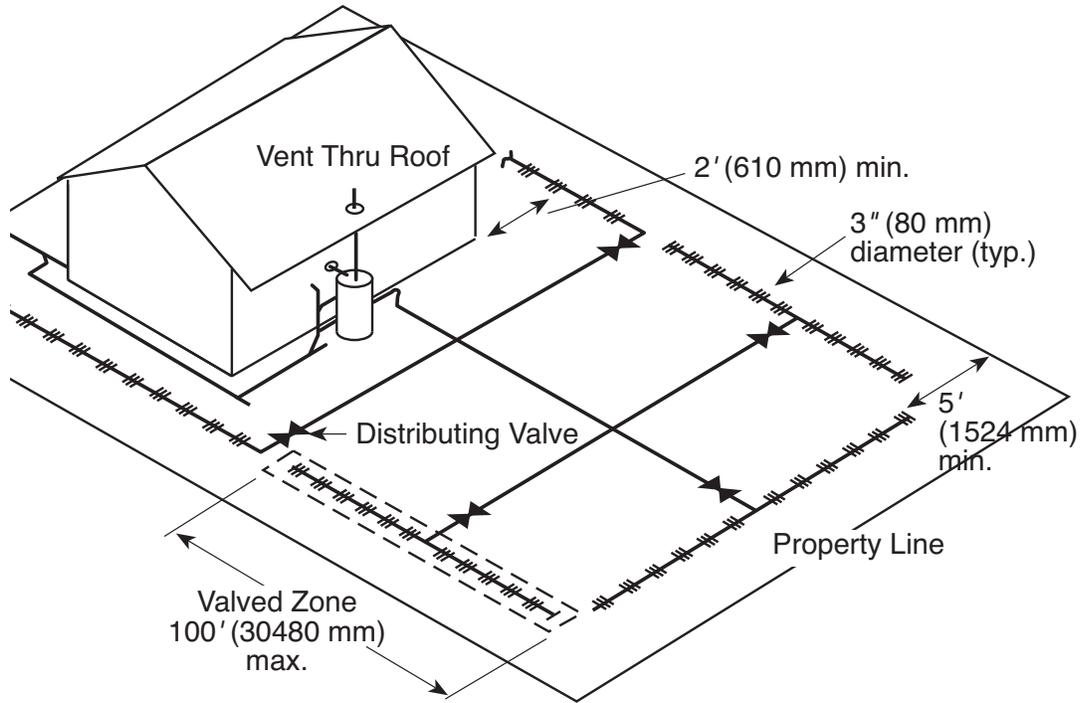
**Figure G-2**  
 Graywater System Tank – Pumped (conceptual)



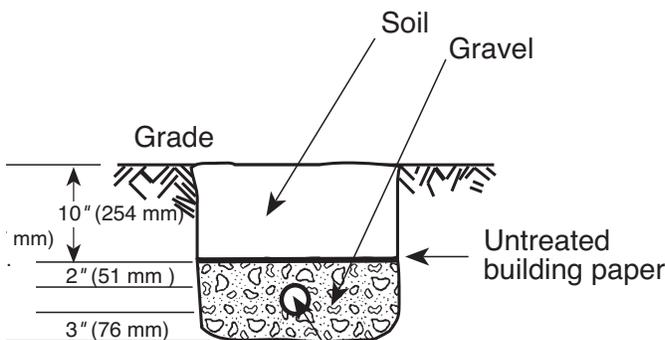
**Figure G-3**  
 Graywater System Multiple Tank Installation (conceptual)



**Figure G-4**  
Graywater System Underground Tank – Pumped (conceptual)



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 G-5**  
 Graywater System Typical Irrigation Layout (conceptual)

