

TABLE 11-2
Sizing of Horizontal Rainwater Piping

Size of Pipe, Inches	Flow at 1/8"/ft. Slope, gpm	Maximum Allowable Horizontal Projected Roof Areas Square Feet at Various Rainfall Rates					
		1"/hr	2"/hr	3"/hr	4"/hr	5"/hr	6"/hr
3	34	3288	1644	1096	822	657	548
4	78	7520	3760	2506	1880	1504	1253
5	139	13,360	6680	4453	3340	2672	2227
6	222	21,400	10,700	7133	5350	4280	3566
8	478	46,000	23,000	15,330	11,500	9200	7670
10	860	82,800	41,400	27,600	20,700	16,580	13,800
12	1384	133,200	66,600	44,400	33,300	26,650	22,200
15	2473	238,000	119,000	79,333	59,500	47,600	39,650

Size of Pipe, Inches	Flow at 1/4"/ft. Slope, gpm	Maximum Allowable Horizontal Projected Roof Areas Square Feet at Various Rainfall Rates					
		1"/hr	2"/hr	3"/hr	4"/hr	5"/hr	6"/hr
3	48	4640	2320	1546	1160	928	773
4	110	10,600	5300	3533	2650	2120	1766
5	196	18,880	9440	6293	4720	3776	3146
6	314	30,200	15,100	10,066	7550	6040	5033
8	677	65,200	32,600	21,733	16,300	13,040	10,866
10	1214	116,800	58,400	38,950	29,200	23,350	19,450
12	1953	188,000	94,000	62,600	47,000	37,600	31,350
15	3491	336,000	168,000	112,000	84,000	67,250	56,000

Size of Pipe, Inches	Flow at 1/2"/ft. Slope, gpm	Maximum Allowable Horizontal Projected Roof Areas Square Feet at Various Rainfall Rates					
		1"/hr	2"/hr	3"/hr	4"/hr	5"/hr	6"/hr
3	68	6576	3288	2192	1644	1310	1096
4	156	15,040	7520	5010	3760	3010	2500
5	278	26,720	13,360	8900	6680	5320	4450
6	445	42,800	21,400	14,267	10,700	8580	7140
8	956	92,000	46,000	30,650	23,000	18,400	15,320
10	1721	165,600	82,800	55,200	41,400	33,150	27,600
12	2768	266,400	133,200	88,800	66,600	53,200	44,400
15	4946	476,000	238,000	158,700	119,000	95,200	79,300

Notes:

1. The sizing data for horizontal piping is based on the pipes flowing full.
2. For rainfall rates other than those listed, determine the allowable roof area by dividing the area given in the 1 inch/hour (25 mm/hour) column by the desired rainfall rate.



MEMORANDUM

DRAINAGE GUIDELINES

Per the City Code Section 15.16.043, a drainage plan is required when there is an increase in roof area or hardscape on a site. The Code also requires said plan to be approved by the City Engineer. In order to help the public address drainage issues, the following guidelines are provided:

- 1) **Who may prepare?** - Drainage plans may be prepared by an architect or other design professional if a grading plan is not required for the site. Otherwise, the drainage plan must be prepared, signed, and stamped by a registered Civil Engineer. Grading plans are required if there is more than 50 cubic yards of cut and fill on a site, or if there is any filling of earth over one foot in depth.
- 2) **What type of calculations?** – Hydrology and hydraulic calculations are required for all pipes, major channels, outlets, catch basins, and other inlets. The City Engineer may require additional calculations as needed.

Hydrology may be calculated using any accepted method, although the Los Angeles County Rational Method and Table 11-2 of the Uniform Plumbing Code are preferred. For the Los Angeles County Method, a 25-year storm shall be used for non-sump conditions, and a 50-year storm for sump conditions. For the Uniform Plumbing Code Method, a 4-inch per hour storm shall be used.

- 3) **What type/size of pipe?** – Drainage on private property and within the public right of way must be at least six inches in diameter and either PVC, HDPE, DIP, or CIP. The strength of the pipe must be at least SDR 35 or Schedule 40. Drainage through curbs may be accomplished using a culvert or 4-inch diameter pipe(s). (In limited instances, 4-inch diameter pipe may be allowed for drainage solely from downspouts at the City Engineer's discretion when a hardship exists.)
- 4) **How do I install my drain(s) across neighboring property(s)?** – The Homes Association owns easements along many private property lines in the City that may be used to place pipe to convey the water from your property and across said property. Usage of these easements is regulated by the Homes Association and the City has no authority regarding these easements.

Drainage pipe(s) installed within the public right of way requires an over-the-counter encroachment permit from the City. Drainage pipe(s) installed within City-owned parklands must be approved by the City Parklands Committee and City Council.

- 5) **Are sump pumps allowed?** – Sump pumps are only allowed when the City Engineer determines there is a severe hardship that cannot be remedied using gravity drainage. All sump pumps must be designed so that the top of the grate is at least one foot below any finished floor of livable area that could be flooded due to a failure of the pump.
- 6) **Can cross-lot drainage be maintained or increased?** – The Courts have determined over the years that existing drainage patterns across lots may be maintained, so long as the flow rate and/or volume of water does not increase. Also, the water may not be concentrated, such as in a pipe, so that erosion of the downstream property will occur.
- 7) **What are the rules regarding rip rap/outlet structures?** – All outlet structures must be sized per Los Angeles County Department of Public Works criteria by a Registered Civil Engineer. All outlets shall be located to minimize erosion and downstream flooding. Whenever possible, they shall be located at the bottom of slopes rather than at the top. They shall be located on private property when being used to discharge water to a street in an area where a standard curb will not exist by the end of the construction.

All guidelines provided here may be modified at the direction of the City Engineer to address site-specific issues.