



The following information is applicable for all single-family residential developments exempt from a grading and drainage plan.

A. Retention & Applicability Requirements:

On-Lot retention for single family lots was adopted by the grading and drainage ordinance in 1972 (Section 32A-24 of the City Code). Retention for developed lots shall be determined based on the recorded subdivision plat date or *project acreage as follows:

Table A.1 Required Retention Criteria

Subdivision Plat Date	Retention Volume
1971 or earlier	Developed lots exempt from on-lot retention. Minimum requirement is to treat first flush storm water runoff where $P=0.5"$ or $i=0.25$ in/hr. $V_{ff} = P/12 \times A$, or $Q = C \times i \times A$
1971-June 1988	$V = 0.0859 \times \text{Lot area in square feet (s.f.)} = \text{retention volume in cubic feet (c.f.)}$ (Based on 10-year storm)
July 1988-Feb 2004	$V = 0.1343 \times \text{Lot area in square feet (s.f.)} = \text{retention volume in cubic feet (c.f.)}$ (Based on 100-year storm)
March 2004-Present	$V = C \times P/12 \times A = \text{retention volume in cubic feet (c.f.)}$. (Based on 100-year, 2-hour storm)

Notes:

1. V: Volume (c.f.), Q: Runoff (cfs), C: Run-off coefficient, P: 100-Year, 2-Hour Rainfall depth (in), i: Rainfall intensity (in/hr.), A: Lot area (s.f. for volume, and acre for flow rate).
2. Site specific rainfall depth can be found at: [PF Data Server-PFDS/HDSC/OWP \(noaa.gov\)](https://hdsc.nws.noaa.gov/pfds/?bkmrk=az) – <https://hdsc.nws.noaa.gov/pfds/?bkmrk=az>
3. First flush information can be found at: Section 6.8.3 of the City of Phoenix Storm Water Policies & Standards (2013).
4. Lots greater than 0.5 acres shall retain the 100-year, 2-hour storm water runoff volume.
5. Please refer to Section 32A-24 of the City Code for specific retention requirements.

B. How to Calculate On-Lot Retention Requirements

Table A.2 City of Phoenix Runoff Coefficients

Land Use	Runoff Coefficient (C)
RE-35	0.55
R1-18	0.60
R1-10	0.65
R1-8	0.70
R1-6	0.75
R-2	0.80
R-3	0.80
R-3A	0.85
R-4	0.85
R-5	0.85
Undeveloped Desert	0.45
Agricultural Areas	0.20
Graveled Surfaces	0.85
Lawns	0.30
Parking Lots	0.95

Source: Table 6.2.2. of the City of Phoenix Storm Water Policies & Standards (2013)

This publication can be made available in alternate formats (Braille, large print or digital media) upon request. Contact Planning & Development at (602) 262-7811 voice or (602) 534-5500 TTY.

Example:

- Zoning: R1-8
- Net area: 8,000 square feet = 0.184 acre
- Rainfall depth: 2.7"/12
- First flush rainfall depth: 0.5"
- First flush rainfall intensity: 0.25 in/hr.

1971 or earlier	$V_{ff} = 0.5"/12 \times 8,000 = 333$ cubic feet (c.f.), or $Q_{ff} = 0.70 \times 0.25 \times 0.184 = 0.03$ cubic feet per second (cfs)
1971-June 1988	$0.0859 \times 8,000 = 687.20$ cubic feet (c.f.)
July 1988-March 2004	$0.1343 \times 8,000 = 1,074.40$ cubic feet (c.f.)
March 2004-Present	0.70 $\times 2.7"/12 \times 8,000 = 1,260$ cubic feet (c.f.)

C. How to Show On-Lot Retention on a Site Plan

After determining the retention volume requirement, show the retention basin(s) location, drawn to scale, on the site plan. Retention details must include the outfall and bottom elevations, the berm side slope, high water and bottom surface area, basin volume and complete retention calculations. Refer to "Residential-Single Family Plot Plan/Grading Plan Checklist" for additional information.

D. Key Facts for On-Lot Retention

On-lot retention information is found in the "The Code of the City of Phoenix Arizona" section 32A-24 and "City of Phoenix Storm Water Policies and Standards" Section 6.0

- Retention basin volume must be adequate to retain runoff from the design.
- Retention is required if the lot was developed or created by plat or lot split after 1971.
- The required retention must be located on private property.
- Once storm water storage basins are filled the outfall must be directed to a public right of way, public accessway or public drainage easement. In all other cases the minimum calculated retention volume must be increased by 25%.
- When the designed retention basin depth is greater than 1-foot (12-inches) a percolation test is required during construction.
- All retained storm water must evaporate or percolate within 36-hours, without exception.
- The maximum side slope for all residential retention basins is 4:1.
- The maximum depth of any retention basin located within 10-feet of the right-of-way is limited to 18-inches.
- The maximum depth of any retention basin located within 20-feet of the right-of-way is limited to 24-inches.
- Berms shall not be located closer than 2-feet from the back of sidewalk or 2-feet from the curb, where the sidewalk is detached from the curb.
- Berms shall not be higher than 2-1/2 feet above the top of sidewalk or curb.
- Berms shall have a minimum top width of 2-feet with an overflow area (emergency spillway) cut into the berm.
- Retention basin sides, edges, or top of slopes shall be of irregular geometry.
- The minimum finish floor elevation must be at least 6-inches above the high-water elevation of all retention basins.

This document should be used in conjunction with TRT 00281, [Grading & Drainage – Residential Single Lot Guideline](#), and submitted to the Planning & Development Department on the 2nd Floor of City Hall, with appropriate fees. Contact Planning & Development at 602-262-7811 for the applicable fee.