

SINGLE FAMILY HOME GRADING AND DRAINAGE PLAN CRITERIA

Any plans submitted to the Building Safety Division of Development Services for construction of **pools**, new additions (attached or detached) or any construction on a private lot must be evaluated by Engineering to determine if a Grading & Drainage plan and permit is required.

This checklist was prepared using the City of Tempe-Public Works-Engineering Design Criteria manual to guide homeowners that are planning to install pools, new additions (attached or detached) or any construction that will affect the existing lot **grading or retention**. It is required that a Grading & Drainage plan is submitted to the City for Engineering review. A Drainage Permit will be issued after approval of the plan. The plan will demonstrate that the stormwater retention has been properly provided or maintained. Contact engineering personnel in **Development Services @ 480-350-8341 option #2** for additional information or to verify your lot retention requirements. For further information and fee schedule please refer to the City of Tempe-Public Works Dept-Engineering Design Criteria manual. This manual can be purchased in the City's Engineering office or can be found online at www.tempe.gov/engineering.

MINIMUM PLAN REQUIREMENTS:

1. Include a complete legal description (containing subdivision name and lot number) of the property as it appears on the deed.
2. Include a vicinity map showing the property in relation to that of the nearest major street intersection.
3. Include a north arrow (pointing to right or top edge of sheet).
4. Include the owner's name or names as it appears on the deed (property, business, developer, etc.) and mailing addresses.
5. Include name, address and phone number of person to whom plans should be returned and who has prepared the plans. Designate as "CONTACT".
6. Include legal address of property and parcel number.
7. Show all lot dimensions, widths and descriptions of easements, and adjacent rights of way.
8. Show and dimension the location of all existing and proposed structures, drainage patterns, proposed spot elevations, and existing topography of the site and adjacent areas.
9. Show the finished floor elevation for the new home, existing home and the proposed construction. Label the lot outfall location & elevation. Label retention basin bottom elevations and proposed high water elevations. New home finished floors must be a minimum of 14" above the lot outfall.
10. Show and dimension all topography in City right of way including pavement, curb, gutter, sidewalks, etc. Note type of existing curb and gutter (6" vertical curb; 4" roll curb, or ribbon curb). For new homes, show the new or existing water meter location & size, sewer tap location, driveways and sidewalks.
11. Distinguish between all existing and proposed construction. Give areas of existing and proposed structures based upon slab dimensions in square feet.

12. Signature block as follows (lower right-hand corner of first sheet):

APPROVAL FOR DRAINAGE ONLY

CITY ENGINEER

DATE

13. Acknowledgement statement block for PROPERTY OWNER signature (lower right-hand corner of first sheet):

I hereby acknowledge this Grading & Drainage design and agree to contact the City Engineering Inspector at 480-350-8475 for a pre-construction meeting. Any changes to or deviations from this plan require City approval.

OWNER – Signature

&

Print Name

DATE

14. Use an engineering scale, 1" = 30' maximum scale.
15. All plans must be on 11" x 17" sheets, minimum; 24"x36" maximum. Plans must be legible when reduced to 11" x 17" sheet size.
16. Show net area of site in square feet and include percentage of existing lot coverage. Lot coverage is considered to be all improvements including structures, driveways, sidewalks, etc.
17. Surface retention on-site of the 100 year storm per City of Tempe Drainage Criteria is required. Show calculations on the grading and drainage plan for the retention volume required and the retention volume provided, show high water levels and bottom elevations for retention areas, and 4:1 maximum side slopes for landscaped retention areas.

The two methods for determining retention volume required are:

Per the Design Manual's Drainage Requirements, Section D. 3. a. (Pages 46 -47), the retention volume required shall be calculated with the following formula:

$$V = (D \div 12) A C$$

V = Volume required, (cubic feet)

D = Depth of water required to retain, (2.4 inches for the 100-year, 1-hour storm event)

A = Area (square feet), total area of lot plus ½ of alley or ½ of street where applicable; [where there is an alley, include ½ of alley area; where there is "ribbon curb", include ½ of street area along property]

C = Coefficient for Non-Absorption (0.95)

OR

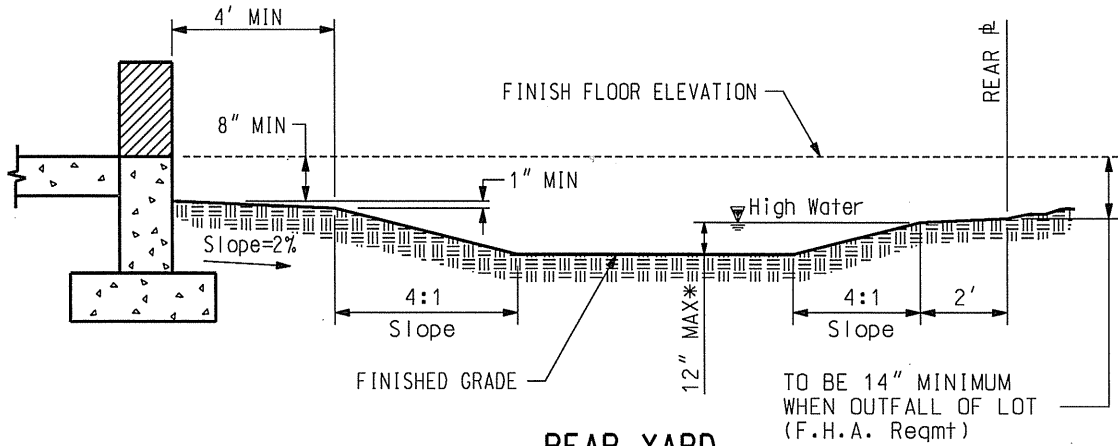
The City allows the usage of the Drainage Design Manual for Maricopa County (Chapter 3, Rational Method) as an alternative method for determining required retention volume. This method determines the volume based on a 100-year 2-hour storm which has a higher precipitation depth (**D**) of **2.7 inches** but has a different assigned lot non-absorption coefficient (**C**) **value that varies** by the size of the lot and the approximate percentage of the lot covered with improvements. See note 16. For single family lots, Tables 3.2 and 3.3 of the County Method will be interpreted for the following lot non-absorption coefficients:

Lot Non-absorption Coefficient - (C)			
Lot Size	20% or Less Lot Coverage	20% to 39% Lot Coverage	40% or More Lot Coverage
6,000 to 12,000 square feet	0.60	0.71	0.82
12,000 to 40,000 square feet	0.53	0.56	0.60
Over 40,000 square feet	0.41	0.47	0.53

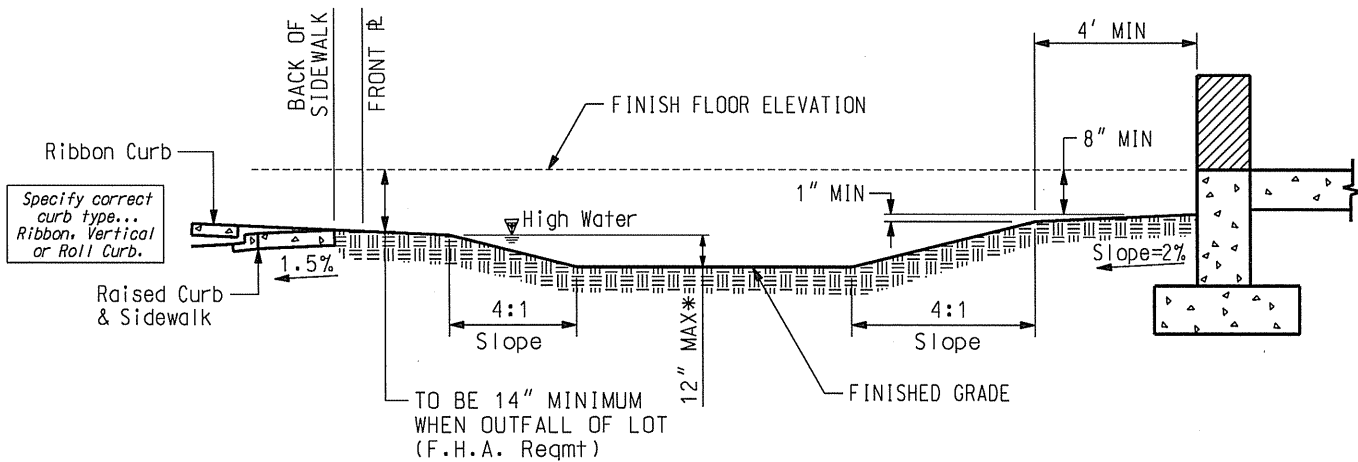
18. Per the Design Manual's Drainage Requirements, Section D. 2. a., the maximum allowable depth of water for calculation of retention volume provided for new single family residential lots will be 6 inches given the rounding with landscaping within these areas, even though the plans specify a depth of 8 inches per Ordinance 819.1.
19. Show positive grade breaks at all property and right-of-way lines including finished grades at all lot corners.
20. Grading and drainage plans for single family residences **may be prepared by the owner**, however, if the grading and drainage plan is prepared by an engineer, surveyor, or architect registered to practice in Arizona, include the registrant's seal, date, and signature.
21. Show the Engineering Private Development (EN) Number, Development Services (DS) Number (assigned during the first review), and the property address in the lower right hand margin on each sheet.
22. Provide title block on each sheet showing project name, type of drawing (grading and drainage plan) and sheet numbers.
23. Plan check is valid for one year following the initial application date. Construction permits shall be obtained during this period or the plans must be resubmitted for review and approval. Permits expire one year from issue date but may be extended upon request and the payment of appropriate fees for subsequent periods of six months each.
24. Include, on the Grading & Drainage Plan, the applicable City of Tempe notes for "Site Plans" from the Design Manual (Pages 63 – 64), which are included below.
25. The lot grading plan should include the cross sections shown on page four of this document or similar cross sections through the property. Indicate on the cross sections the type of curb and also the elevation difference between the finished floor & lot outfall.

SITE PLAN NOTES

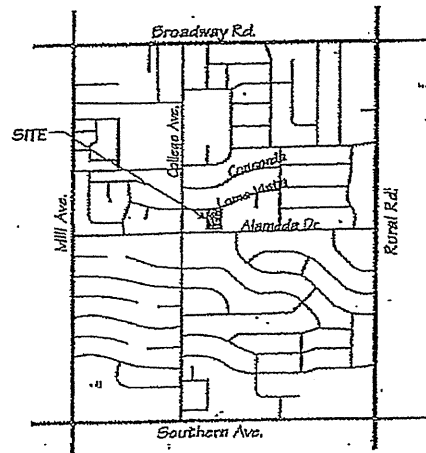
1. This set of plans has been reviewed for compliance with City requirements prior to issuance of construction permits. However, such review shall not prevent the City from requiring correction of errors in plans found to be in violation of any law or ordinance.
2. The City does not warrant any quantities shown on these plans.
3. The City approval is for on-site grading, drainage. Plan check is valid for one year following the initial application date. Construction permits must be obtained prior to plan check expiration date. Permits expire one year from issue date but may be extended upon request and the payment of appropriate fees for subsequent periods of six months each.
4. An approved set of plans shall be available on the job site at all times.
5. Call the engineering inspection request line at (480) 350-8475 at least one business day before construction to request inspection of grading and drainage. Construction work concealed without inspection by the City shall be subject to exposure at the contractor's expense.
6. The homeowners shall contact BLUE STAKE (602-263-1100) 48 hours prior to construction.
7. All broken or displaced existing concrete curb, gutter, or sidewalk shall be removed and replaced as directed by the City of Tempe Engineering Division inspector.



* Drywell req'd when depth is over 12"



* Drywell req'd when depth is over 12"



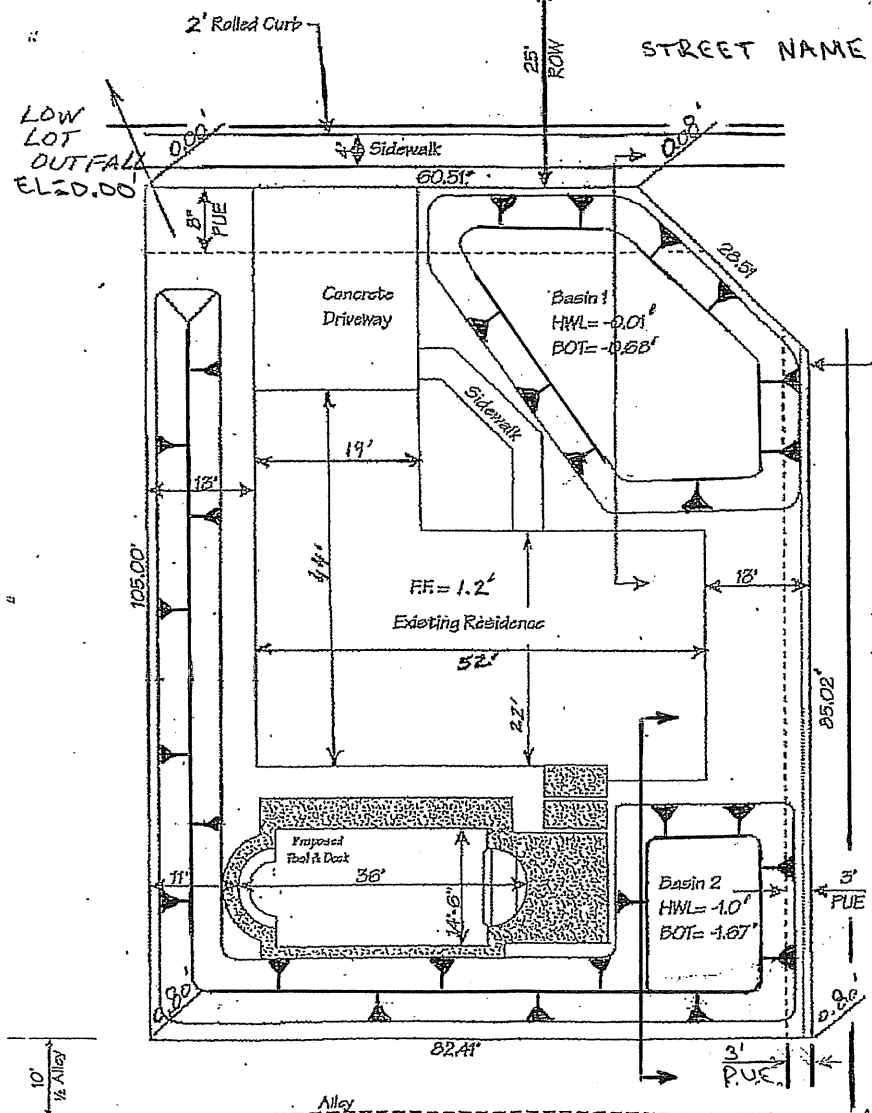
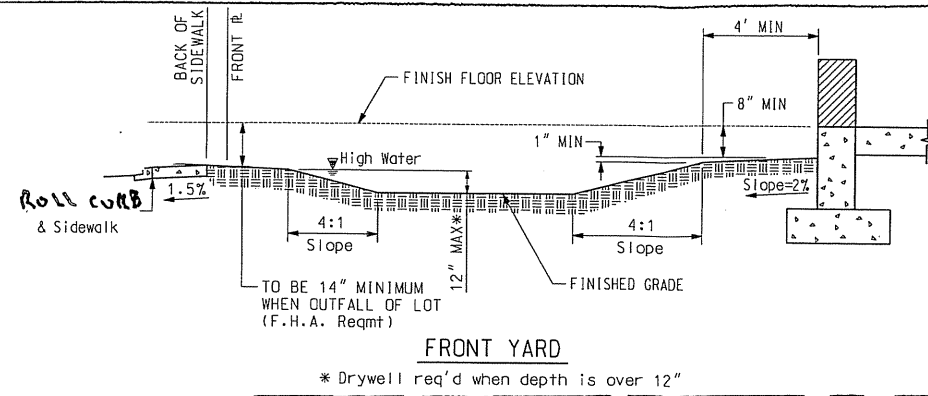
VICINITY MAP

SITE PLAN NOTES

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GENERAL NOTE

1. All elevation points have been presented relative to the front of the property or the finished floor. Actual elevations have not been provided.



RETENTION REQUIRED

$C = 0.95$
 $D = 2.4 \text{ Inches}$
 $A = \text{Area of lot in ft.}^2$
 $C \times A \times (D/12) = \text{XXXX ft.}^3$

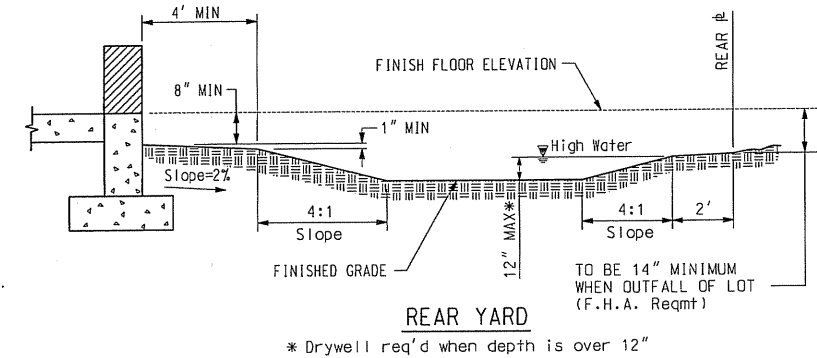
SUMMARY:

Volume Provided > Volume Required

RETENTION PROVIDED

Basin 1:
 Average Area = XXXX ft.²
 Depth = XX ft.
 Volume: Area x Depth = XXXX ft.³
 Basin 2:
 Average Area = XXXX ft.²
 Depth = XX ft.
 Volume: Area x Depth = XXXX ft.³

TOTAL AREA OF SITE = XXX ft.²
 AREA OF EXISTING BUILDING = XXX ft.²
 AREA OF PROPOSED BUILDING = XXX ft.²
 TOTAL AREA OF BUILDING = XXX ft.²
 NET AREA OF SITE = XXX ft.²
 COVERAGE = XXX %



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OWNER - Signature & Print Name DATE

LEGAL DESCRIPTION:

Lot No. of Subdivision Name, Book No., Page No., Records
 of Maricopa County, Arizona.
 Parcel number

PROJECT: Owner's Name Residence
 Address of Property
 ##### Street Name
 Tempe, AZ #####

DRAWING TITLE: GRADING & DRAINAGE PLAN
 Contact:

SITE PLAN
 SCALE 1" = 20'-0"

APPROVAL FOR DRAINAGE ONLY:

CITY ENGINEER DATE Sheet Number

DS# EN# Address of Property

EXAMPLE