

PRIVATE DEVELOPMENT ENGINEERING SINGLE FAMILY HOME GRADING AND DRAINAGE PLAN CRITERIA



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

This checklist was prepared using the City of Tempe 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 Community Development, Private Development Engineering, for Engineering review. A Drainage Permit (SFR) will be issued after approval of the plan. The plan will demonstrate that the stormwater retention has been properly provided or maintained. For further information and fee schedule please refer to the City of Tempe Engineering Design Criteria manual. This manual can be purchased in the City's Engineering and Transportation office or can be found online at <https://www.tempe.gov/government/engineering-and-transportation/engineering>

Engineering plans must be submitted as a separate PDF package under the EN number. Submit under the EN number in LANDSCAPE orientation through the Citizen's Portal: <https://epermits.tempe.gov/CitizenAccess/Default.aspx>

Project Name: _____

Project Address: _____

Project DS/EN Number: DS _____ EN _____

Description of Work: _____

Engineer of record (ENG) must fill out all boxes in the first column as either (Addressed) or N/A (Not Applicable).

Engineer's Signature: _____

Engineer's Name: _____ Date: _____

Civil plan reviewer (RVW) shall check the second column as **X** (Required)

City Plan Reviewer: _____ Date: _____

Email: _____ Phone: _____

MINIMUM PLAN REQUIREMENTS:

ENG / RVW

- Contact engineering personnel in Community Development @ 480-350-8341 or email permitcenter@tempe.gov to verify the property's retention requirements.
- Provide project description of proposed construction on cover sheet.
- Include the most current local Arizona Blue Stake block on all sheets.

- Include a complete legal description (containing subdivision name and lot number) of the property as it appears on the title report (current within 6 months) or deed.
- Include a vicinity map showing the property in relation to that of the nearest major street intersection and closest streets.
- Include a north arrow (pointing to right or top edge of sheet).
- Include the owner's name or names as it appears on the deed (property, business, developer, etc.) and mailing addresses.
- Include name, address, and phone number of the person to whom plans should be returned and who has prepared the plans. Designate as "CONTACT".
- Include legal address of property and parcel number.
- Show all property dimensions, widths and descriptions of easements, and adjacent rights of way per MAG Detail 112. Include dimensions of sidewalk, curb, and utilities from centerline. Include bearings and distances for property lines.
- Show and dimension the location of all existing and proposed structures, drainage patterns, proposed spot elevations, and existing topography of the site and adjacent. Show arrows for site and roof drainage patterns.
- Show the finished floor elevation for the new home, existing home, and the proposed construction. Label the low 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.
- 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).
- Show and label the new and/or existing water meter location & size, sewer tap location, driveways, and sidewalks
- Distinguish between all existing and proposed construction. Give areas of existing and proposed structures based upon slab dimensions in square feet.
- Signature block as follows (lower right-hand corner of first sheet). Provide minimum 1" space for signature

APPROVAL FOR DRAINAGE ONLY

CITY OF TEMPE

DATE

- Acknowledgement statement block for PROPERTY OWNER signature (lower right-hand corner of first sheet). This must be signed for final approval and included on final submittal of plan. Provide minimum 1" space for signature

I hereby acknowledge this Grading & Drainage design and agree to contact the Private Development Engineering Inspector at 480-350-8072 for a pre-construction meeting. Any changes to or deviations from this plan require City approval.

OWNER – Signature & Print Name DATE

- Use an engineering scale, 1" = 30' maximum scale. Include bar scale.
- All plans must be on minimum 11" x 17" sheets and 24"x36" maximum. Plans must be legible and scalable when reduced to 11" x 17" sheet size. Minimum 12pt font size.

- Show gross and net area of site in square feet. Include percentage of existing lot coverage and list individual quantities. Lot coverage is considered to be all improvements including structures, driveways, patios, sidewalks, walls, etc.
- Per City of Tempe Drainage Criteria, on-site surface retention of the 100-year design event is required for all new homes. Check individual lots for differing storm criteria when making improvements to existing structures. 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 label 4:1 maximum side slope for landscaped retention areas.
- Show positive grade breaks at all property and right-of-way lines including finished grades at all lot corners. Show arrows for site and roof drainage patterns
- 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.
- 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, (2.2 inches for the 100-year, 2-hour storm vent)

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] per Sec. 12-73, item D of the City Code

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 2.2 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

- Grading and drainage plans for single family residences must be prepared by an engineer, surveyor, or architect registered to practice in Arizona, include the registrant's seal, date, and signature.

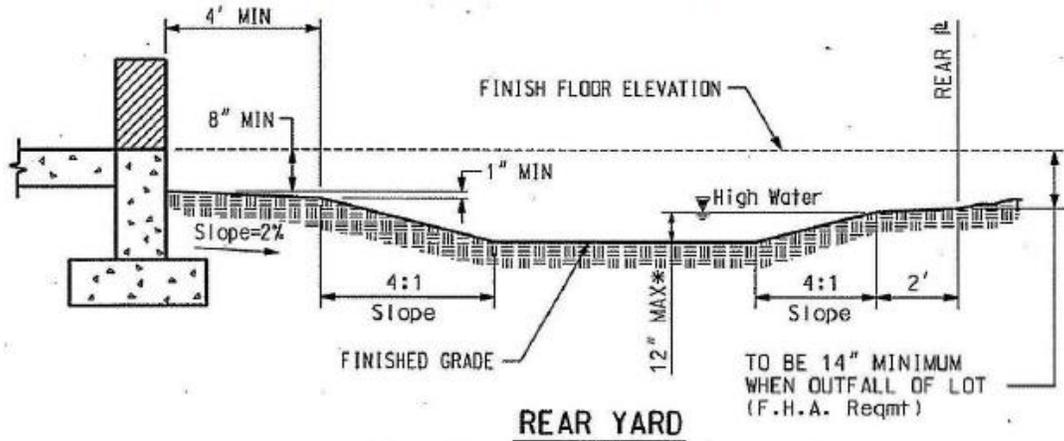
-
- Show the Engineering Private Development (EN) Number, Community Development (DS) Number (assigned during the first review), property address, and quarter section along right-hand margin on each sheet. Minimum font size shall be between 24-36 pt.
 - Provide title block on each sheet showing project name, type of drawing (grading and drainage plan) and sheet numbers.
 - Plan check is valid for one year following the initial application date per Engineering Design Criteria, p. 19, note 45. 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.
 - On the Grading & Drainage Plan, include the City of Tempe notes for “Site Plans” from the Design Manual (Pages 63 – 64), which are included below.
 - The lot grading plan should include the cross sections shown at the end of this document. Indicate on the cross sections the type of curb and the elevation difference between the finished floor & lot outfall. Show high water line and elevation. Provide cross sections specific to lot and from property line to property line. Include curb, sidewalk, and street centerline
 - Address Site Plan Review (SPR) comments if applicable.
 - For asbuilts and maps, submit public records request form to CDpr@tempe.gov The request form can be found at <https://www.tempe.gov/government/community-development/building-safety/public-records>
 - Engineering plans must be submitted as a separate PDF package under the EN number. Submit plans under the EN number in LANDSCAPE orientation through the Citizen's Portal: <https://epermits.tempe.gov/CitizenAccess/Default.aspx>
 - The “Private Development Engineering Single Family Home Grading and Drainage Plan Criteria” can be found at: <https://www.tempe.gov/government/community-development/building-safety/applications-forms> Scroll to “Civil Engineering & Right of Way Private Development and select “Single Family Home Grading & Drainage.”_

SITE PLAN NOTES

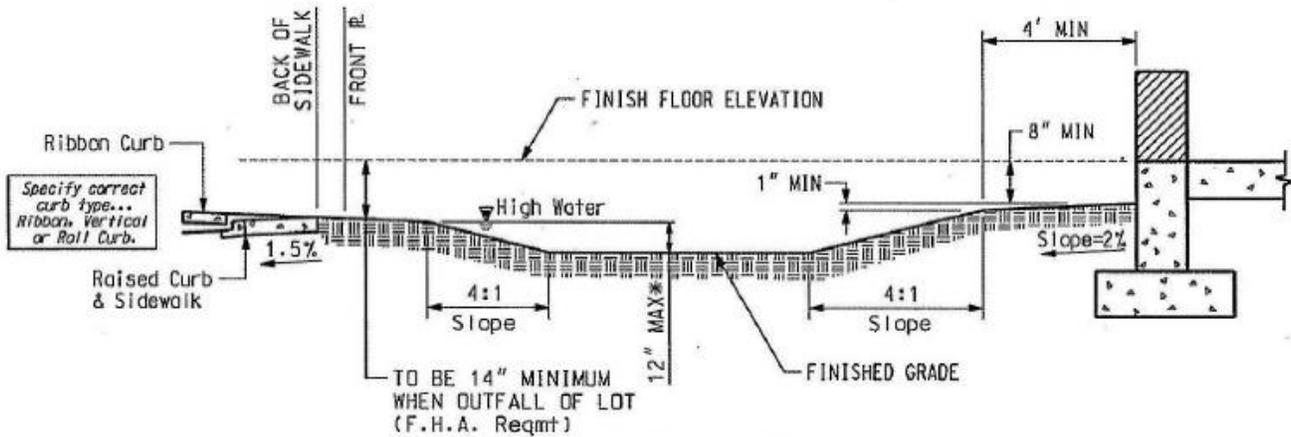
1. This set of plans has been reviewed for compliance with City requirements prior to issuance of construction permits. However, such review shall not prevent the City from requiring correction of errors in plans found to be in violation of any law or ordinance.
2. The City does not warrant any quantities 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 always be available on the job site.
5. Call the engineering inspection request line at (480) 350-8072 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 ARIZONA BLUE STAKE (811) 48 hours prior to construction.
7. All broken or displaced existing concrete curb, gutter, or sidewalk in front of and adjacent to the project shall be removed and replaced as directed by the City of Tempe Private Development Engineering Division inspector.

Source: <https://www.tempe.gov/city-hall/public-works/engineering/standards-details>

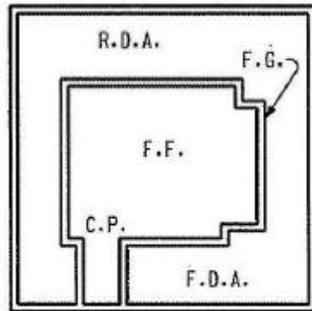
FIGURE 1: STANDARD DETAIL FOR SINGLE-FAMILY HOMES



* Drywell req'd when depth is over 12"



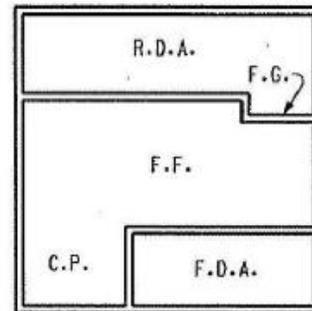
* Drywell req'd when depth is over 12"



PLAN "A"

LEGEND

- C.P. = CARPORT
- F.D.A. = FRONT DEPRESSED AREA
- F.F. = FINISHED FLOOR
- F.G. = FINISHED PAD GRADE
- R.D.A. = REAR DEPRESSED AREA



PLAN "B"

NOTE:

Include the appropriate PLAN "A" or PLAN "B" plus the following note on the recorded plat.
 "These lots are to be graded to retain storm water in accordance with ordinance".