



Chandler · Arizona
Where Values Make The Difference

Civil Engineering Grading and Drainage Plan Review Checklist

Log No: _____

C.I.P. No: _____

Project:	
Location:	

Item Number Proofing Marks:	
/	Requirement satisfied.
O	Requirement not satisfied.
?	Unable to determine status, more information is required.
X	Not applicable.

Review #	Reviewed By	Date
1		
2		
3		
4		
5		

The requirements referred to on the checklist can be found in the City's Technical Design Manuals.

Item	Requirement	Comments
1.	The grading and drainage plans must conform to the requirements of the <i>Construction Plans Checklist</i> .	
2.	Include the <i>Grading and Drainage Construction Notes</i> on the cover sheet.	
3.	When temporary retention basins or storm drainage facilities are present, place the following note on the cover sheet: The existing retention and drainage facilities within this development will not be removed from service until the permanent retention and drainage facilities are functional.	
4.	Include in the legend the symbols used for the following items:	

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A. B. C. D. E. F. G. H. I. J. K.	Existing top-of-curb elevations. Existing ground elevations. Existing pad and finish floor elevations. Proposed top-of-curb elevations. Proposed ground elevations. Proposed finished floor and pad elevations. Existing contour lines. Proposed contour lines. Arrows designating direction of drainage flow. Drainage structures. Grade breaks.	
5.	Submit soils report for review.	
6.	The grading and drainage plans must encompass the entire development. Show all lots, tracts, and parcels in their entirety.	
7.	Show the limits of the model home area on the plans.	
8.	Show the existing topography by contours. Spot elevations are required when the subdivision's topography cannot be clearly defined by contours. Spot elevations are required immediately off-site adjacent to the subdivision boundary sufficient to permit analysis of grade differentials and drainage. A retaining wall will be required if there is a one-foot difference in elevation between this site and adjacent properties.	
9.	Existing storm drainage facilities such as retention basins, catch basins, scuppers, and storm drain pipes must be shown and identified by type on plans.	
10	Existing trees within the City right-of-way shall be protected in place or replaced in kind. Contact the City of Chandler Streets Division at 480-782-3494 prior to start of construction.	
11	Show all wells, streams, canals, irrigation laterals and ditches, lakes and other water features. Note any modifications. Open ditches and canals must be tiled, or landscaped, as specified within the City's technical design manuals.	

Item	Requirement	Comments
12	Show existing spot elevations for all existing curb and gutter adjacent to the development. Show elevations adjacent to each property corner, at all grade breaks, and at all scuppers/catch basins.	
13	Identify all portions of the development that are within the FEMA 100-year flood zones. If any such areas exist, submit plans and drainage report to the Flood Control District of Maricopa County. FCDMC approval is required.	
	A. Add the following approval block to the cover sheet:	
	<hr/> <p style="text-align: center;">FLOOD CONTROL DISTRICT DATE OF MARICOPA COUNTY</p>	
	B. Acquire Flood Control District of Maricopa County approval and signature.	
14	Show a grading detail for a typical lot and a corner lot on the detail sheet. This detail must satisfy the following requirements:	
	A. The building's finished floor elevation must be at least 14" above the lot's low outfall elevation.	
	B. The lot grading must be sufficiently sloped to prevent stormwater from ponding on the lot.	
	C. The maximum allowable elevation difference between adjacent yard elevations must be less than or equal to one foot.	
	D. Typical swale location and grade.	
15	Show scaled cross-sections across the development's property line boundaries. The maximum allowable elevation difference between adjacent properties is one foot.	
16	Show scaled cross-sections for all retention basins. The maximum allowable side slope requirements are 4:1.	
17	Show the depth of ponding due to the 100-year 2-hour design storm for retention facilities on the retention basin cross-sections. The maximum allowable depth of ponding resulting from the design storm is 3 ft. Call out required volume of storage and proposed volume.	
18	Show construction details, plan and profile views for all proposed drainage facilities, such as:	

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	<ul style="list-style-type: none"> A. Drainage swales. B. Storm drains (equalizer pipe exempted from profile requirement). C. Catch basins. D. Hydraulic profile must be shown. E. Scuppers (profiles must include elevations at grade breaks with dimensions and elevations demonstrating no ponding within the right of way). 	
19	<p>When catch basins are proposed within the right-of-way, the plans shall also specify:</p> <ul style="list-style-type: none"> 1) Storm drain inlet marker per C-508. 2) Curb and gutter transition per MAG Std Dtl 532. 3) Alternate cover for curb-opening catch basins per MAG Std Dtl 536. 4) Bicycle-safe grate for grated catch basins. 	
20	<p>A trash rack with hinges on bottom are required at all open ends of pipe 12" or more in diameter. Specify C-503.</p>	
21	<p>A safety rail in accordance with MAG Std Dtl 145 is required along the top edge of structures adjacent to public pedestrian access ways where the grade difference is 30" or greater.</p>	
22	<p>Structures which present a fall hazard of 48" or greater shall have a safety rail per MAG Std Dtl 145.</p>	
23	<p>Show the following information for each lot:</p> <ul style="list-style-type: none"> A. Proposed elevations at front lot corners, typically top-of-curb elevations. B. Proposed elevations at rear lot corners. C. Proposed finished pad elevations. D. Proposed finished floor elevations. E. Top and bottom elevations on retaining walls. F. All existing block walls on and adjacent to subdivision boundaries and retention basin perimeters, with top of wall elevations. G. All proposed block walls on subdivision boundaries and retention basin perimeters, with top of wall elevations. 	
24	<p>Provide all infiltration test results prior to any grading</p>	

Item	Requirement	Comments
25	<p>on the site as a part of the grading and drainage plan review process. Under no circumstances will testing be deferred until after completion of site grading.</p> <p>The following additional storm water system requirements apply to the development:</p> <ul style="list-style-type: none"> A. All retention areas must comply with the aesthetic standards given within the City Zoning Code. Retention volumes must accommodate mounding in retention ponds. There are no exceptions to standards given within the City Zoning Code. Any required amenities must be above the 10-year retention level. B. Amount of retention area allowed along the street frontage per the Zoning Code. C. Accommodate ½ street runoff and onsite retention plus 10%, retained entirely on private property. D. Maximum allowable depth of retention is 3 ft. for the 2-hour 100-year storm and 10%. E. Maximum side slopes are 4:1. Access to the bottom must be provided for maintenance vehicles not to exceed 10:1. F. Certified double-ring infiltrometer testing is required in the locations of each proposed basin. Basin drain shall be less than 36 hours based on 50% of percolation test rate. 	
26	<p>Water lines, fire lines, and water service lines are not allowed to pass under retention basins. This does not apply to irrigation lines downstream of the backflow preventor.</p>	
27	<p>Register all proposed drywells with the Arizona Department of Environmental Quality (ADEQ) and submit a copy of the application to the City of Chandler for inclusion in the file. The following requirements also apply:</p> <ul style="list-style-type: none"> A. All drywells must conform to the City detail. B. All drywells receiving storm runoff directly from paved areas must have interceptors installed on them. C. Large retention basins (the size of a soccer field) must have all drywells installed along the perimeter. D. Provide a plan showing the location of drywells and a log form for recording ADEQ registration number and field-verified infiltration rate by location. 	

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28	Show existing drywells and ADEQ registration numbers.	
29	A drainage report is required.	
30	<p>As a minimum, include the following in the drainage report:</p> <ul style="list-style-type: none"> A. An exhibit delineating each drainage area with the corresponding retention basins, and drainage structures. Provide arrows delineating drainage flow directions. B. A discussion concerning off-site drainage flows and patterns including FEMA flow zones. C. Calculations determining the volume of retention required for each drainage area. D. Calculations showing the volume of retention provided for each drainage area. The volume of retention provided for each drainage area must include the 10% required to account for expected future volume losses. E. Calculations determining the depth of ponding within the retention basins. The depth must include the required 10% noted above and not exceed 3'. F. A discussion concerning the low outfall elevation for each drainage area, including the effects of an overflow situation. The elevation must be called out in the report and shown on the exhibit. G. Certified infiltration test results and retention basin drainage time calculations are required for each drainage basin/area. Retention basin drainage time shall be based on a 50% attenuation of the double-ring infiltrometer test results. If drywells are deemed to be necessary to meet the 36-hour drainage time requirement, the number of drywells must be determined. Drywells shall have a presumptive capacity of 0.1 cfs until field tests have been performed on each drywell. H. Street hydraulic calculations showing that the 10-year storm runoff is retained within the curbs. Velocities shall be based upon 65% of full-depth velocity. I. Storm drainage inlet and pipe sizing/capacity 	

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	<p>calculations.</p> <p>J. A discussion concerning the minimum finished floor elevation within the development. This elevation cannot be below the appropriate low outfall elevation noted previously.</p> <p>K. Show all calculations, formulas, and charts used.</p> <p>31 Structural design calculations are required for storm drains and/or equalizing pipes subject to wheel loading.</p> <p>32 Refer to the Underground Retention checklist for additional requirements.</p> <p>33 If one or more of the following wall conditions exist, a separate building permit for wall construction will be required:</p> <p>A. Retaining wall where the finish grade differential is in excess of 48" (4').</p> <p>B. Screen wall where the maximum exposed height is in excess of 7'.</p> <p>C. Retaining wall that supports a surcharge load.</p>	

Prior checklists and plans are required for subsequent submittals.

City Use Only
<p>1. Buy-ins paid?</p> <p>2. Zoning code landscaped area in front?</p> <p>3. Review by City service supervisors needed?</p> <p>4. Reimbursement Agreement</p> <p style="padding-left: 20px;">A. Required</p> <p style="padding-left: 20px;">B. Prepared</p>