

Drainage Report Guideline

This form is a GUIDELINE to assist in the preparation of a Drainage Report for submittal to and review by the city.

REQUIREMENTS:

A Drainage Report is **required** with the First Submittal of all Improvement Plans for Subdivisions and applicable Site Developments. The Drainage Report shall include the following items, as a minimum:

1. The Pinal County Drainage Ordinance must be used for drainage design criteria.
2. The Drainage Report and Drainage Maps must be signed and sealed by the Engineer.
3. The Drainage Report shall include a Pre-Development Drainage exhibit showing:
 - a. North Arrow and scale
 - b. Area of the Development
 - c. Limits of all drainage sub-basins within and adjacent to the development property
 - d. Storm event: 100-yr, 2-hr storm design
 - e. Q_{10} and Q_{100} runoff or flow amounts for each drainage sub-basin
 - f. Location and elevation of the outfall point for the property.
 - g. Direction of flows onto and/or across the Development property
 - h. Location of all significant watercourses within or adjacent (within 100 feet) to the Development property
 - i. Type and limits of any FEMA Flood Zones on the property.
 - j. Legend for all symbols used on the map.
4. The Drainage Report shall include a Post-Development Drainage exhibit showing:
 - a. Title Block with Legal Description of the property
 - b. North Arrow and scale
 - c. Property, Parcel, and Lot Lines
 - d. Street Names
 - e. Location of existing and proposed drainage structures
 - f. Location and size of any existing or proposed drainage easements
 - g. An on-site temporary elevation benchmark for verification purposes – the City of Maricopa benchmark is currently located at the Post Office, Maricopa, AZ
 - h. Topography with a maximum one (1) foot contour interval and/or sufficient spot elevations to determine building pad elevation(s)
 - i. Tables showing the Q_{10} and Q_{100} values for all on-site concentration points and intercepted and bypass flow amounts for each drainage structure such as catch basins and scuppers.



- j. Delineation of all drainage areas and associated retention basins and drainage structures.
 - k. Q_{10} and Q_{100} volumes for any off-site drainage entering the site and the locations of the entrance points.
 - l. Q_{10} and Q_{100} volumes for any off-site pass-through drainage exiting the site and the locations of the exit points.
 - m. Flow arrows indicating the drainage flow direction and patterns.
 - n. Legend for all symbols used on the map.
 - o. Type and limits of any FEMA Flood Zones on the property.
 - p. Locations of all percolation tests.
5. The Report shall include a discussion of any off-site drainage flows and patterns affecting the site, including the types and limits of the FEMA flood zones.
 6. The Report shall include a discussion of the low outfall elevation for each drainage area, including the effects of an overflow situation in the case of back-to-back storms. The location and elevation of the low outfall point for each drainage area and the overall subdivision site must be shown on the Drainage Map.
 7. The Report shall include a discussion concerning the minimum Finished Floor elevations within the development.
 8. The Report shall include typical street sections for all street types in the subdivision and hydraulic calculations showing the water surface elevations of the Q_{100} flow in the streets in all critical areas, i.e. where the Q_{100} flow is not contained within the street right-of-way. The report must also include a Table showing the Q_{100} high water elevation and the minimum Finished Floor Elevations for all Lots in those critical areas.
 9. The street calculations shall show that at least one 12-foot driving lane in each direction shall remain dry for collector and arterial streets. The velocities shall be based upon the 10-year full depth.
 10. The report shall include calculations that determine the point on the streets at which the MAG Standard 220, Type C, 4" roll curb is not adequate to contain the Q_{10} flow and the curb is transitioned to the MAG Standard 220, Type A, 6" vertical curb and gutter.
 11. The Report shall include calculations showing the volume of retention required for each drainage area retention basin or system of multiple retention basins connected by equalization pipes. The required volume shall include the calculated individual volumes, based on the 100-year, 2-hour storm precipitation rate (P) from all drainage sub-basins or sub-areas contributing to the retention basin or retention basin system.



12. The Report shall include calculations showing the volume of retention provided for each drainage area retention basin or system of multiple retention basins connected by equalization pipes. The retention volume provided in each retention basin must meet or exceed the required volume calculated for that drainage area retention basin or system of multiple retention basins connected by equalization pipes.
13. The Report shall include calculations determining the depth of ponding, or high-water elevation, within the drainage area retention basin or system of multiple retention basins connected by equalization pipes based on the required retention volume.
14. The Report shall include calculations showing the retention basin drain-down or dry-up time due to basic percolation. If the calculated time exceeds the 36-hour dry-up requirement, one or more drywells are required. The calculations must show the number of drywells required to comply with the 36-hour requirement.

(Note: The theoretical drywell design drainage rate cannot exceed 0.1 cfs until an 'As-Built' percolation test is performed on the drywell and the actual percolation rate is determined.)

15. **All drywells must be two (2) – chamber design.**
16. **Underground storage is not recommended; however, it will be considered on a case-by-case basis per the City Engineer.**
17. The Report shall include catch basin inlet and pipe sizing and capacity calculations.
18. The Report shall include scupper inlet sizing and capacity calculations and scupper spillway calculation, where appropriate.
19. Copies of all calculations, formulas, and charts used in the analysis shall be included in the Report.
20. Copies of the Shallow pit percolation test results shall be included as an Appendix to the Drainage Report.

