DRAINAGE REPORT REVIEW CHECKLIST

LOG NUMBER: _____
PROJECT: _____

REVIEWER:
1st _____ Date _____
2nd _____ Date _____
3rd _____ Date _____

KEY: **/ = Acceptable** **X = Not Applicable**
O = Not Acceptable or Missing **? = Unable to Determine Acceptability Status**

PLEASE RETURN THIS ORIGINAL CHECKLIST WITH THE NEXT SUBMITTAL.

Complies	Requirement

DRAINAGE REPORT REQUIREMENTS

A Drainage Report is required to be submitted with the First Submittal of all Grading Plans of Subdivisions and the Improvement Plans of all Site Developments. The Drainage Report shall include the following items, as a minimum.

_____ 1. The Drainage Report must be signed and sealed by the Engineer.

_____ 2. The Drainage Report shall include a Pre-Development Drainage Map showing:

a. North Arrow and scale,
b. The area of the Development,
c. The limits of all drainage sub-basins within and adjacent to the Development property,
d. The Q_{10} and Q_{100} run-off or flow amounts for each drainage sub-basin,
e. The direction of flows onto and/or across the Development property,
f. The location and elevation of the out-fall point for the property,
g. The location of all significant watercourses within or adjacent to the Development property
h. The type and limits of any FEMA Flood Zones on the property,
i. A Legend for all symbols used on the Map

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Complies	Requirement

_____ 3. The Drainage Report shall include a Post-Development Drainage Map exhibit showing:

a. Title Block with the Legal Description of the property,
b. Property, Parcel, and Lot Lines,
c. Street Names,
d. North arrow and scale,
e. Location of existing and proposed drainage structures,
f. Location and size of any all existing or proposed drainage easements,
g. Topography with a maximum five foot contour interval and/or sufficient spot elevations to determine the lay of the land,
h. 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 (catch basins and/or scuppers),
i. Delineation of all drainage areas and associated retention basins and drainage structures,
j. Location and elevation of the Site Out-fall Point,
k. The Q_{10} and Q_{100} volumes for any Off-site drainage entering the site and the locations of the entrance points,
l. The 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. A Legend for all symbols used on the Map,
o. The type and limits of any FEMA Flood Zones on the property,
p. The locations of all percolation tests.

_____ 4. The Report shall include a discussion concerning all off-site drainage flows and patterns that affect the site, including the types and limits of the FEMA flood zones

_____ 5. The Report shall include a discussion concerning the low out-fall elevation for each drainage area, including the effects of an overflow situation in the case of catastrophic or back-to-back storms. The location and elevation of the low outfall point for each drainage area and for the over-all subdivision site must be shown on the Drainage Map.

_____ 6. The Report shall include a discussion of the Typical Lot Grading necessary to ensure that the runoff transfer to the street is adequate. The discussion shall include grading diagrams for the various Lot configurations showing the flow lines around the building pad and from the back yard to the street with the typical slopes noted. These same diagrams must also be shown on the cover Sheet of the Grading Plans.

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_____	7.	The Report shall include a discussion concerning the minimum Finished Floor elevations within the development. The Pinal County Drainage Ordinance, Section 602.6, requires that the Finished Floor elevations be a minimum of 12 inches above the high point of the building site or 12 inches above the water surface elevation of the Q_{100} flow in the adjacent street(s) or drainage way.
_____	8.	The Report shall include street typical sections for all types of streets in the subdivision, 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. (Note A: The Pinal County Drainage Ordinance (Section 602.5.4) states that "If roads are designed to convey runoff, the amount conveyed shall not exceed design standards. Additional flow shall be conveyed in drainage ways if the design standards are exceeded or if the depth within roadways is greater than eight inches." For a 32' Local Street Section with a 4" roll curb, a Q_{100} street flow depth of 8" at the gutter line will not be contained within the 50' Right of Way unless the grade behind the sidewalk is increased to greater than 3.5%. Otherwise, a 6" vertical curb and gutter are required.) (Note B: In those areas where the Q_{100} is not contained within the street Right of Way, a Drainage Easement, between the Right of Way line and the high water elevation line, must be provided across all affected Lots and must be shown on the Grading Plans and the Final Plat.)
_____	9.	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.
_____	10.	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, 1-hour storm precipitation rate (p) from all drainage sub-basins or sub-areas contributing to the Retention Basin or Retention Basin System.

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_____	11.	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 Drainage Area Retention Basin or System of multiple Retention Basins connected by equalization pipes must meet or exceed the Required Volume calculated for that Drainage Area Retention Basin or System of multiple Retention Basins connected by equalization pipes.
_____	12.	The Report shall include calculations that determine 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.
_____	13.	A underground storage is not recommended, however, it will be considered on a case-by-case basis by the Town Engineer.
_____	14.	The Report shall include calculations showing the Retention Basin drain-down or dry-up time due to basic soil percolation. If the calculated time exceeds the 36-hour dry-up requirement, one or more drywells are required, and additional calculations must be included show the number of drywells tentatively 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 for that dry well in that Retention Basin is determined.)
_____	15.	The Report shall include catch basin inlet and pipe sizing and capacity calculations.
_____	16.	The Report shall include scupper inlet sizing and capacity calculations and scupper spillway capacity calculations, were appropriate.
_____	17.	Copies of all calculations, formulas, and charts used in the analysis shall be included in the Drainage Report.
_____	18.	Copies of the Percolation Test results shall be included as an Appendix to the Drainage Report.