

PRELIMINARY DRAINAGE REPORT CHECKLIST

Preliminary Drainage Reports shall include the following as a minimum. The DCM Criteria must be shown to be met with the Final Drainage Report. Additional information may be required to show Criteria is being met.

REPORT TEXT

1. Cover Page

- a. Report type (i.e., "Preliminary Drainage Report")
- b. Subdivision name matching Final Plat (or project name for capital projects)
- c. Prepared for
- d. Prepared by
- e. Date prepared

2. Signature Blocks

- a. Engineer – must be signed/stamped prior to City approval
- b. Owner/Developer – must be signed prior to City approval
- c. City Review

3. Introduction / Site Description

- a. Subdivision name, land use, project description
- b. Total site area, total disturbance area
- c. Section, township and range ("west of 6th principal meridian")
- d. City, County and State
- e. Reference criteria used
- f. Is the site in the Streamside Zone
- g. Soil conditions, including source of soils data (e.g., NRCS) and Hydrologic Soil Group
- h. Street classifications for any existing / proposed roads if street capacity calculations are needed

4. Previous Studies

- a. Discussion of prior studies affecting the site

5. Existing Drainage Conditions

- a. List major watershed (e.g. – Sand Creek Basin)
- b. List any existing site improvements (e.g. – grading, swales, utilities, storm drains, etc.)



- c. General drainage pattern (cardinal direction references)
- d. Specific drainage patterns and description of hydraulic routing and outfall locations
- e. Off-site drainage conditions affecting the site

6. Proposed Drainage Conditions

- a. Discuss proposed site improvements (e.g. – grading, swales, utilities, storm drains, etc.)
- b. Specific drainage patterns and description of hydraulic routing and outfall locations
- c. Discussion regarding compliance or variance with other drainage studies
- d. Public or private maintenance of facilities proposed

7. 4 Step Process / Detention

- a. Statement with disturbance area and whether 4 Step Process and detention criteria apply
- b. Statement on how detention is being provided for site
- c. Description of Exclusions, if applicable
- d. Description of compliance with each step individually
 - i. Step 1 – Volume Reduction
 - 1. Description of Planned Infiltration Areas (PIAs)
 - 2. List of percent of volume reduction
 - 3. Statement that Criteria is being met
 - 4. Reference to calculations and exhibit in Appendix
 - ii. Step 2 – WQSV
 - 1. Table with design points following format below
 - 2. Description of emergency spillway routing of PCM
 - 3. Tabulation of regional water quality contributing areas with new site included
 - a. Include tributary area diagrams as needed

Design Point	Associated Disturbance Area (ac)	Treatment Method	Ownership / Maintenance
1	1.3	Extended Detention Basin A	Private (Metro District)
2	0.5	75% Infiltration	Public
3	0.2	Utility Exclusion	N/A



4	0.1	Not Treated	N/A
Total	2.1		

iii. Step 3 – Channel Stabilization

1. Description of adjacent channels
2. Distance from site to nearest channel
3. Description of channel improvements if applicable or reference to Channel Design Report

iv. Step 4 – Source Control

1. Description of permanent non-structural source control measures implemented on site based on the land use of the site

8. Floodplain Statement

- a. Typically stated as either the following or a variation thereof:
- b. “No portion of the site is located within a 100 year floodplain as determined by the Flood Insurance Rate Map (FIRM) number ##### effective date, December 7, 2018 (see appendix)”
- c. If the site is within a floodplain, then the statement must state so
- d. Description of floodplain permitting (CLOMR/LOMR, No Rise) and US Army Corp of Engineers permitting

9. Drainage and Bridge Fees

- a. List drainage basin and current year
 - i. Fees must be paid at the time of Plat recordation. The fee year for the year the plat will be recorded must be used,
- b. Include table with plat acreage, fee / acre, calculated fee
- c. State that fees are due prior to plat recordation
- d. If reimbursable improvements will be constructed with development
 - i. Include DBPS excerpt or Drainage Board approval showing infrastructure is considered to be reimbursable in appendix
 - ii. Include engineer’s cost estimate for reimbursable facilities (proposed reimbursement amount must be at or below DBPS estimate without requiring Drainage Board approval)
 - iii. Include statement on amount of deferred fees and fees owed at time of plat (if any)



10. Variances

- a. List of variances requested, reference to Variance Request in Appendix – only include variances related to the following:
 - i. Hydrology
 - ii. PCMs (any variances needed for larger site design / space constraints)
 - iii. Channels

11. Summary

- a. Subdivision name matching Final Plat (or project name for capital projects)
- b. Statement that site runoff and storm drain and appurtenances will not adversely affect the downstream and surrounding developments



APPENDICES

12. Vicinity Map

- a. Show surrounding streets and a label for the site, should show adjacent streets, nearby drainageways, and a few major roadways
- b. Site delineated with border shown or border and hatch
- c. North arrow and scale reference

13. Soils Data

- a. NRCS (or other) map copy or print with soil types (numbered) labeled
- b. Site delineated with border shown or border and hatch
- c. North arrow and scale reference

14. FEMA Floodplain Map

- a. FIRM copy or print out (maps can be made on the FEMA web site)
- b. Site delineated with border shown or border and hatch
- c. North arrow and scale reference
- d. FEMA map number and map effective date

15. Hydrologic Calculations – 5yr and 100yr minimum

- a. Rational Method calculations – it must be clearly shown that DCM Criteria is being used/met
 - i. Composite C calculations, including composite percent imperviousness
 - ii. Tc calculations
 - iii. Maximum Tc checks
 - iv. Intensity calculations
 - v. Discharge values
- b. Routing calculations (if applicable)
 - i. CN calculations, including % imperviousness
 - ii. Rainfall values
 - iii. Inlet summary
 - iv. Model schematic
 - v. Output tables with relevant values boxed or highlighted
- c. Design points with contributing basins table



16. Hydraulic Calculations – all necessary input/output reports/figures must be included to show DCM Criteria is being met

- a. Conveyance infrastructure
 - i. Street capacity calculations
 - ii. Inlet calculations
- b. Culverts and bridges
 - i. Headwater / Depth calculations
 - ii. Velocity calculations
- c. Channels
 - i. See Channel Design Report requirements
- d. Swales
 - i. Manning's formula calculations

17. 4 Step Process / Detention Calculations

- a. Composite % impervious calculations for each design point
- b. Volume Reduction spreadsheet for each design point
- c. Green infrastructure diagram showing all UIAs and PIAs
 - i. Unconnected Impervious Areas (UIAs) must be shown as translucent blue
 - ii. Planned Infiltration Areas (PIAs) must be shown as translucent green
 - iii. Include scale and flow arrows
 - iv. Clearly label between individual areas in diagram and corresponding areas in Volume Reduction spreadsheet
 - v. Total disturbance area must be delineated with 4 Step Process exclusion areas clearly labeled
- d. Additional green infrastructure calculations as needed
 - i. Swales
 - ii. Flow spread from point discharge location
- e. MHFD-Detention spreadsheet basin tab or summary of required volume on routed model

18. Variance Request Letter

19. Drainage Maps – Existing and Proposed as separate maps

- a. Property boundary with label or legend item
- b. Streets with labels
- c. Buildings, parking and landscape areas with labels
- d. Existing (and Proposed) contours, with elevation labels
 - i. Existing contours must be shown at minimum 50-feet beyond basin delineations or property line, whichever is greater



- e. Underground conveyance pipe and structures labeled with approximate size and public/private
- f. Ditches/swales/channels with labels and grades (and cross section identifier if applicable)
- g. Design point identifier
- h. Basin boundaries with label or legend item (full offsite basin extents must be shown)
- i. Flow arrows
- j. Basin identifiers
- k. Basin/Design Point summary table
- l. Drainage easements or tracts with labels
- m. 100-yr floodplain and streamside overlay limits (if applicable) with label or legend reference
- n. Planned Infiltration Areas (PIAs) delineated and labeled
- o. Permanent Control Measures (PCMs) labeled with type and maintenance responsibility (public/private)
 - i. Major features (forebays, outlet structures, low-flow channels, retaining walls, emergency spillways, maintenance access roads, etc.)
 - ii. Slopes for access roads, low-flow channels, and basin sides

