



City Of Fountain City Engineering Drainage Report Checklist

✓ - okay
→ - needed
NA - not applicable but
subject to design
engineer verification

Introduction

This checklist has been modified from the City of Colorado Springs Subdivision Policy Manual, Engineering Criteria Manual for use by the City of Fountain. The following outline is a compilation of criteria to be used for Final Drainage Report review. MDDP review is very similar and can be done with the following procedures; however a certain level of detail is not required. DBPS review is altogether different and follows formatting and content that is appropriate for that major watershed specifically. This is decided on early in the process City of Fountain Engineering representatives. The following checklist is intended to be a guideline and is not an all inclusive list of report content.

Cover Sheet

- Report type; FDR, MDDP, etc.
- Subdivision name - *add full name*
- Prepared for
- Prepared by
- Date prepared

STATEMENT SHEET

- Engineer statement/signature block (see below)
- Developer statement/ signature block (see below)
- City Engineer signature block (see below)

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- NA Grading and Erosion Control Plan (optional)



Purpose

- Type of report and subdivision name
- State purpose (e.g. – “identify on-site and offsite drainage patterns, storm sewer, culvert and inlet locations, areas tributary to the site, and to safely route developed storm water to adequate outfalls”)

General Description

- Subdivision name, acreage and land use
- Section, township and range (“west of 6th principal meridian”) **PAGE 3, ITEM C**
- City, County and State
- Bounded by what developments on all sides (plat names)
- Number of lots to be platted

Soils Conditions

- Any pertinent soil discussion
- Source of soils data (typically NRCS)
- Hydrologic group (A,B,C or D) used for calculations in this report

Drainage Criteria

- Hydrologic and hydraulic criteria referencing Colorado Springs Drainage Criteria Manual Volume 1 (DCM 1)
- Hydrologic and hydraulic referencing other criteria such as Urban Drainage Criteria Manual by the Urban Drainage and Flood Control District (UDFCD) of the Denver Metro area
- NA Hydrologic and hydraulic criteria per Colorado Department of Transportation (CDOT), usually used for Type “R”, “C” and “D” types which vary from the Colorado Springs products
- NA Criteria used other than City of Colorado Springs needs to be definitively justified in the narrative
- Hydrologic methodology must be listed (e.g. – Rational method < 100 acres, NRCS Method > 100 acres, etc.) as well as for what storm recurrence intervals
- Hydraulic grade line calculation criteria must also be listed (e.g. – Standard method, HEC 22 Energy method, etc.) **Added to Page 10 of document.**

Existing Drainage Conditions

- List major watershed (e.g. – Jimmy Camp Creek Basin)
- List any site improvements (e.g. – grading, swales, utilities, storm drains, etc.) *include size & material also*
- Reference to the existing conditions map
- Note vegetation type currently on site
- General drainage pattern (cardinal direction references) with general slope %'s **noted** *See Section II.A.1 (Added Slope range)*
- General drainage information to preface detailed descriptions of certain site attributes listed above (e.g. – swale that runs parallel and adjacent to Maple Street from a 30” RCP...)



add existing pond in narrative
current outfall issues @ Link/
swale that is sub-std. Kane

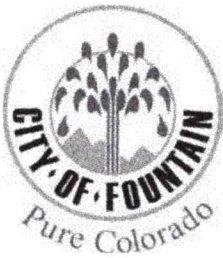
- Specific drainage patterns and hydraulic routing
 - Some consultants may route their flows by basin as opposed to design point Added description to Section II.A.1. Existing Drainage Conditions.
 - Basin name, acreage and flow (5 yr. and 100 yr. min.)
 - PA Runoff source (e.g. – “rear of lots 3 and 4”) and type (sheet flow or concentrated)
 - Routing to design points specified and labeled on map
- Routing of runoff into structures (size, type, condition and material), amount intercepted and flow by (if any)
- Off-site drainage conditions affecting the site (see comment letter re: 36" pipe w/ custom end section designed to address this comment and avoid encroachment of adjacent property.)
 - PA Discussion of prior studies affecting the site southeast corner

Proposed Drainage Conditions

- Reference to the proposed conditions map
- General drainage information to preface detailed descriptions of certain site attributes listed above (e.g. – swale that runs parallel and adjacent to Maple Street from a 30" RCP...)
- Specific drainage patterns and hydraulic routing
- Basin name, acreage and flow (5 yr. and 100 yr. min.) - revise per comment letter
- Runoff source (e.g. – “rear of lots 3 and 4”) and type (sheet flow or concentrated) Sub-basin & DP descriptions added to Appendix A.
 - Routing to design points specified and labeled on map
 - Street capacities (major and minor storm) with street classification noted
- Routing of runoff into structures (size, type, condition and material), amount intercepted and flow by (if any)
- Emergency overflow routing within a tract
- On-site detention requirements discussion with reference to calculations
- Discussion regarding compliance or variance with other drainage studies
- Public or private maintenance of facilities proposed

Water Quality

- Statement required specifying criteria used (DCM Volume 2 or other). If other, then definitive reasoning is required to justify its use
- What type of facility is proposed
- Basins contributing to the facility and total acreage (check acreage against total site to verify they are treating the entire site)
- Percent impervious listed (composite for site to be included in the calculations which should be referenced in the appendix) Need IRF spreadsheet. Completed and added to Appendix A
- Sized facility information (e.g. – “minimum bottom area of 1450 sf and a minimum volume of 0.25 acre-ft.”) Added information to list of relevant pond design data.
- Emergency spillway information (e.g. – “20' broad crested weir which outfalls into the street”)
 - Reference to the design calculations in the appendix Information added to pond design data list.



Erosion Control Plan

- NA Per DCM Vol. I criteria, an Erosion Control Plan is required to be included with the drainage analysis, however it may be submitted separately as a stand alone construction drawing
- If the plan is included, it will need to be in the appendix and a cost estimate in the report text

Floodplain Statement

Typically stated as either the following or a variation thereof:

- "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 18, 2018 (see appendix)"
- NA If the site is within a floodplain, then the statement must state so
- NA If the development will change the floodplain, then a CLOMR or LOMR may be needed and should be discussed in the narrative

Drainage and Bridge Fees

- List major watershed
- List the current year and the fees associated (fees updated every year by City Engineering and approved by City Council) - revise per 2020 fees & include support calcs.
- The fees are derived from the unit price (\$/acre) established in the DBPS and the total site platted acreage (impervious acreage only)
- NA Some basins have special additional fees associated with them, a review of the basin summary sheet EDRD compiles is appropriate prior to acceptance of the values
- Fees are due prior to plat recordation and must be stated as such in the report text, typically after the estimate table

Construction Cost Opinion

- Cost opinions are required for private and public facilities Differentiate in report tables.
- A clear distinction needs to be made with regards to what is private and what is public
- NA Clearly define what is reimbursable and what is not. Reimbursement is limited to facilities and cost limitations per the D.B.P.S.
- The table should include a description, quantity, unit price and cost as well as an engineering contingency that should not exceed 10% (per City criteria for drainage reimbursements) and of course a grand total
- Unit prices should be reviewed for general acceptance only (i.e. - they should be reasonable)

Summary

- Subdivision name [name of development (e.g. - The Markets at Mesa Ridge) if applicable] Use plat name
- Statement that site runoff and storm drain and appurtenances will not adversely affect the downstream and surrounding developments
- Statement that this report and findings is in general conformance with the MDDP or Preliminary Drainage Report or other pertinent studies



Appendices

Vicinity Map

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

Soils Map

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

FEMA Floodplain Map

- FIRM map copy or print out (maps can be made on the FEMA web site)
- Site delineated with border shown or border and hatch
- North arrow and scale reference
- FEMA Map number on exhibit, and includes the FIRM map effective date

Hydrologic Calculations

- Composite runoff coefficients (if applicable)
- Basin Runoff Summary (individual basins)
 - Needs to show time of concentration calculations (T_c) for overland and street/channel flow
 - Intensity values (I) for the applicable design storms (5yr and 100yr minimum)
 - Discharge (Q) values for the applicable design storms (5yr and 100yr minimum)
- Surface Routing Summary
 - Design point references
 - Contributing basins and/or design points
 - "CA" equivalents
 - Maximum T_c
 - Intensity values
 - Discharge values
 - Structure sizes (e.g. – 10' D-10-R sump inlet) or route into feature (e.g. – pond or ditch)

Hydraulic Calculations

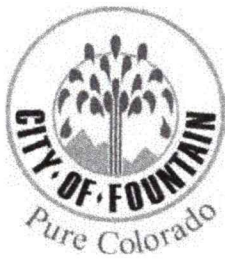
- Pipe Routing Summary has same data as Surface Routing Summary except structure would be pipe or feature as listed above

- Headwater Depth calc sheets or program printouts (if applicable)

- Hydraulic Grade Line (HGL) calculations (see comment letter) These will be submitted as an addendum with the construction drawings.

- Inlet structure calculations with design point references

Channel/ditch/swale calculations



HGLs will be submitted as Addendum with Construction Drawings.
Manning's calculations included in report Appendix A.

- Pipe calculations, at a minimum using "Manning's" formula for open channel flow (see comment letter)
- Street capacity calculations *revise per comment letter* (letter)

Water Quality Calculations

- % impervious calculations (composite) for site *IRF needed* Added to Appendix A
- UDFCD Volume 2 spreadsheet copy or printouts

Detention Pond Calculations (if applicable)

- Outlet structure input data (orifice, weir, grate, elevation, pipes, etc.)
- Pond geometry data (contour elevations and areas)
- Output data (staged flow discharges (i.e. – release rates), water surface elevations for staged discharges, exit flow velocities, storage volumes, etc.)

Drainage Maps *Proposed*

- Existing Condition
 - Property boundary with label or legend item
 - Streets with labels
 - Curb and gutter with type noted *Included in DR-02 and updated to indicate curb type for bumpouts*
 - Buildings, parking and landscape areas with labels *(label park & firesta parcel)*
 - Existing contours
 - Lot labels *Added to DR-02 and DR-03*
 - Storm pipe and structures labeled with size, material and type (and condition if applicable)
 - Ditches/swales/channels with labels and grades (and cross section identifier if applicable)
 - Design point identifier
 - Basin boundaries with label or legend item
 - Adjacent development plat name labels
 - Flow arrows
 - Basin identifiers
 - Basin summary table
 - Design point summary
- Drainage easements or tracts with labels *Added tract labels*
- NA* 100 yr. floodplain (if applicable) with label or legend reference
- Discharge values at key locations (typically site inflow and outflow locations minimum)
- Off-site basins with labels
- (see above)* Proposed Conditions (same as for existing conditions with the exception of proposed facilities to include site structures (e.g. – buildings, parking lot, ponds, etc.), storm system and proposed contours)
- NA* Grading and Erosion Control Plan in map pocket (if applicable, see above for more information)