INNOVATIVE DESIGN. **CLASSIC RESULTS.**

PRELIMINARY/FINAL DRAINAGE REPORT FOR FLYING HORSE NO. 13 CAPRI FILING NO. 1 & 2

February 2019

Prepared for:
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Job no. 1171.36

PRELIMINARY/FINAL DRAINAGE REPORT FOR FLYING HORSE NO. 13 CAPRI FILING NO. 1 & 2

Engineer's Statement

This report and plan for the drainage design of **Flying Horse No. 13 Capri Filing No. 1 & 2** was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SIGNATURE (Affix Seal):_____

David Lee Gibson Colorado P.E. No. 46477 Date

Developer's Statement

Pulpit Rock Investments LLC hereby certifies that the drainage facilities for **Flying Hose No. 13 Capri Filing No. 1 & 2** shall be constructed according to the design presented in this report. I understand that the City of Colorado Springs does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that are submitted to the City of Colorado Springs pursuant to section 7.7.906 of the City Code; and cannot, on behalf of **Pulpit Rock Investments LLC**, guarantee that final drainage design review will absolve **Pulpit Rock Investments LLC** and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Pulpit Rock Investments LLC
Name of Developer

_____
Signed Name

Mr. Drew Balsick
Printed Name

Vice President
Title

6385 Corporate Drive, Suite 200
Colorado Springs, CO 80919
Address:

City of Colorado Springs Statement:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

_____ _____
For City Engineer Date

Conditions:

CLASSIC CONSULTING ENGINEERS & SURVEYORS

PRELIMINARY/FINAL DRAINAGE REPORT FOR FLYING HORSE NO. 13 CAPRI FILING NO. 1 & 2

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CLASSIC CONSULTING ENGINEERS & SURVEYORS

PRELIMINARY/FINAL DRAINAGE REPORT FOR FLYING HORSE NO. 13 CAPRI FILING NO. 1 & 2

PURPOSE

This document is the Final Drainage Report for Flying Horse No. 13 Capri Filing No. 1 & 2. The purpose of this report is to identify onsite and offsite drainage patterns, and areas tributary to the site, and to safely route developed storm water runoff to adequate outfall facilities.

GENERAL DESCRIPTION

Please consider this the Final Drainage Report for Flying Horse No. 13 Capri Filing No. 1 & 2. This report is being written to accompany the Flying Horse No. 13 Capri Filing No. 1 & 2 Development Plan and Plats. Flying Horse No. 13 Capri Filing No. 1 & 2 is 23.46 acres of proposed residential development in a portion of section 21, township 12 south, range 66 west of the sixth principal meridian, state of Colorado, city of Colorado Springs, El Paso County. The site is located east of Running Water Drive, west of Hwy 83, north of New Life Drive. This Development Plan proposes to develop approximately 23.46 acres into 93 small lot PUD residential single-family lots and tracts.

According to the Soil Survey of El Paso County Area, Colorado, prepared by the U.S. Department of Agriculture Soil Conservation Service, the soils underlying the site consist of Soil Type "83" Stapleton Sandy Loam classification. This classification is considered a Hydrologic Group "B" (See Appendix).

EXISTING DRAINAGE CONDITIONS

The site is located within the Elkhorn Drainage Basin with existing slopes ranging from 1% to 9% and ground cover being predominantly native grasses. This site has been previously studied in the "Final Drainage Report for Reserve at Northcreek and Addendum to The Master Development Drainage Plan for Marketplace at Interquest and Final Drainage Report for Marketplace at Interquest Filing No. 1 and Filing No. 2" by Catamount Engineering approved June 2017 as Basin 10B and O2B.

Currently there is an existing public 24" RCP Storm sewer culvert located at the intersection of New Life Drive and Running Water Drive. The existing 24" RCP storm sewer culvert in previous reports was to receive a total flow of Q= 35 cfs from the development of the 44+ acres of the Flying Horse Master Plan in the Elkhorn Basin. (Basin O2B), now proposed Flying Horse No. 13 Capri Filing No. 1 & 2 and future Flying Horse No. 17.

Per previous reports detention to historic rates is required.

PROPOSED DRAINAGE CONDITIONS

Reference drainage map in appendix along with proposed conditions description below.

Design Point 1 (Q_5= 7 cfs, Q_{100}= 20 cfs) consists of flows from Basin A. Basin A is 6.25 acres of proposed residential with associated streets, landscaping and homes. Developed flows will travel to Design Point 1 where a proposed public 10' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a residential street with Type 1 curb and gutter at 4.00% is Q_5= 12.7 cfs (1/2 street), Q_{100}= 41.6 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 24" RCP storm sewer (see appendix for capacity Pipe 1). The emergency overflow route for this inlet will overtop the crown or the road to Design Point 2.

Design Point 2 (Q_5= 0.40 cfs, Q_{100}= 1 cfs) consists of flows from Basin B. Basin B is 0.08 acres of proposed residential road and landscaping. Developed flows will travel to Design Point 2 where a proposed public 4' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a residential street with Type 1 curb and gutter at 4.00% is Q_5= 8.7cfs (1/2 street), Q_{100}= 41.6 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 24" RCP storm sewer (see appendix for capacity, Pipe 2). The emergency overflow route for this inlet will be the intersection of Sweet Water Road and Corn Creek Ct. then to Design Point 3.

Design Point 3 (Q_5= 7 cfs, Q_{100}= 21 cfs) consists of flows from Basins C. Basin C is 7.13 acres of proposed residential with associated streets, landscaping and homes. Developed flows will travel to Design Point 3 where a proposed public 10' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a residential street with Type 1 curb and gutter at 2.25% is Q_5= 12.7 cfs (1/2 street), Q_{100}= 57.7 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 24" RCP storm sewer (see appendix for capacity Pipe 3). The emergency overflow route for this inlet will overtop the crown in the road to Design Point 4.

Design Point 4 (Q_5= 1 cfs, Q_{100}= 2 cfs) consists of flows from Basin D. Basin D is 0.35 acres proposed residential road with landscaping. Developed flows will travel to Design Point 4 where a proposed public 4' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a residential street with Type 5 curb and gutter at 2.25% is Q_5= 12.7 cfs (1/2 street), Q_{100}= 57.7 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 18" RCP storm sewer (see appendix for capacity Pipe 4). The emergency overflow route for this inlet will be the intersection of Sangria Road and Sweet Water Road, then to Design Point 9.

Design Point 5 (Q_5= 3 cfs, Q_{100}= 5 cfs) consists of flows from Basin E. Basin E is 0.91 acres of proposed collector roadway with landscaping. Developed flows will travel in the curb line of Cretto Road to Design Point 4 where a proposed public 4' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a collector street with Type 1 curb and gutter at 1.50% is Q_5= 8.9 cfs (1/2 street), Q_{100}= 80.2 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 18" RCP storm sewer (see appendix for capacity Pipe 7). The emergency overflow route for this inlet will overtop the crown of the road to Design Point 6.

Design Point 6 (Q_5= 1 cfs, Q_{100}= 2 cfs) consists of flows from Basin F. Basin F is 0.25 acres of proposed collector roadway with landscaping. Developed flows will travel in the curb line of Cretto Road to Design Point 5 where a proposed public 4' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a collector street with Type 1 curb and gutter at 1.50% is Q_5= 8.9 cfs (1/2 street), Q_{100}= 80.2 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 18" RCP storm sewer (see appendix for capacity Pipe 8). The emergency overflow route for this inlet will overtop the highpoint in Cretto Road to the north New Life Drive curb line.

Design Point 7 (Q_5= 1 cfs, Q_{100}=5 cfs) consists of flows from Basins G. Basin G is 0.91 acres of proposed residential with associated streets, landscaping and homes. Developed flows will travel to Design Point 7 where a proposed public 4' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a residential street with Type 1 curb and gutter at 2.00% is Q_5= 6.1 cfs (1/2 street), Q_{100}= 51.2 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 18" RCP storm sewer (see appendix for capacity Pipe 9). The emergency overflow route for this inlet will overtop the curb in the parking area to a proposed swale, then to the proposed private extended detention basin in Tract F of Filing No. 1.

Design Point 8 (Q_5= 2 cfs, Q_{100}= 7 cfs) consists of flows from Basin H. Basin H is 2.10 acres proposed residential with associated streets, landscaping and homes. Developed flows will travel to Design Point 8 where a proposed public 4' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a residential street with Type 1 curb and gutter at 2.00% is Q_5= 6.1 cfs (1/2 street), Q_{100}= 51.2 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 18" RCP storm sewer (see appendix for capacity Pipe 10). The emergency overflow route for this inlet will overtop the curb and to the proposed private extended detention basin in Tract F of Filing No. 1.

Design Point 9 (Q_5= 1 cfs, Q_{100}= 4 cfs) consists of flows from Basin J. Basin J is 1.23 acres proposed residential with associated streets, landscaping and homes. Developed flows will travel to Design Point 9 where a proposed public 4' D-10-R sump inlet will completely intercept flows (see appendix for inlet capacity). Street Capacity for a residential street with Type 1 curb and gutter at 2.00% is Q_5= 6.1 cfs (1/2 street), Q_{100}= 51.2 cfs (to ROW) at this design point. Flows will be conveyed by a proposed public 18" RCP storm sewer (see appendix for capacity Pipe 11). The emergency overflow route for this inlet will overtop the curb and to the proposed private extended detention basin in Tract F of Filing No. 1.

Design Point 10 (Q_5= 24 cfs, Q_{100}= 67 cfs) consists of flows from Pipes 6, 10 & 11 and Basin I. This design point represents the total flow reaching the proposed private full spectrum detention facility EDB. Basin I is 1.43 acres of proposed landscaped pond area, tract and residential lots.

Design Point 11 (Q_5= 0.70 cfs, Q_{100}= 3 cfs) consists of flows from Basin L and Basin M. Basin L is 0.53 acres proposed residential with associated streets, landscaping and homes. Basin M is 0.65 acres proposed residential with associated streets, landscaping and homes. Developed flows will travel to Design Point 11 where an existing 6' crosspan will carry developed flows along with existing flows in Running Water Drive and New Life Drive to an existing public 4' curb chase in New Life Drive to an existing public 36" RCP storm culvert under Jet Stream Drive. In in he predeveloped condition per the Reserve at Northcreek drainage report basin 10B contributed (Q_5= 1.6 cfs, Q_{100}= 8.2 cfs) to the curb line of Running Water Drive. Design Point 11 represents a reduction of flows to (Q_5= 0.70 cfs, Q_{100}= 3 cfs) form previous Basin 10B. Any roof drains will be route east to the proposed roadway in an attempt to route as much impervious area to the proposed Full Spectrum Detention Facilty.

Basin K (Q_5= 0.3 cfs, Q_{100}= 1 cfs) is 0.46 acres. This basin consists of front yard landscaping, roof, and sidewalk within the single-family lots and undisturbed vegetated slope. Of that 0.46 acres of basin, 0.08 acres is the assumed impervious area (sidewalk, roof) of the residential development. This basin will drain as unconcentrated sheet flow across the undisturbed vegetated slope along its historic path to the adjacent Black Squirrel Creek. Due to the slope constraints of the existing grading the disturbance along this corridor are limited. The physical constraints of the elevations along the existing natural ridgeline make collection of stormwater difficult to capture and treat in the interim condition, and is impractical to access for maintenance. This 0.08 acres of impervious area will sheet flow over approximately 300' +feet of natural grass buffer. Any roof drains will be routed east to the proposed roadway in an attempt to route as much impervious area to the proposed full spectrum detention Facility. Once development occurs north of Flying Horse No. 13 Capri Filing No. 2, flows from this basin will need to be accounted for in the future Full Spectrum Detention Basin for the residential development to the north prior to discharging into Black Squirrel Creek.

Basin N (Q_5= 0.1 cfs, Q_{100}= 1 cfs) is 0.32 acres. This basin consists of tract landscaping and slope. Along the future road west of the proposed roundabout. This basin will drain as unconcentrated sheet flow across the vegetated slope along its historic path to the adjacent Black Squirrel Creek. Due to the slope constraints of the existing grading the disturbance along this corridor are limited. The physical constraints of the elevations along the existing natural ridgeline make collection of stormwater difficult to capture and treat in the interim condition, and is impractical to access for maintenance. This landscaped tract area will sheet flow over approximately 300' +feet of natural grass buffer. Once development occurs north of Flying Horse No. 13 Capri Filing No. 2, flows from this basin will need to be accounted for in the future Full Spectrum Detention Basin for the residential development to the north prior to discharging into Black Squirrel Creek.

Basin OS-1 (Q_5= 4cfs, Q_{100}= 28 cfs) is 22.91 acres of currently undeveloped area (Flying Horse Master Plan Parcel 17) that is the remainder of the 44+ acres of previous reports Basin O2B. A 24" public storm sewer stub will be provided (Pipe 13) and will serve as the outfall for a future full spectrum detention facility that will be provided in the future. Flows will be limited to 1 (Q_5= 1cfs, Q_{100}= 14 cfs). This combined with the flows from the proposed Flying Horse No. 13 Capri Filing No. 1 & 2 private full spectrum detention facility will meet the maximum discharge into the existing public 24" RCP storm culvert under New Life Drive (Pipe 14).

STORM WATER QUALITY/DETENTION

There are multiple existing detention facilities down stream in the Elkhorn Drainage Basin that account for developed flows from Flying Horse No. 13 Capri Filing No. 1 & 2 as well as the remainder of previous Basin O2B, but this is limited to 35 cfs per the various MDDP updates. Flying Horse No. 13 Capri Filing No. 1 & 2 will provide onsite full spectrum detention in a proposed private extended detention basin.

The UD-BMP spreadsheet along with the UD-Detention spreadsheet were used to calculate the required volume for the EURV and 100-year release. User input 1-hour precipitation values in the UD-Detention spreadsheet were taken from Table 6-2 Volume 1 Colorado Springs Drainage Criteria Manual. The UD-BMP IRF spreadsheet (see appendix) was used to calculate the overall total site imperviousness from Basins A, B, C, D, E, F, G, H, I and J to the EDB. This total area is 21.24 acres. Per the spread sheet a 28.6% imperviousness will be used for the total site imperviousness. Per UD-Detention and UD-BMP spreadsheets a 0.260 ac-ft WQCV is required, and a 0.361 ac-ft EURV is required. With a total required Basin Volume of 1.37 ac-ft. The outlet structure will have a 3-hole configuration with 3 individual 1 1/4" diameter holes spaced 12 inches apart. The inlet box will be a 4'x4' grated inlet box 3.00' tall with a 18" RCP storm sewer outlet. A 15' wide 2.0' deep emergency overflow weir will be installed in the pond berm with Type M rip-rap (see appendix for calculation). Flows will be routed to New Life Drive. Planned release per the UD-Detention spreadsheet from the EDB will be Q_5= 0.451 cfs, Q_{100}= 21.8 cfs.

This is below the allowable release rate into this existing system from previous reports. Construction documents for this private full spectrum detention facility will be provided and approved by City Water Resources Division along with the Inspection and Maintenance Plan. This facility will be a private facility with maintenance by the Flying Horse Metro District.

The City of Colorado Springs has required the Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainage ways, and implementing long-term source controls. The Four Step Process pertains to management of smaller, frequently occurring storm events, as opposed to larger storms for which drainage and flood control infrastructure are sized. Implementation of these four steps helps to achieve storm water permit requirements. This site adheres to this Four Step Process as follows:

1. **Employ Runoff Reduction Practices:** Development of project site is proposed single family residential with individual lots with homes and associated landscaping. Following the City of Colorado Springs Small Lot PUD Guidelines provides a greater amount of landscape common open space. Proposed impervious areas (roof tops, patios) will sheet flow across landscaped ground to slow runoff and increase time of concentration prior to being conveyed to the proposed public streets. This will minimize directly connected impervious areas within the project site.

2. **Implement BMP's that provide a Water Quality Capture Volume with slow release:** Runoff from Flying Horse No. 13 Capri Filing No. 1 & 2 will be treated through capture and slow release of the EURV in a permanent Extended Detention Basin designed per current City of Colorado Springs drainage criteria.

3. **Stabilize Drainageways:** This site will utilize existing storm sewer adjacent to the site. An existing public storm system will intercept and direct the on-site development flows further downstream to an existing regional detention facility designed to release at pre-determined allowable rates from existing approved reports.

4. **Implement Site Specific and Other Source Control BMP's**: A site specific storm water quality and erosion control plan and narrative will be submitted and approved by City Engineering prior to any disturbance within the project area. Details such as site specific source control construction BMP's as well as permanent BMP's will be detailed in this plan and narrative to protect receiving waters.

DRAINAGE CRITERIA

Hydrologic calculations were performed using the City of Colorado Springs Drainage Criteria Manual, as revised in May 2014. Stormwater quality analysis and calculations were performed using the Drainage Criteria Manual, Volume 2 and Urban Drainage Flood Control District. The Rational Method was used to estimate stormwater runoff anticipated from design storms for the 2 year, 5 year, and 100 year recurrence interval.

All stormwater flows are within street capacity at per the current Engineering Criteria Manual. All basins/design points have been evaluated to ensure that the gutter capacity has not been exceeded for this development. In the event of clogging or inlet failure, emergency overflow routing for each inlet will either be provided by overtopping the nearby high point in the roadway to the next downstream inlet, or will be provided in an emergency overflow swale between lots in a defined drainage easement or tract.

In addition, where adjacent uphill lots are proposed to drain through a lower adjacent lot (upstream rear yard to downstream rear yard), only one lot is allowed to be conveyed through a downstream lot. Side yard swales are required on the lower lots to convey the combined rear yard drainage to the street.

Storm Sewer plans have not been completed at this time. An addendum to this report at the time of Storm Sewer construction drawing submittal will be required that includes any changes to the initial storm sewer design detailing in this report and additional calculations for the required 5 and 100 year HGL lines.

FLOODPLAIN STATEMENT

No portion of this site is located within a floodplain as determined by the Flood Insurance Rate Maps (F.I.R.M.) Map Number 08041C 0295G effective date, December 7, 2018 (See Appendix).

EROSION CONTROL PLAN

The City of Colorado Springs Drainage Criteria Manual specifies an Erosion Control Plan and associated cost estimate be submitted with the Final Drainage Report. We respectfully request that the Erosion Control Plan and Cost Estimate be submitted in conjunction with the grading plan and construction assurances posted prior to obtaining a grading permit.

DRAINAGE AND BRIDGE FEES FILING NO. 1 & 2

Elkhorn Drainage Basin

This site is included in the Elkhorn Drainage Basin which is a closed basin per the annexation agreements for the area. No fees will be paid.

CONSTRUCTION COST OPINION

Public Drainage Facilities Non-reimbursable

ITEM	DESCRIPTION	QUANTITY	UNIT COST	COST
1.	4' D-10-R Inlet	5 EACH	$3,000/EA	$ 15,000.00
2.	6' D-10-R Inlet	2 EACH	$3,200/EA	$ 6,400.00
3.	10' D-10-R Inlet	2 EACH	$3,400/EA	$ 6,800.00
4.	18" RCP Storm Drain	670 LF	$45/LF	$ 30,150.00
5.	24" RCP Storm Drain	1,845 LF	$50/LF	$ 92,250.00
6.	30" RCP Storm Drain	80 LF	$55/LF	$ 4,400.00
7.	Type II Storm MH	11 EACH	$2,500/EA	$ 27,500.00

SUB-TOTAL	$ 182,500.00
10% ENGINEERING	$ 18,250.00
5% CONTINGENCIES	$ 9,125.00
TOTAL	**$ 209,875.00**

Classic Consulting Engineers & Surveyors cannot and does not guarantee that the construction cost will not vary from these opinions of probable construction costs. These opinions represent our best judgment as design professionals familiar with the construction industry and this development in particular.

SUMMARY

Flows for Flying Horse No. 13 Capri Filing No. 1 & 2 site are proposed to outfall into an existing 24" RCP storm sewer constructed with the development of surrounding areas. Developed flows from Flying Horse No 13 Capri Filing No. 1 & 2 will be treated in a permanent private Full Spectrum EDB to be constructed with this development. This is in general conformance with the previously referenced reports. All drainage facilities were sized using the current City of Colorado Springs Drainage Criteria and will safely discharge storm water runoff to adequate outfalls and will not adversely affect the downstream and surrounding developments.

PREPARED BY:
Classic Consulting Engineers & Surveyors, LLC

David L Gibson P.E.
Project Manager
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REFERENCES

1. City of Colorado Springs Drainage Criteria Manual volumes 1 and 2 dated May 2014.

2. "Final Drainage Report for Reserve at Northcreek and Addendum to the Master Development Drainage Plan for Marketplace at Interquest and Final Drainage Report for Marketplace at Interquest Filing No. 1 and Filing No. 2" by Catamount Engineering dated June, 2017

3. "Master Drainage Plan for Marketplace at Interquest and Final Drainage Report for Marketplace at Interquest Filing No. 1 and Filing No. 2" by Classic Consulting Engineers & Surveyors dated September 2016.

APPENDIX

VICINITY MAP

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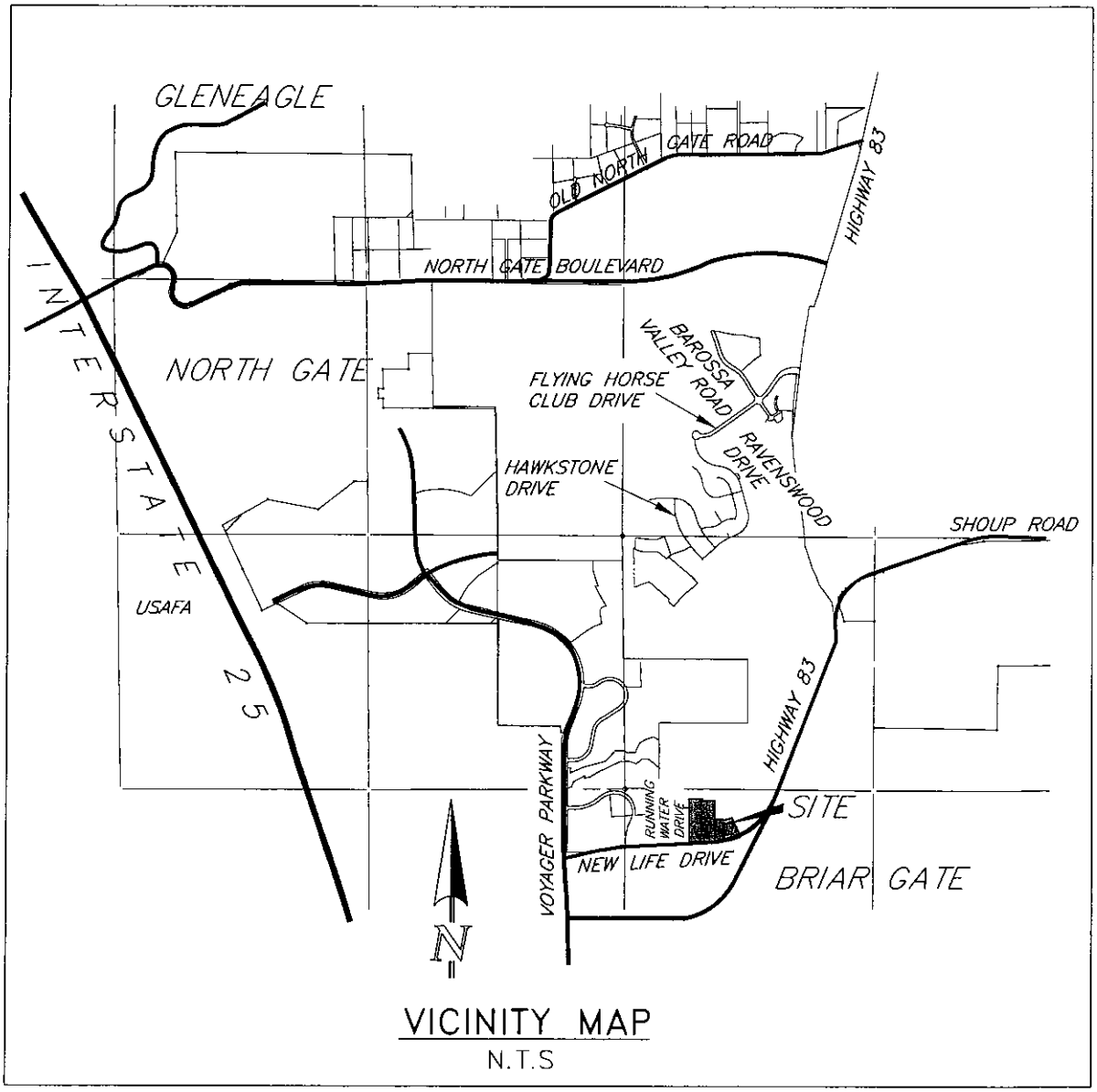
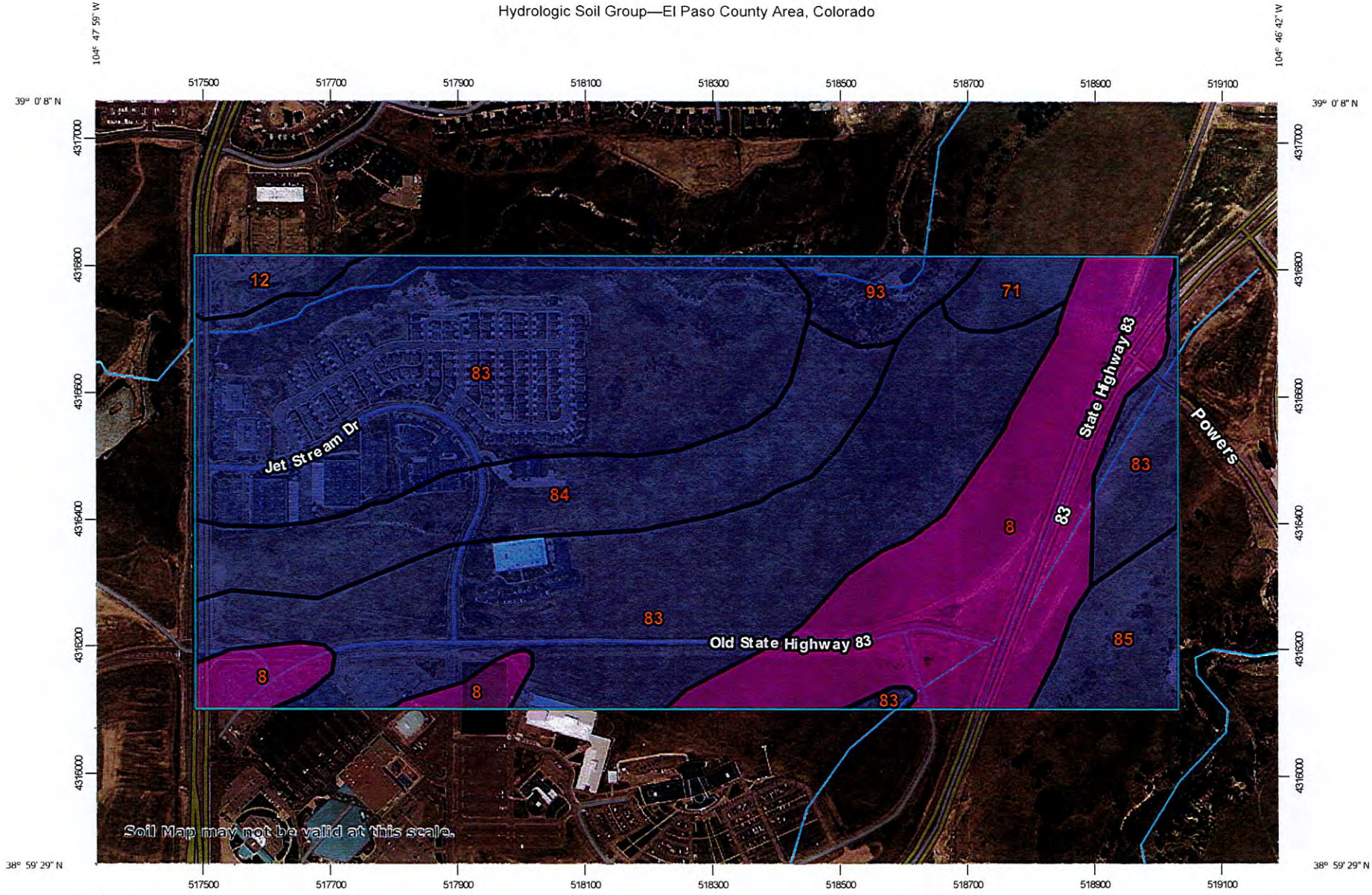


VICINITY MAP

N.T.S

SOILS MAP (S.C.S SURVEY)

CLASSIC℠
CONSULTING
ENGINEERS & SURVEYORS



Map Scale: 1:8,490 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 16, Sep 10, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 15, 2011—Jun 17, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	56.2	20.5%
12	Bresser sandy loam, cool, 3 to 5 percent slopes	B	4.5	1.6%
71	Pring coarse sandy loam, 3 to 8 percent slopes	B	4.7	1.7%
83	Stapleton sandy loam, 3 to 8 percent slopes	B	157.7	57.4%
84	Stapleton sandy loam, 8 to 15 percent slopes	B	33.5	12.2%
85	Stapleton-Bernal sandy loams, 3 to 20 percent slopes	B	10.7	3.9%
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	B	7.2	2.6%
Totals for Area of Interest			**274.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

F.E.M.A. MAP

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National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainag areas of less than one square mile *Zone*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represe an authoritative property location.

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The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/26/2019 at 12:21:22 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

CALCULATIONS

CLASSIC SM
CONSULTING
ENGINEERS & SURVEYORS

JOB NAME: *FLYING HORSE NO. 13 CAPRI FIL. NO. 1 & 2*
JOB NUMBER: *1171.36*
DATE: *02/12/19*
CALCULATED BY: *DLG*

FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

		IMPERVIOUS AREA / STREETS				LANDSCAPE/UNDEVELOPED AREAS				WEIGHTED			WEIGHTED CA		
BASIN	TOTAL AREA (AC)	AREA (AC)	C(2)	C(5)	C(100)	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)
A	6.25	1.60	0.89	0.90	0.96	4.65	0.02	0.08	0.35	0.24	0.29	0.51	**1.52**	**1.81**	**3.16**
B	0.08	0.08	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	**0.07**	**0.07**	**0.08**
C	7.13	1.47	0.89	0.90	0.96	5.66	0.02	0.08	0.35	0.20	0.25	0.48	**1.42**	**1.78**	**3.39**
D	0.35	0.25	0.89	0.90	0.96	0.10	0.02	0.08	0.35	0.64	0.67	0.79	**0.22**	**0.23**	**0.28**
E	0.91	0.51	0.89	0.90	0.96	0.40	0.02	0.08	0.35	0.51	0.54	0.69	**0.46**	**0.49**	**0.63**
F	0.25	0.15	0.89	0.90	0.96	0.10	0.02	0.08	0.35	0.54	0.57	0.72	**0.14**	**0.14**	**0.18**
G	1.51	0.30	0.89	0.90	0.96	1.21	0.02	0.08	0.35	0.19	0.24	0.47	**0.29**	**0.37**	**0.71**
H	2.10	0.48	0.89	0.90	0.96	1.62	0.02	0.08	0.35	0.22	0.27	0.49	**0.46**	**0.56**	**1.03**
I	1.43	0.00	0.89	0.90	0.96	1.43	0.02	0.08	0.35	0.02	0.08	0.35	**0.03**	**0.11**	**0.50**
J	1.23	0.36	0.89	0.90	0.96	0.87	0.02	0.08	0.35	0.27	0.32	0.53	**0.34**	**0.39**	**0.65**
K	0.46	0.00	0.89	0.90	0.96	0.46	0.02	0.08	0.35	0.02	0.08	0.35	**0.01**	**0.04**	**0.16**
L	0.53	0.05	0.89	0.90	0.96	0.48	0.02	0.08	0.35	0.10	0.16	0.41	**0.05**	**0.08**	**0.22**
M	0.65	0.03	0.89	0.90	0.96	0.62	0.02	0.08	0.35	0.06	0.12	0.38	**0.04**	**0.08**	**0.25**
N	0.32	0.00	0.89	0.90	0.96	0.32	0.02	0.08	0.35	0.02	0.08	0.35	**0.01**	**0.03**	**0.11**
OS-1	22.91	0.00	0.89	0.90	0.96	22.91	0.02	0.08	0.35	0.02	0.08	0.35	**0.46**	**1.83**	**8.02**

JOB NAME:	*FLYING HORSE NO. 13 CAPRI FIL. NO. 1 & 2*
JOB NUMBER:	*1171.36*
DATE:	*02/12/19*
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$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{S^{0.33}} \qquad V = C_v S_w^{0.5} \qquad Tc = L/V$$

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)* $t_c = \frac{L}{180} + 10$	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

*For buried riprap, select C_v value based on type of vegetative cover.

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED CA(2)	CA(5)	CA(100)	OVERLAND C(5)	Length (ft)	Height (ft)	Tc (min)	STREET / CHANNEL FLOW Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	Tc TOTAL (min)	INTENSITY I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	TOTAL FLOWS Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
A	1.52	1.81	3.16	0.08	100	4	11.7	300	2.0%	2.8	1.8	13.4	2.94	3.69	6.19	4	7	20
B	0.07	0.07	0.08	0.08	7	0.5	2.5	130	2.0%	2.8	0.0	5.0	4.12	5.17	8.68	0.3	0.4	1
C	1.42	1.78	3.39	0.08	100	4	11.7	300	2.0%	2.8	1.8	13.4	2.94	3.69	6.19	4	7	21
D	0.22	0.23	0.28	0.08	25	1	5.8	130	2.0%	2.8	0.8	6.6	3.79	4.75	7.98	0.9	1	2
E	0.46	0.49	0.63	0.08	7	0.5	2.5	300	2.0%	2.8	1.8	5.0	4.12	5.17	8.68	2	3	5
F	0.14	0.14	0.18	0.08	7	0.5	2.5	300	2.0%	2.8	1.8	5.0	4.12	5.17	8.68	0.6	0.7	2
G	0.29	0.37	0.71	0.08	100	4	11.7	170	2.0%	2.8	1.0	12.7	3.01	3.78	6.34	1	1	5
H	0.46	0.56	1.03	0.08	100	6	10.2	170	2.0%	2.8	1.0	11.2	3.16	3.96	6.65	1	2	7
I	0.03	0.11	0.50	0.08	100	8	9.3	0	0.0%	0.0	0.0	9.3	3.38	4.24	7.12	0.1	0.5	4
J	0.34	0.39	0.65	0.08	100	3	12.8	170	2.0%	2.8	1.0	13.8	2.91	3.64	6.12	0.98	1.43	4.0
K	0.01	0.04	0.16	0.08	150	12	11.4	0	0.0%	0.0	0.0	11.4	3.14	3.94	6.61	0.0	0.1	1
L	0.05	0.08	0.22	0.08	50	2	8.2	0	0.0%	0.0	0.0	8.2	3.53	4.42	7.42	0.2	0.4	1.6
M	0.04	0.08	0.25	0.08	50	2	8.2	0	0.0%	0.0	0.0	8.2	3.53	4.42	7.42	0.1	0.3	1.8
N	0.01	0.03	0.11	0.08	50	24	3.6	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	0.0	0.1	1.0
OS-1	0.46	1.83	8.02	0.08	500	6	38.8	0	0.0%	0.0	0.0	38.8	1.68	2.10	3.52	1	4	28

JOB NAME:	*FLYING HORSE NO. 13 CAPRI FIL. NO. 1 & 2*
JOB NUMBER:	*1171.36*
DATE:	*02/12/19*
CALCULATED BY:	*DLG*

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		
					I(5)	I(100)	Q(5)	Q(100)	Inlet Size
1	BASIN A	1.81	3.16	13.4	3.69	6.19	7	20	10' D-10-R
2	BASIN B	0.07	0.08	5.0	5.17	8.68	0.4	1	4' D-10-R
3	BASIN C	1.78	3.39	13.4	3.69	6.19	7	21	10' D-10-R
4	BASIN D	0.23	0.28	6.6	4.75	7.98	1	2	4' D-10-R
5	BASIN E	0.49	0.63	5.0	5.17	8.68	3	5	4' D-10-R
6	BASIN F	0.14	0.18	5.0	5.17	8.68	1	2	4' D-10-R
7	BASIN G	0.37	0.71	12.7	3.78	6.34	1	5	4' D-10-R
8	BASIN H	0.56	1.03	11.2	3.96	6.65	2	7	4' D-10-R
9	BASIN J	0.39	0.65	13.8	3.64	6.12	1	4	4' D-10-R
10	POND IN (PIPE 6, 9, 10 BASIN D)	6.69	11.25	13.4	3.69	6.19	25	70	N/A
11	BASIN L & BASIN M	0.16	0.46	8.2	4.42	7.42	0.7	3	CROSSPAN

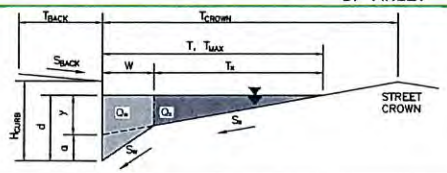
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 1 INLET



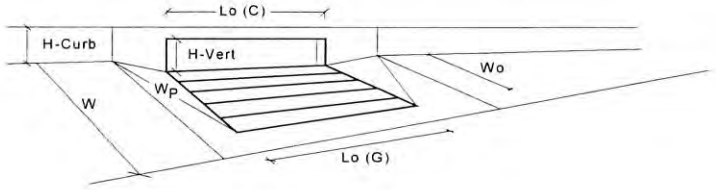
Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	0.02	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.083	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	Colorado Springs D-10-R		MINOR	MAJOR	
Type of Inlet		Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	9.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	0.02	0.02	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.50	0.82	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.57	0.92	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**11.1**	**24.9**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	7.0	20.0	cfs

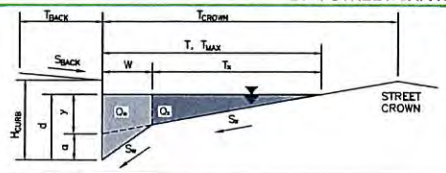
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 1 STREET CAPACITY



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	8.7	41.6	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

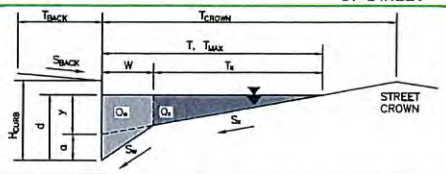
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 2 INLET



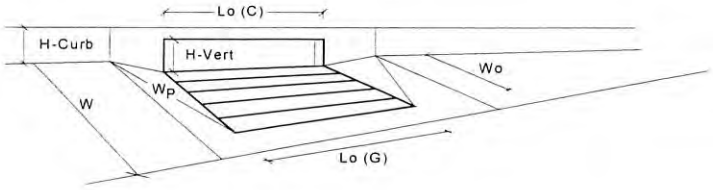
Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	9.8	inches
Grate Information		MINOR	MAJOR	☑ Overnde Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.37	0.69	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**11.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	0.4	1.0	cfs

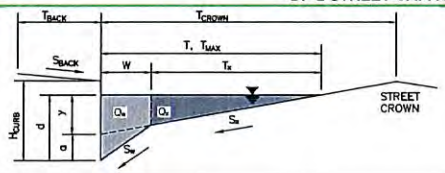
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 2 STREET CAPACITY



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.040	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	8.7	41.6	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

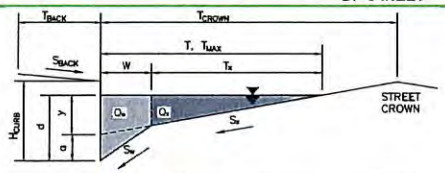
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 3 INLET



Gutter Geometry (Enter data in the blue cells)

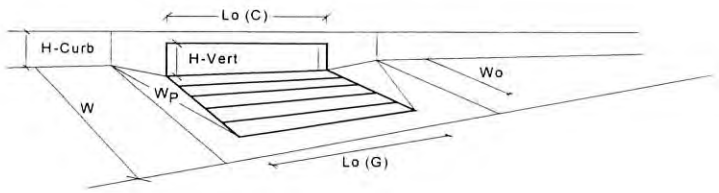
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_w =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_o =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	Colorado Springs D-10-R		MINOR	MAJOR	
Type of Inlet		Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	9.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	10.00	10.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.37	0.69	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.57	0.92	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	0.93	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**9.7**	**26.1**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	7.0	21.0	cfs

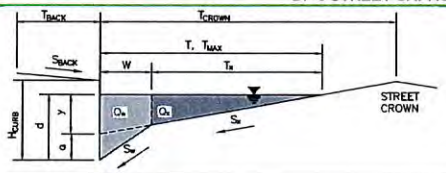
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 3 STREET CAPACITY



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.023	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	12.7	57.7	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

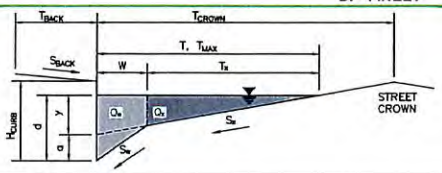
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 4 INLET



Gutter Geometry (Enter data in the blue cells)

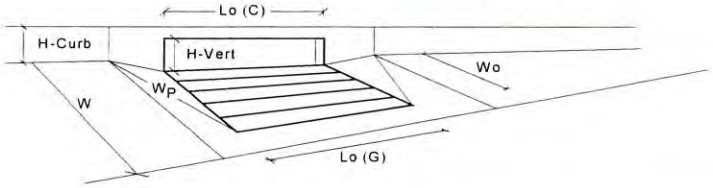
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_w =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_o =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	Colorado Springs D-10-R		MINOR	MAJOR	
Type of Inlet		Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	9.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.37	0.69	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		Q_a =	5.4	11.4	cfs
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	1.0	2.0	cfs

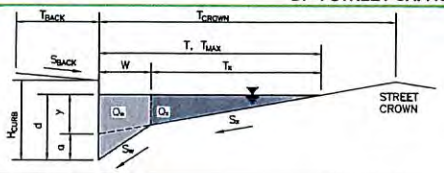
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 4 STREET CAPACITY



Gutter Geometry (Enter data in the blue cells)			
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	17.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.023	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	17.0	17.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☐	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Spread Criterion	Q_{allow} =	12.7	12.7	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

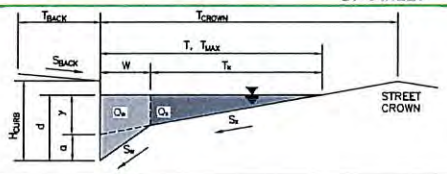
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 5 INLET



Gutter Geometry (Enter data in the blue cells)

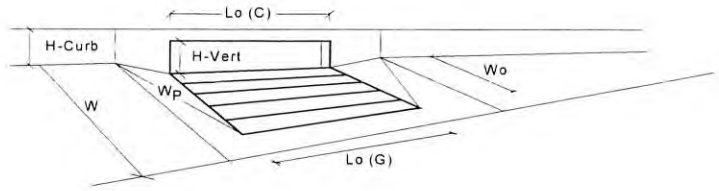
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	12.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	16.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	10.9	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	Colorado Springs D-10-R		MINOR	MAJOR	
Type of Inlet		Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	10.9	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.37	0.78	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**5.4**	**12.0**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	3.0	5.0	cfs

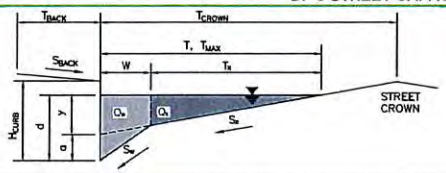
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 5 STREET CAPACITY



Gutter Geometry (Enter data in the blue cells)				
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	12.0		ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020		ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016		
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00		inches
Distance from Curb Face to Street Crown	T_{CROWN} =	16.0		ft
Gutter Width	W =	2.00		ft
Street Transverse Slope	S_x =	0.020		ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_w =	0.065		ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.015		ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020		
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	10.9	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes
		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	8.9	80.2	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

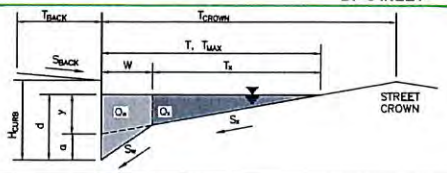
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 6 INLET



Gutter Geometry (Enter data in the blue cells)

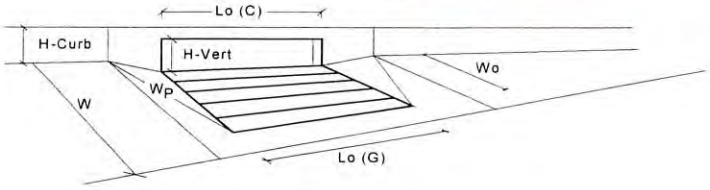
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	12.0	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	16.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	16.0	16.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)	Colorado Springs D-10-R		MINOR	MAJOR	
Type of Inlet		Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)		a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)		No =	1	1	
Water Depth at Flowline (outside of local depression)		Ponding Depth =	6.0	9.8	inches
Grate Information			MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate		L_o (G) =	N/A	N/A	feet
Width of a Unit Grate		W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)		A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)		C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)		C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)		C_o (G) =	N/A	N/A	
Curb Opening Information			MINOR	MAJOR	
Length of a Unit Curb Opening		L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches		H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches		H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)		Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)		W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)		C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)		C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)		C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)			MINOR	MAJOR	
Depth for Grate Midwidth		d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation		d_{Curb} =	0.37	0.69	ft
Combination Inlet Performance Reduction Factor for Long Inlets		$RF_{Combination}$ =	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets		RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets		RF_{Grate} =	N/A	N/A	
			MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)		**Q_a =**	**5.4**	**11.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)		$Q_{PEAK\ REQUIRED}$ =	1.0	2.0	cfs

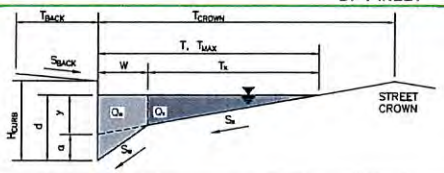
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 7 INLET



Gutter Geometry (Enter data in the blue cells)

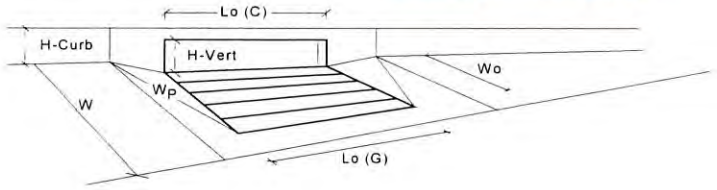
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	9.8	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.37	0.69	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	5.4	11.4	cfs
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.0	5.0	cfs

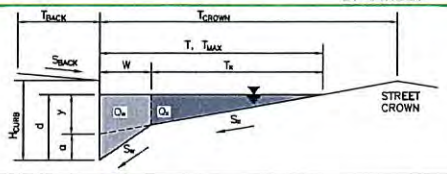
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 8 INLET



Gutter Geometry (Enter data in the blue cells)

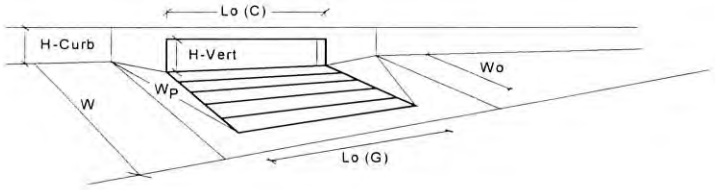
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_W =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	9.8	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.37	0.69	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	Q_a =	5.4	11.4	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	2.0	7.0	cfs

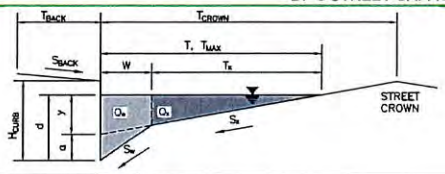
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 8 STREET CAPACITY



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_w =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_O =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	6.1	51.2	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

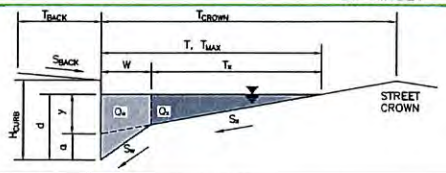
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 9 INLET



Gutter Geometry (Enter data in the blue cells)

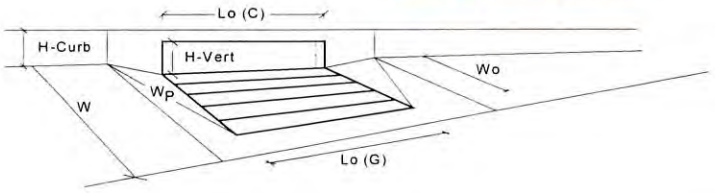
Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_w =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_o =	0.000	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Depth Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	SUMP	SUMP	cfs

INLET IN A SUMP OR SAG LOCATION

Version 4.05 Released March 2017



Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	Colorado Springs D-10-R		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	4.00	4.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	9.8	inches
Grate Information		MINOR	MAJOR	☑ Override Depths
Length of a Unit Grate	L_o (G) =	N/A	N/A	feet
Width of a Unit Grate	W_o =	N/A	N/A	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	A_{ratio} =	N/A	N/A	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	C_f (G) =	N/A	N/A	
Grate Weir Coefficient (typical value 2.15 - 3.60)	C_w (G) =	N/A	N/A	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	C_o (G) =	N/A	N/A	
Curb Opening Information		MINOR	MAJOR	
Length of a Unit Curb Opening	L_o (C) =	4.00	4.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	8.00	8.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	8.00	8.00	inches
Angle of Throat (see USDCM Figure ST-5)	Theta =	81.00	81.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	W_p =	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	C_f (C) =	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	C_w (C) =	3.60	3.60	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
Low Head Performance Reduction (Calculated)		MINOR	MAJOR	
Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
Depth for Curb Opening Weir Equation	d_{Curb} =	0.37	0.69	ft
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	0.85	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**11.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	$Q_{PEAK\ REQUIRED}$ =	1.0	4.0	cfs

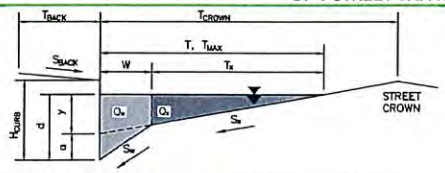
Version 4.05 Released March 2017

ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)

Project: FLYING HORSE NO. 13 CAPRI FILING 1 & 2

Inlet ID: DP 9 STREET CAPACITY



Gutter Geometry (Enter data in the blue cells)

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =	7.5	ft
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S_{BACK} =	0.020	ft/ft
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n_{BACK} =	0.016	
Height of Curb at Gutter Flow Line	H_{CURB} =	8.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	13.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_x =	0.020	ft/ft
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S_w =	0.065	ft/ft
Street Longitudinal Slope - Enter 0 for sump condition	S_o =	0.020	ft/ft
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n_{STREET} =	0.020	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	13.0	13.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	9.8	inches
Allow Flow Depth at Street Crown (leave blank for no)		☐	☑	check = yes

		Minor Storm	Major Storm	
MINOR STORM Allowable Capacity is based on Spread Criterion				
MAJOR STORM Allowable Capacity is based on Depth Criterion	Q_{allow} =	6.1	51.2	cfs

Minor storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

Major storm max. allowable capacity GOOD - greater than the design flow given on sheet 'Inlet Management'

JOB NAME: *FLYING HORSE NO. 13 CAPRI FIL. NO. 1 & 2*
JOB NUMBER: *1171.36*
DATE: *02/12/19*
CALCULATED BY: *DLG*

* PIPES ARE LISTED AT MAXIMUM SIZE REQUIRED TO ACCOMMODATE Q100 FLOWS AT MINIMUM GRADE. REFER TO INDIVIDUAL PIPE SHEETS FOR HYDRAULIC INFORMATION.

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins/Design Points	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity		Flow		
					I(5)	I(100)	Q(5)	Q(100)	Pipe Size*
1	DP 1	1.81	3.16	13.42	3.69	6.19	7	20	24" RCP STORM
2	DP 2 & PIPE 1	1.88	3.24	13.42	3.69	6.19	7	20	24" RCP STORM
3	DP 3	1.78	3.39	13.42	3.69	6.19	7	21	24" RCP STORM
4	DP 4	0.23	0.28	6.6	4.75	7.98	1	2	18" RCP STORM
5	PIPE 3 & PIPE 4	2.01	3.67	13.4	3.69	6.19	7	23	24" RCP STORM
6	PIPE 2 & PIPE 5	3.89	6.91	13.4	3.69	6.19	14	43	30" RCP STORM
7	DP 5	0.49	0.63	5.0	5.17	8.68	3	5	18" RCP STORM
8	DP 6 & PIPE 7	0.63	0.81	5.0	5.17	8.68	3	7	18" RCP STORM
9	DP 7 & PIPE 8	1.00	1.52	12.7	3.78	6.34	4	10	18" RCP STORM
10	DP 8 & PIPE 9	1.56	2.55	12.7	3.78	6.34	6	16	24" RCP STORM
11	DP 9	0.39	0.65	13.8	3.64	6.12	1	4	18" RCP STORM
12	POND OUT	0.35	8.30	58.24	1.49	2.49	0.5	21	24" RCP STORM
13	BASIN OS-2 ALLOWABLE	0.35	5.75	58.0	1.49	2.50	1	14	24" RCP STORM
14	PIPE 11 & 12-- 35 CFS MAX	0.70	14.05	58.2	1.49	2.49	1	35	24" RCP STORM

Worksheet for PIPE 1

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	20.00	ft^3/s

Results

Normal Depth	1.46	ft
Flow Area	2.46	ft^2
Wetted Perimeter	4.10	ft
Hydraulic Radius	0.60	ft
Top Width	1.77	ft
Critical Depth	1.61	ft
Percent Full	73.1	%
Critical Slope	0.00812	ft/ft
Velocity	8.13	ft/s
Velocity Head	1.03	ft
Specific Energy	2.49	ft
Froude Number	1.22	
Maximum Discharge	24.33	ft^3/s
Discharge Full	22.62	ft^3/s
Slope Full	0.00782	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	73.08	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 1

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.46	ft
Critical Depth	1.61	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00812	ft/ft

Worksheet for PIPE 2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	19.00	ft³/s

Results

Normal Depth	1.40	ft
Flow Area	2.36	ft²
Wetted Perimeter	3.97	ft
Hydraulic Radius	0.59	ft
Top Width	1.83	ft
Critical Depth	1.57	ft
Percent Full	70.2	%
Critical Slope	0.00769	ft/ft
Velocity	8.07	ft/s
Velocity Head	1.01	ft
Specific Energy	2.41	ft
Froude Number	1.25	
Maximum Discharge	24.33	ft³/s
Discharge Full	22.62	ft³/s
Slope Full	0.00705	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	70.18	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 2

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.40	ft
Critical Depth	1.57	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00769	ft/ft

Worksheet for PIPE 3

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	21.00	ft³/s

Results

Normal Depth	1.52	ft
Flow Area	2.57	ft²
Wetted Perimeter	4.24	ft
Hydraulic Radius	0.61	ft
Top Width	1.70	ft
Critical Depth	1.64	ft
Percent Full	76.2	%
Critical Slope	0.00859	ft/ft
Velocity	8.18	ft/s
Velocity Head	1.04	ft
Specific Energy	2.56	ft
Froude Number	1.17	
Maximum Discharge	24.33	ft³/s
Discharge Full	22.62	ft³/s
Slope Full	0.00862	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	76.18	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 3

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.52	ft
Critical Depth	1.64	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00859	ft/ft

Worksheet for PIPE 4

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	1.50	ft
Discharge	2.00	ft^3/s

Results

Normal Depth	0.44	ft
Flow Area	0.44	ft^2
Wetted Perimeter	1.72	ft
Hydraulic Radius	0.25	ft
Top Width	1.37	ft
Critical Depth	0.53	ft
Percent Full	29.6	%
Critical Slope	0.00495	ft/ft
Velocity	4.58	ft/s
Velocity Head	0.33	ft
Specific Energy	0.77	ft
Froude Number	1.43	
Maximum Discharge	11.30	ft^3/s
Discharge Full	10.50	ft^3/s
Slope Full	0.00036	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	29.57	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 4

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.44	ft
Critical Depth	0.53	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00495	ft/ft

Worksheet for PIPE 5

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	21.00	ft^3/s

Results

Normal Depth	1.52	ft
Flow Area	2.57	ft^2
Wetted Perimeter	4.24	ft
Hydraulic Radius	0.61	ft
Top Width	1.70	ft
Critical Depth	1.64	ft
Percent Full	76.2	%
Critical Slope	0.00859	ft/ft
Velocity	8.18	ft/s
Velocity Head	1.04	ft
Specific Energy	2.56	ft
Froude Number	1.17	
Maximum Discharge	24.33	ft^3/s
Discharge Full	22.62	ft^3/s
Slope Full	0.00862	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	76.18	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 5

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.52	ft
Critical Depth	1.64	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00859	ft/ft

Worksheet for PIPE 6

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.50	ft
Discharge	40.00	ft^3/s

Results

Normal Depth	2.00	ft
Flow Area	4.20	ft^2
Wetted Perimeter	5.52	ft
Hydraulic Radius	0.76	ft
Top Width	2.01	ft
Critical Depth	2.13	ft
Percent Full	79.8	%
Critical Slope	0.00893	ft/ft
Velocity	9.52	ft/s
Velocity Head	1.41	ft
Specific Energy	3.40	ft
Froude Number	1.16	
Maximum Discharge	44.12	ft^3/s
Discharge Full	41.01	ft^3/s
Slope Full	0.00951	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	79.83	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 6

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	2.00	ft
Critical Depth	2.13	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00893	ft/ft

Worksheet for PIPE 7

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	1.50	ft
Discharge	5.00	ft^3/s

Results

Normal Depth	0.73	ft
Flow Area	0.85	ft^2
Wetted Perimeter	2.31	ft
Hydraulic Radius	0.37	ft
Top Width	1.50	ft
Critical Depth	0.86	ft
Percent Full	48.6	%
Critical Slope	0.00577	ft/ft
Velocity	5.87	ft/s
Velocity Head	0.54	ft
Specific Energy	1.26	ft
Froude Number	1.37	
Maximum Discharge	11.30	ft^3/s
Discharge Full	10.50	ft^3/s
Slope Full	0.00227	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	48.57	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 7

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.73	ft
Critical Depth	0.86	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00577	ft/ft

Worksheet for PIPE 8

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	1.50	ft
Discharge	7.00	ft^3/s

Results

Normal Depth	0.90	ft
Flow Area	1.10	ft^2
Wetted Perimeter	2.65	ft
Hydraulic Radius	0.42	ft
Top Width	1.47	ft
Critical Depth	1.02	ft
Percent Full	59.7	%
Critical Slope	0.00676	ft/ft
Velocity	6.36	ft/s
Velocity Head	0.63	ft
Specific Energy	1.52	ft
Froude Number	1.30	
Maximum Discharge	11.30	ft^3/s
Discharge Full	10.50	ft^3/s
Slope Full	0.00444	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	59.69	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 8

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.90	ft
Critical Depth	1.02	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00676	ft/ft

Worksheet for PIPE 9

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	1.50	ft
Discharge	10.00	ft^3/s

Results

Normal Depth	1.17	ft
Flow Area	1.48	ft^2
Wetted Perimeter	3.25	ft
Hydraulic Radius	0.46	ft
Top Width	1.24	ft
Critical Depth	1.22	ft
Percent Full	78.0	%
Critical Slope	0.00921	ft/ft
Velocity	6.77	ft/s
Velocity Head	0.71	ft
Specific Energy	1.88	ft
Froude Number	1.09	
Maximum Discharge	11.30	ft^3/s
Discharge Full	10.50	ft^3/s
Slope Full	0.00906	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	77.96	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 9

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.17	ft
Critical Depth	1.22	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00921	ft/ft

Worksheet for PIPE 10

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	16.00	ft^3/s

Results

Normal Depth	1.24	ft
Flow Area	2.05	ft^2
Wetted Perimeter	3.63	ft
Hydraulic Radius	0.56	ft
Top Width	1.94	ft
Critical Depth	1.44	ft
Percent Full	62.1	%
Critical Slope	0.00661	ft/ft
Velocity	7.81	ft/s
Velocity Head	0.95	ft
Specific Energy	2.19	ft
Froude Number	1.34	
Maximum Discharge	24.33	ft^3/s
Discharge Full	22.62	ft^3/s
Slope Full	0.00500	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	62.07	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 10

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.24	ft
Critical Depth	1.44	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00661	ft/ft

Worksheet for PIPE 11

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	4.00	ft^3/s

Results

Normal Depth	0.57	ft
Flow Area	0.74	ft^2
Wetted Perimeter	2.25	ft
Hydraulic Radius	0.33	ft
Top Width	1.81	ft
Critical Depth	0.70	ft
Percent Full	28.5	%
Critical Slope	0.00449	ft/ft
Velocity	5.43	ft/s
Velocity Head	0.46	ft
Specific Energy	1.03	ft
Froude Number	1.50	
Maximum Discharge	24.33	ft^3/s
Discharge Full	22.62	ft^3/s
Slope Full	0.00031	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	28.47	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 11

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.57	ft
Critical Depth	0.70	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00449	ft/ft

Worksheet for PIPE 12

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	10.00	ft^3/s

Results

Normal Depth	0.93	ft
Flow Area	1.43	ft^2
Wetted Perimeter	3.00	ft
Hydraulic Radius	0.48	ft
Top Width	2.00	ft
Critical Depth	1.13	ft
Percent Full	46.5	%
Critical Slope	0.00520	ft/ft
Velocity	6.98	ft/s
Velocity Head	0.76	ft
Specific Energy	1.69	ft
Froude Number	1.45	
Maximum Discharge	24.33	ft^3/s
Discharge Full	22.62	ft^3/s
Slope Full	0.00195	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	46.54	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 12

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	0.93	ft
Critical Depth	1.13	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00520	ft/ft

Worksheet for PIPE 13

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.01000	ft/ft
Diameter	2.00	ft
Discharge	21.00	ft^3/s

Results

Normal Depth	1.52	ft
Flow Area	2.57	ft^2
Wetted Perimeter	4.24	ft
Hydraulic Radius	0.61	ft
Top Width	1.70	ft
Critical Depth	1.64	ft
Percent Full	76.2	%
Critical Slope	0.00859	ft/ft
Velocity	8.18	ft/s
Velocity Head	1.04	ft
Specific Energy	2.56	ft
Froude Number	1.17	
Maximum Discharge	24.33	ft^3/s
Discharge Full	22.62	ft^3/s
Slope Full	0.00862	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	76.18	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 13

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.52	ft
Critical Depth	1.64	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00859	ft/ft

Worksheet for PIPE 14

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.013	
Channel Slope	0.03000	ft/ft
Diameter	2.00	ft
Discharge	35.00	ft^3/s

Results

Normal Depth	1.47	ft
Flow Area	2.48	ft^2
Wetted Perimeter	4.13	ft
Hydraulic Radius	0.60	ft
Top Width	1.76	ft
Critical Depth	1.92	ft
Percent Full	73.7	%
Critical Slope	0.02086	ft/ft
Velocity	14.10	ft/s
Velocity Head	3.09	ft
Specific Energy	4.56	ft
Froude Number	2.09	
Maximum Discharge	42.15	ft^3/s
Discharge Full	39.18	ft^3/s
Slope Full	0.02394	ft/ft
Flow Type	SuperCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	73.70	%
Downstream Velocity	Infinity	ft/s

Worksheet for PIPE 14

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.47	ft
Critical Depth	1.92	ft
Channel Slope	0.03000	ft/ft
Critical Slope	0.02086	ft/ft

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input

Calculated cells

Designer: dlg
Company: CLASSIC CONSULTING
Date: February 12, 2019
Project: FLYING HORSE NO. 13 CAPRI FIL. 1 & 2
Location:

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.53	inches
***Minor Storm: 1-Hour Rain Depth	5-Year Event	1.50	inches
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches
Optional User Defined Storm	CUHP		
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event	2.52	

Max Intensity for Optional User Defined Storm: 2.51496

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	A	B	C	D	E&F	G	H	I	J					
Receiving Pervious Area Soil Type	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand					
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	6.250	0.080	7.130	0.350	1.160	1.510	2.100	1.430	1.230					
Directly Connected Impervious Area (DCIA, acres)	1.870	0.080	1.190	0.250	0.660	0.300	0.370	0.000	0.250					
Unconnected Impervious Area (UIA, acres)	0.320	0.000	0.420	0.000	0.000	0.090	0.110	0.080	0.080					
Receiving Pervious Area (RPA, acres)	2.630	0.000	4.370	0.000	0.500	0.510	1.030	0.320	0.830					
Separate Pervious Area (SPA, acres)	1.430	0.000	1.150	0.100	0.000	0.610	0.590	1.030	0.070					
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	C	C	C	C	C	C	C	C	C					

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	6.250	0.080	7.130	0.350	1.160	1.510	2.100	1.430	1.230					
Directly Connected Impervious Area (DCIA, %)	29.9%	100.0%	16.7%	71.4%	56.9%	19.9%	17.6%	0.0%	20.3%					
Unconnected Impervious Area (UIA, %)	5.1%	0.0%	5.9%	0.0%	0.0%	6.0%	5.2%	5.6%	6.5%					
Receiving Pervious Area (RPA, %)	42.1%	0.0%	61.3%	0.0%	43.1%	33.8%	49.0%	22.4%	67.5%					
Separate Pervious Area (SPA, %)	22.9%	0.0%	16.1%	28.6%	0.0%	40.4%	28.1%	72.0%	5.7%					
A_a (RPA + UIA)	8.219	0.000	10.405	0.000	0.000	5.667	9.364	4.000	10.375					
I_a Check	0.110	1.000	0.090	1.000	1.000	0.150	0.100	0.200	0.090					
f / I for WQCV Event:	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6					
f / I for 5-Year Event:	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5					
f / I for 100-Year Event:	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4					
f / I for Optional User Defined Storm CUHP:	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39					
IRF for WQCV Event:	0.24	1.00	0.19	1.00	1.00	0.32	0.22	0.43	0.19					
IRF for 5-Year Event:	0.46	1.00	0.38	1.00	1.00	0.63	0.42	0.84	0.38					
IRF for 100-Year Event:	0.48	1.00	0.39	1.00	1.00	0.65	0.43	0.86	0.39					
IRF for Optional User Defined Storm CUHP:	0.48	1.00	0.39	1.00	1.00	0.65	0.43	0.86	0.39					
Total Site Imperviousness: I_{total}	35.0%	100.0%	22.6%	71.4%	56.9%	25.8%	22.9%	5.6%	26.8%					
Effective Imperviousness for WQCV Event:	31.1%	100.0%	17.8%	71.4%	56.9%	21.8%	18.7%	2.4%	21.6%					
Effective Imperviousness for 5-Year Event:	32.3%	100.0%	18.9%	71.4%	56.9%	23.6%	19.8%	4.7%	22.8%					
Effective Imperviousness for 100-Year Event:	32.4%	100.0%	19.0%	71.4%	56.9%	23.7%	19.9%	4.8%	22.9%					
Effective Imperviousness for Optional User Defined Storm CUHP:	32.4%	100.0%	19.0%	71.4%	56.9%	23.7%	19.9%	4.8%	22.9%					

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	6.8%	0.0%	15.5%	0.0%	0.0%	10.8%	13.1%	54.7%	13.5%	N/A	N/A	N/A	N/A	N/A
This line only for 10-Year Event	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	7.8%	0.3%	17.2%	0.1%	0.0%	8.6%	14.0%	21.5%	15.7%	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:	5.7%	0.0%	10.9%	0.0%	0.0%	5.6%	8.9%	6.5%	10.4%					

Total Site Imperviousness:	**28.6%**
Total Site Effective Imperviousness for WQCV Event:	**24.6%**
Total Site Effective Imperviousness for 5-Year Event:	**25.8%**
Total Site Effective Imperviousness for 100-Year Event:	**25.9%**
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	**25.9%**

Notes:

* Use Green-Ampt average infiltration rate values from Table 3-3

** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM

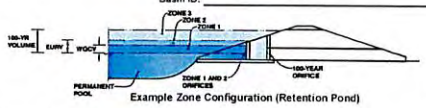
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: FLYING HORSE NO. 13 CAPRI FILING NO. 1 & 2

Basin ID:



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	EDB	
Watershed Area =	21.24	acres
Watershed Length =	1,200	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	28.60%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.260	acre-feet
Excess Urban Runoff Volume (EURV) =	0.621	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.474	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.677	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	1.047	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	1.785	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	2.267	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	2.899	acre-feet
500-yr Runoff Volume (P1 = 3 in.) =	3.970	acre-feet
Approximate 2-yr Detention Volume =	0.442	acre-feet
Approximate 5-yr Detention Volume =	0.635	acre-feet
Approximate 10-yr Detention Volume =	0.936	acre-feet
Approximate 25-yr Detention Volume =	1.094	acre-feet
Approximate 50-yr Detention Volume =	1.153	acre-feet
Approximate 100-yr Detention Volume =	1.370	acre-feet

Optional User Override 1-hr Precipitation	
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
3.00	inches

Stage-Storage Calculation

Zone 1 Volume (WQCV) =	0.260	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.361	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.749	acre-feet
Total Detention Basin Volume =	1.370	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	

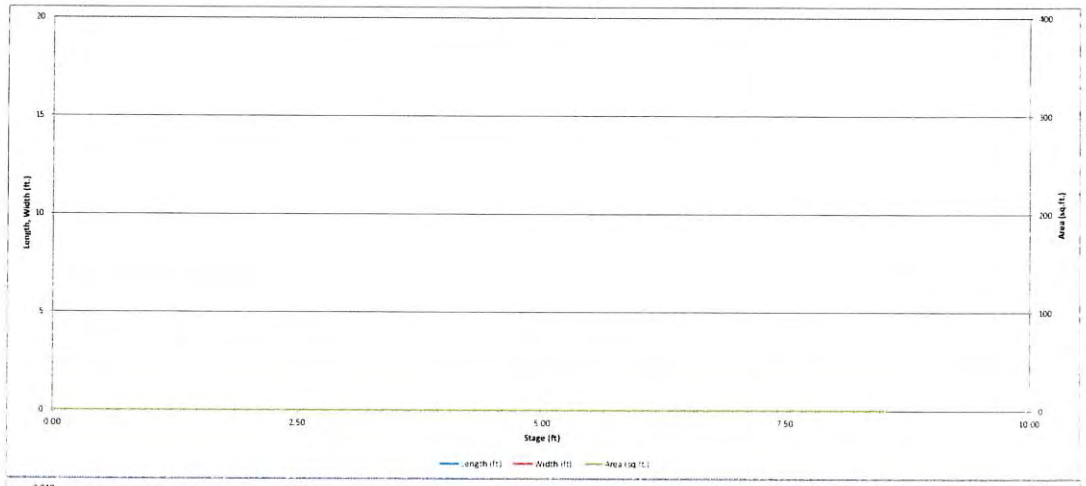
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

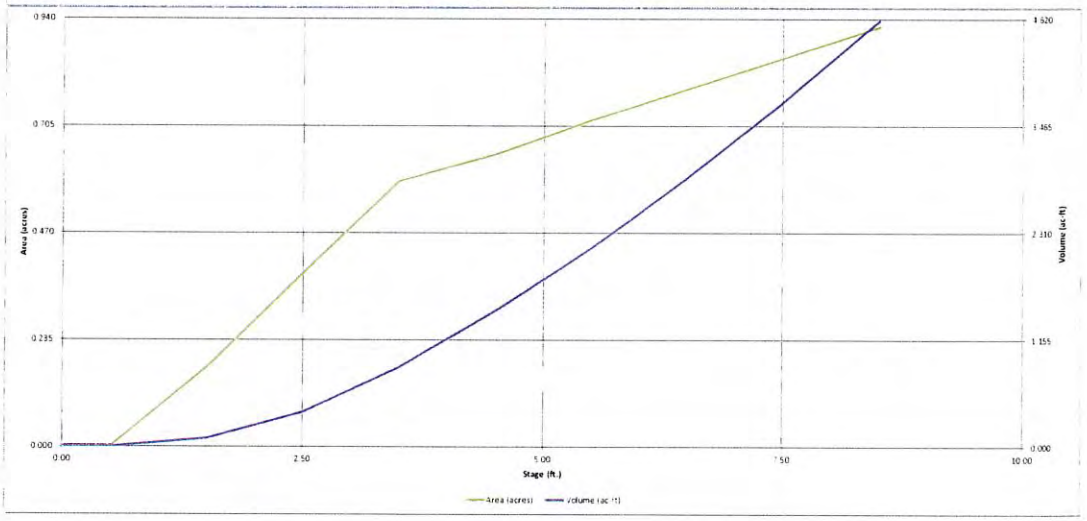
Depth Increment = 1 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	100	0.002		
6804	--	0.50	--	--	--	100	0.002	49	0.001
6805	--	1.50	--	--	--	7,681	0.176	3,864	0.089
6806	--	2.50	--	--	--	16,585	0.381	16,073	0.369
6807	--	3.50	--	--	--	25,397	0.583	37,064	0.851
6808	--	4.50	--	--	--	27,989	0.643	63,757	1.464
6809	--	5.50	--	--	--	31,273	0.718	93,388	2.144
6810	--	6.50	--	--	--	34,184	0.785	126,117	2.895
6811	--	7.50	--	--	--	37,153	0.853	161,785	3.714
6812	--	8.50	--	--	--	40,177	0.922	200,450	4.602

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



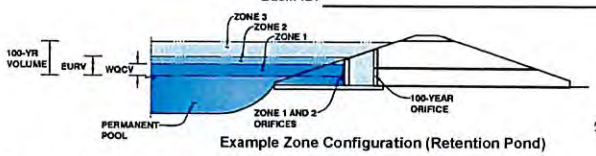


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: FLYING HORSE NO. 13 CAPRI FIL. 1 & 2

Basin ID:



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.19	0.260	Orifice Plate
Zone 2 (EURV)	3.08	0.361	Orifice Plate
Zone 3 (100-year)	4.36	0.749	Weir&Pipe (Restrict)
		1.370	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	N/A	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	2.99	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	12.00	inches
Orifice Plate: Orifice Area per Row =	1.20	sq. inches (diameter = 1-1/4 inches)

Calculated Parameters for Plate

WQ Orifice Area per Row =	8.333E-03	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.00	1.99					
Orifice Area (sq. inches)	1.20	1.20	1.20					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.00	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	4.00	N/A	feet
Overflow Weir Slope =	4.00	N/A	H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Grate Open Area % =	70%	N/A	%, grate open area/total area
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	4.00	N/A	feet
Over Flow Weir Slope Length =	4.12	N/A	feet
Grate Open Area / 100-yr Orifice Area =	6.53	N/A	should be ≥ 4
Overflow Grate Open Area w/o Debris =	11.54	N/A	ft^2
Overflow Grate Open Area w/ Debris =	5.77	N/A	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	18.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	18.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	1.77	N/A	ft^2
Outlet Orifice Centroid =	0.75	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	3.14	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	6.50	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	15.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

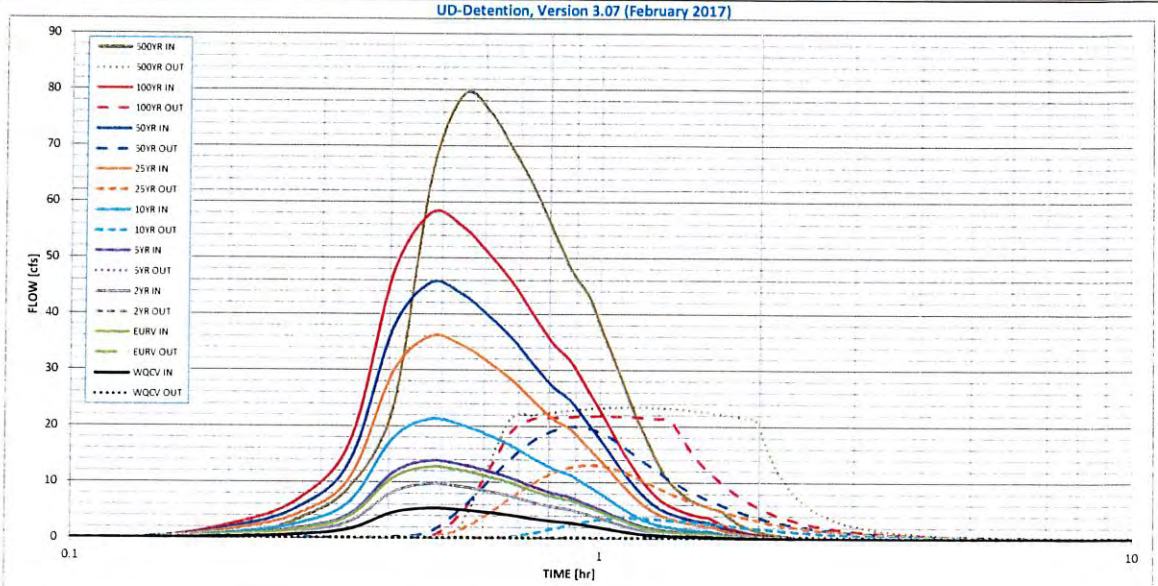
Spillway Design Flow Depth=	0.98	feet
Stage at Top of Freeboard =	8.48	feet
Basin Area at Top of Freeboard =	0.92	acres

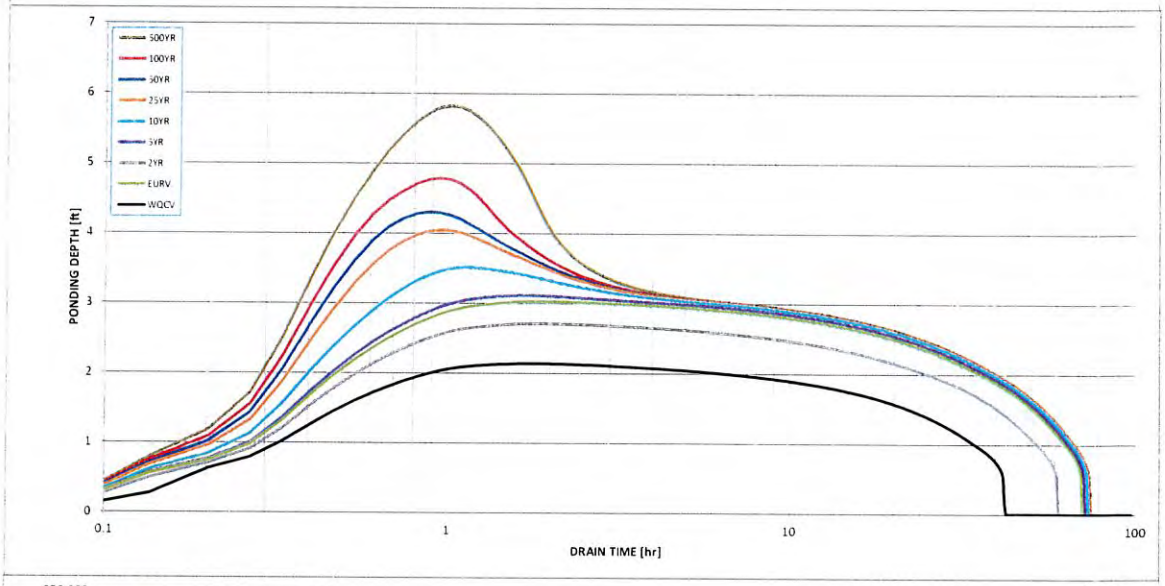
Routed Hydrograph Results

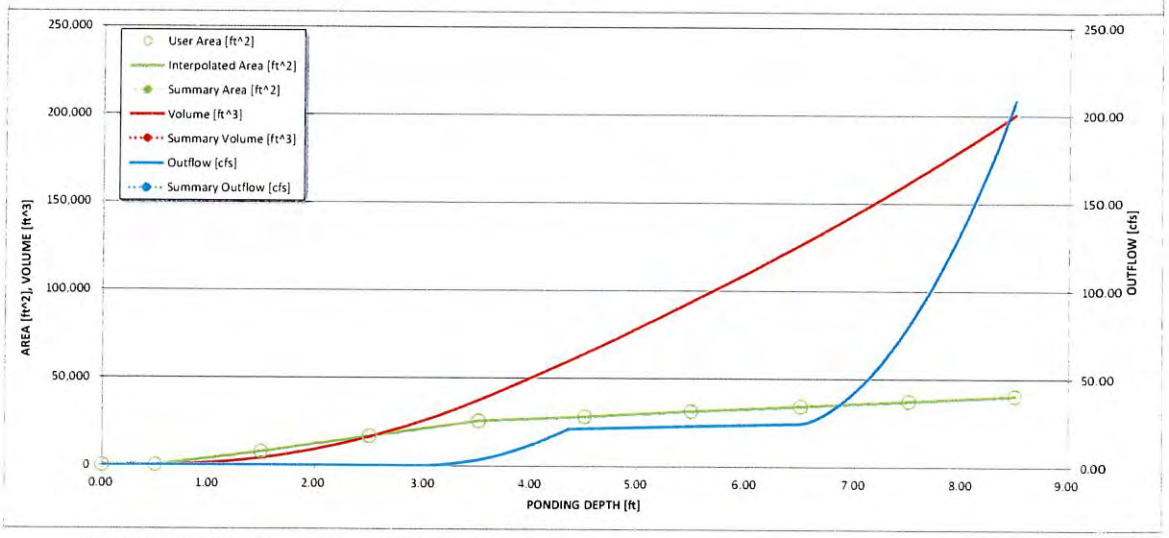
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	3.00
Calculated Runoff Volume (acre-ft) =	0.260	0.621	0.474	0.677	1.047	1.785	2.267	2.899	3.970
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.260	0.621	0.474	0.676	1.046	1.784	2.266	2.896	3.967
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.02	0.03	0.26	0.82	1.14	1.52	2.13
Predevelopment Peak Q (cfs) =	0.0	0.0	0.3	0.555	5.5	17.5	24.2	32.2	45.3
Peak Inflow Q (cfs) =	5.4	12.7	9.7	13.8	21.2	36.0	45.5	58.0	79.0
Peak Outflow Q (cfs) =	0.1	0.2	0.2	0.451	3.6	13.0	19.9	21.8	23.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.8	0.7	0.7	0.8	0.7	0.5
Structure Controlling Flow =	Plate	Overflow Grate 1	Plate	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	0.00	N/A	0.0	0.3	1.1	1.7	1.9	2.0
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	40	66	56	67	66	62	59	56	52
Time to Drain 99% of Inflow Volume (hours) =	42	70	60	71	72	70	68	67	65
Maximum Ponding Depth (ft) =	2.14	3.03	2.71	3.11	3.51	4.04	4.31	4.79	5.82
Area at Maximum Ponding Depth (acres) =	0.31	0.49	0.42	0.50	0.58	0.62	0.63	0.66	0.74
Maximum Volume Stored (acre-ft) =	0.245	0.594	0.453	0.639	0.857	1.174	1.336	1.647	2.377

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

Storm Inflow Hydrographs **UD-Detention, Version 3.07 (February 2017)**

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

Time Interval	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
4.07 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:04:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydrograph	0:08:08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Constant	0:12:13	0.24	0.56	0.43	0.61	0.93	1.55	1.95	2.46	3.29
1.228	0:16:17	0.65	1.51	1.16	1.64	2.51	4.23	5.33	6.76	9.13
	0:20:21	1.66	3.88	2.98	4.22	6.46	10.86	13.70	17.37	23.45
	0:24:25	4.57	10.68	8.20	11.60	17.75	29.83	37.60	47.66	64.30
	0:28:29	5.36	12.67	9.69	13.78	21.21	35.96	45.52	57.99	79.04
	0:32:34	5.10	12.09	9.24	13.15	20.27	34.42	43.61	55.62	76.00
	0:36:38	4.64	11.00	8.41	11.97	18.45	31.33	39.70	50.61	69.20
	0:40:42	4.12	9.82	7.50	10.70	16.52	28.11	35.66	45.53	62.33
	0:44:46	3.54	8.48	6.46	9.24	14.31	24.42	31.04	39.71	54.51
	0:48:50	3.09	7.39	5.64	8.05	12.45	21.21	27.00	34.59	47.57
	0:52:55	2.80	6.69	5.10	7.29	11.28	19.24	24.46	31.30	42.96
	0:56:59	2.29	5.52	4.20	6.02	9.36	16.03	20.41	26.16	35.99
	1:01:03	1.85	4.51	3.42	4.92	7.67	13.21	16.85	21.63	29.81
	1:05:07	1.40	3.47	2.62	3.79	5.96	10.34	13.23	17.05	23.61
	1:09:11	1.03	2.58	1.94	2.83	4.47	7.86	10.11	13.09	18.22
	1:13:16	0.75	1.87	1.41	2.05	3.24	5.77	7.46	9.71	13.60
	1:17:20	0.59	1.45	1.10	1.58	2.49	4.39	5.65	7.32	10.21
	1:21:24	0.49	1.19	0.90	1.30	2.05	3.57	4.59	5.92	8.21
	1:25:28	0.41	1.01	0.77	1.11	1.73	3.02	3.87	4.99	6.91
	1:29:32	0.36	0.89	0.67	0.97	1.52	2.64	3.38	4.35	6.02
	1:33:37	0.33	0.80	0.61	0.87	1.37	2.37	3.03	3.90	5.38
	1:37:41	0.31	0.74	0.56	0.81	1.26	2.18	2.78	3.57	4.93
	1:41:45	0.22	0.54	0.41	0.59	0.92	1.60	2.05	2.65	3.67
	1:45:49	0.16	0.40	0.30	0.43	0.68	1.17	1.49	1.92	2.66
	1:49:53	0.12	0.29	0.22	0.32	0.50	0.86	1.10	1.42	1.96
	1:53:58	0.09	0.21	0.16	0.23	0.37	0.64	0.82	1.05	1.46
	1:58:02	0.06	0.15	0.12	0.17	0.26	0.46	0.59	0.77	1.07
	2:02:06	0.04	0.11	0.08	0.12	0.19	0.33	0.42	0.55	0.77
	2:06:10	0.03	0.08	0.06	0.08	0.13	0.24	0.31	0.40	0.56
	2:10:14	0.02	0.05	0.04	0.06	0.09	0.16	0.21	0.28	0.39
	2:14:19	0.01	0.03	0.02	0.03	0.05	0.10	0.13	0.18	0.25
	2:18:23	0.00	0.01	0.01	0.02	0.03	0.05	0.07	0.10	0.14
	2:22:27	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.04	0.06
	2:26:31	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02
	2:30:35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:34:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:38:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:42:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:46:52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:50:56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:59:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:03:09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:07:13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:11:17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:19:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:23:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:27:34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:31:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:39:47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:43:51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:47:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:51:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:56:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:04:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:08:16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:12:20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:16:25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:24:33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:28:37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:32:41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:36:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:44:54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:48:58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:53:02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

DRAINAGE MAP

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N
0.32

LEGEND

DESCRIPTION	SYMBOL
EXISTING GROUND CONTOUR	6910
PROPOSED FINISHED CONTOUR	6910
BASIN BOUNDARY	
DESIGN POINT	3
BASIN IDENTIFIER / AREA IN ACRES	BB 10.0
EXISTING DIRECTION OF FLOW	
PROPOSED DIRECTION OF FLOW	
PIPE RUN	4
STORM SEWER	
CROSS PAN	

DRAINAGE MAP
FLYING HORSE NO. 13 CAPRI
1171.36

SHEET 1 OF 1

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FINAL DRAINAGE REPORT ~ BASIN RUNOFF COEFFICIENT SUMMARY

BASIN	TOTAL AREA (AC)	IMPERVIOUS AREA / STREETS				LANDSCAPE/UNDEVELOPED AREAS				WEIGHTED			WEIGHTED CA		
		AREA (AC)	C(2)	C(5)	C(100)	AREA (AC)	C(2)	C(5)	C(100)	C(2)	C(5)	C(100)	CA(2)	CA(5)	CA(100)
A	6.25	1.60	0.89	0.90	0.96	4.65	0.02	0.08	0.35	0.24	0.29	0.51	**1.52**	**1.81**	**3.16**
B	0.08	0.08	0.89	0.90	0.96	0.00	0.02	0.08	0.35	0.89	0.90	0.96	**0.07**	**0.07**	**0.08**
C	7.13	1.47	0.89	0.90	0.96	5.66	0.02	0.08	0.35	0.20	0.25	0.48	**1.42**	**1.78**	**3.39**
D	0.35	0.25	0.89	0.90	0.96	0.10	0.02	0.08	0.35	0.64	0.67	0.79	**0.22**	**0.23**	**0.28**
E	0.91	0.51	0.89	0.90	0.96	0.40	0.02	0.08	0.35	0.51	0.54	0.69	**0.46**	**0.49**	**0.63**
F	0.25	0.15	0.89	0.90	0.96	0.10	0.02	0.08	0.35	0.54	0.57	0.72	**0.14**	**0.14**	**0.18**
G	1.51	0.30	0.89	0.90	0.96	1.21	0.02	0.08	0.35	0.19	0.24	0.47	**0.29**	**0.37**	**0.71**
H	2.10	0.48	0.89	0.90	0.96	1.62	0.02	0.08	0.35	0.22	0.27	0.49	**0.46**	**0.56**	**1.03**
I	1.43	0.00	0.89	0.90	0.96	1.43	0.02	0.08	0.35	0.02	0.08	0.35	**0.03**	**0.11**	**0.50**
J	1.23	0.36	0.89	0.90	0.96	0.87	0.02	0.08	0.35	0.27	0.32	0.53	**0.34**	**0.39**	**0.65**
K	0.46	0.00	0.89	0.90	0.96	0.46	0.02	0.08	0.35	0.02	0.08	0.35	**0.01**	**0.04**	**0.16**
L	0.53	0.05	0.89	0.90	0.96	0.48	0.02	0.08	0.35	0.10	0.16	0.41	**0.05**	**0.08**	**0.22**
M	0.65	0.03	0.89	0.90	0.96	0.62	0.02	0.08	0.35	0.06	0.12	0.38	**0.04**	**0.08**	**0.25**
N	0.32	0.00	0.89	0.90	0.96	0.32	0.02	0.08	0.35	0.02	0.08	0.35	**0.01**	**0.03**	**0.11**
OS-1	22.91	0.00	0.89	0.90	0.96	22.91	0.02	0.08	0.35	0.02	0.08	0.35	**0.46**	**1.83**	**8.02**

FINAL DRAINAGE REPORT ~ BASIN RUNOFF SUMMARY

BASIN	WEIGHTED			OVERLAND				STREET / CHANNEL FLOW				Tc	INTENSITY			TOTAL FLOWS		
	CA(2)	CA(5)	CA(100)	C(5)	Length (ft)	Height (ft)	Tc (min)	Length (ft)	Slope (%)	Velocity (fps)	Tc (min)	TOTAL (min)	I(2) (in/hr)	I(5) (in/hr)	I(100) (in/hr)	Q(2) (cfs)	Q(5) (cfs)	Q(100) (cfs)
A	1.52	1.81	3.16	0.08	100	4	11.7	300	2.0%	2.8	1.8	13.4	2.94	3.69	6.19	4	**7**	**20**
B	0.07	0.07	0.08	0.08	7	0.5	2.5	130	2.0%	2.8	0.8	5.0	4.12	5.17	8.68	0.3	**0.4**	1
C	1.42	1.78	3.39	0.08	100	4	11.7	300	2.0%	2.8	1.8	13.4	2.94	3.69	6.19	4	**7**	**21**
D	0.22	0.23	0.28	0.08	25	1	5.8	130	2.0%	2.8	0.8	6.6	3.79	4.75	7.98	0.9	1	**2**
E	0.46	0.49	0.63	0.08	7	0.5	2.5	300	2.0%	2.8	1.8	5.0	4.12	5.17	8.68	2	**3**	**5**
F	0.14	0.14	0.18	0.08	7	0.5	2.5	300	2.0%	2.8	1.8	5.0	4.12	5.17	8.68	0.6	**0.7**	**2**
G	0.29	0.37	0.71	0.08	100	4	11.7	170	2.0%	2.8	1.0	12.7	3.01	3.78	6.34	1	1	**5**
H	0.46	0.56	1.03	0.08	100	6	10.2	170	2.0%	2.8	1.0	11.2	3.16	3.96	6.65	1	**2**	**7**
I	0.03	0.11	0.50	0.08	100	8	9.3	0	0.0%	0.0	0.0	9.3	3.38	4.24	7.12	0.1	**0.5**	**4**
J	0.34	0.39	0.65	0.08	100	3	12.8	170	2.0%	2.8	1.0	13.8	2.91	3.64	6.12	0.98	**1.43**	**4.0**
K	0.01	0.04	0.16	0.08	150	12	11.4	0	0.0%	0.0	0.0	11.4	3.14	3.94	6.61	0.0	**0.1**	1
L	0.05	0.08	0.22	0.08	50	2	8.2	0	0.0%	0.0	0.0	8.2	3.53	4.42	7.42	0.2	**0.4**	**1.6**
M	0.04	0.08	0.25	0.08	50	2	8.2	0	0.0%	0.0	0.0	8.2	3.53	4.42	7.42	0.1	**0.3**	**1.8**
N	0.01	0.03	0.11	0.08	50	24	3.6	0	0.0%	0.0	0.0	5.0	4.12	5.17	8.68	0.0	**0.1**	**1.0**
OS-1	0.46	1.83	8.02	0.08	500	6	38.8	0	0.0%	0.0	0.0	38.8	1.68	2.10	3.52	1	**4**	**28**

FINAL DRAINAGE REPORT ~ PIPE ROUTING SUMMARY

Pipe Run	Contributing Basins/Design Points	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Pipe Size*
1	DP 1	1.81	3.16	13.42	3.69	6.19	7	20	24" RCP STORM
2	DP 2 & PIPE 1	1.88	3.24	13.42	3.69	6.19	7	20	24" RCP STORM
3	DP 3	1.78	3.39	13.42	3.69	6.19	7	21	24" RCP STORM
4	DP 4	0.23	0.28	6.6	4.75	7.98	1	2	18" RCP STORM
5	PIPE 3 & PIPE 4	2.01	3.67	13.4	3.69	6.19	7	23	24" RCP STORM
6	PIPE 2 & PIPE 5	3.89	6.91	13.4	3.69	6.19	14	43	30" RCP STORM
7	DP 5	0.49	0.63	5.0	5.17	8.68	3	5	18" RCP STORM
8	DP 6 & PIPE 7	0.63	0.81	5.0	5.17	8.68	3	7	18" RCP STORM
9	DP 7 & PIPE 8	1.00	1.52	12.7	3.78	6.34	4	10	18" RCP STORM
10	DP 8 & PIPE 9	1.56	2.55	12.7	3.78	6.34	6	16	24" RCP STORM
11	DP 9	0.39	0.65	13.8	3.64	6.12	1	4	18" RCP STORM
12	POND OUT	0.35	8.30	58.24	1.49	2.49	0.5	21	24" RCP STORM
13	BASIN OS-2 ALLOWABLE	0.35	5.75	58.0	1.49	2.50	1	14	24" RCP STORM
14	PIPE 11 & 12-- 35 CFS MAX	0.70	14.05	58.2	1.49	2.49	1	35	24" RCP STORM

FINAL DRAINAGE REPORT ~ SURFACE ROUTING SUMMARY

Design Point(s)	Contributing Basins	Equivalent CA(5)	Equivalent CA(100)	Maximum Tc	Intensity I(5)	Intensity I(100)	Flow Q(5)	Flow Q(100)	Inlet Size
1	BASIN A	1.81	3.16	13.4	3.69	6.19	7	20	10' D-10-R
2	BASIN B	0.07	0.08	5.0	5.17	8.68	0.4	1	4' D-10-R
3	BASIN C	1.78	3.39	13.4	3.69	6.19	7	21	10' D-10-R
4	BASIN D	0.23	0.28	6.6	4.75	7.98	1	2	4' D-10-R
5	BASIN E	0.49	0.63	5.0	5.17	8.68	3	5	4' D-10-R
6	BASIN F	0.14	0.18	5.0	5.17	8.68	1	2	4' D-10-R
7	BASIN G	0.37	0.71	12.7	3.78	6.34	1	5	4' D-10-R
8	BASIN H	0.56	1.03	11.2	3.96	6.65	2	7	4' D-10-R
9	BASIN J	0.39	0.65	13.8	3.64	6.12	1	4	4' D-10-R
10	POND IN (PIPE 6, 9, 10 BASIN D)	6.69	11.25	13.4	3.69	6.19	25	70	N/A
11	BASIN L & BASIN M	0.16	0.46	8.2	4.42	7.42	0.7	3	CROSSPAN

CALCULATIONS
FLYING HORSE NO. 13 CAPRI
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FEBRUARY 2019
SHEET 2 OF 2

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