

DRAINAGE LETTER
For
LOT 3, MONUMENT RIDGE

December 2020

Project No. CO35006

Prepared For:

WMG DEVELOPMENT
1200 Network Centre, Suite 3
Effingham, IL 62401
Phone (314) 537-4140

Prepared By:

BASELINE ENGINEERING CORP

Engineering, Planning, Surveying

1046 Elkton Drive
Colorado Springs, Colorado 80907
Phone (719) 531-6200

TABLE OF CONTENTS

Statements
Floodplain Statement
Drainage Letter

ATTACHMENTS

Vicinity Map
Floodplain Map
Soils Map
Hydrologic/Hydraulic Calculations
Drainage Reference

MAP POCKET

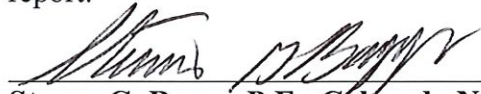
Drainage Plan

**Drainage Letter
For Lot 3, Monument Ridge**

Project No. CO35006

ENGINEER'S STATEMENT

The attached drainage letter and plan were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said letter and plan has been prepared according to the established criteria for drainage letters and said letter is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.



Steven G. Baggs, P.E., Colorado No. 26020

DEVELOPER'S STATEMENT

I, the developer have read and will comply with all of the requirements specified in this drainage letter and plan.

Name of Business: _____

Authorized Signature/Date: _____

Printed Name: _____

Title: _____

Address: _____

TOWN OF MONUMENT

Filed in accordance with Section 17.45 of the Zoning Ordinance of the Town of Monument, and Section 16.12.060 of the Subdivision Code for the Town of Monument, revised February, 2007.

Director of Development Services

Date

**Drainage Letter
For Lot 3, Monument Ridge**

Project No. CO35006

FLOODPLAIN STATEMENT

To the best of my knowledge and belief, the Lot 3, Monument Ridge site is not located within a designated floodplain as indicated by the Flood Insurance Rate Map Panel 08041C0287G, dated December 7, 2018. A portion of the FIRM Panel is included in the Appendix of this study.

A handwritten signature in black ink, appearing to read "Steven G. Baggs", is written over a horizontal line.

Steven G. Baggs, P.E., Colorado No. 26020

Town of Monument
Planning Dept.
645 Beacon Lite Road
Monument, Colorado 80132

December, 2020

Re: Drainage Letter
For Lot 3, Monument Ridge

Project No. CS35006

To Whom It May Concern:

This Drainage Letter has been prepared to accompany a submittal of a Final PD for Lot 3 of the Monument Ridge development. Lot 3, Monument Ridge is a proposed 0.78-acre commercial development in the Town of Monument. The site is located in the Northwest 1/4 of Section 36, Township 11 South, Range 67 West of the 6th P.M. in the Town of Monument, El Paso County, Colorado. More specifically it is located on the south side of Baptist Road approximately 485 feet east of the intersection of Baptist Road and Struthers Road. The site is bounded to the north by Baptist Road, to the east by Walgreens (Lot 4) and to the south and west by paved access roads for the development. The site is to be developed for a 3290 s.f. dental office with associated paved parking and landscaping.

The site is part of the Monument Ridge commercial development located on Baptist Road. The infrastructure of the development, including drainage facilities, was installed at the time of initial development. A final drainage report titled "Preliminary/Final Drainage Report for Monument Ridge" was prepared by WestWorks Engineering in March, 2006 and documented the required drainage facilities for the subdivision including a regional detention/water quality facility that serves the subdivision including Lot 3. The site was included in Subbasin A-3 of that study. A commercial use similar to the dental office proposed for this site was anticipated in that report. The site was bulk graded at the time of the original development and has a temporary sediment pond that connects to the storm sewer stub provided for the site.

In general, the majority of the site drains to the south end of the site. The west and south edges of the site slope down to the adjacent access roads. The site is underlain by soil identified as Tomah-Crowfoot complex in the El Paso County Soil Survey prepared by the Natural Resources Conservation Service. This soil is categorized in Hydrologic Soils Group B. Hydrologic Soils Group A/B will be used for runoff calculations. A copy of a portion of the soil survey map is included in the Attachments. The site is a revegetated building pad with fair covering of native grasses. The site is located in the Jackson Creek Drainage Basin. The site is not located in a designated floodplain. A copy of a portion of the appropriate FIRM panel is included in the Appendix.

This drainage analysis has been prepared in accordance with the current El Paso County/City of Colorado Springs Drainage Criteria Manual Volumes 1 & 2 and applicable portions of the Urban Storm Drainage Criteria Manual by the Urban Drainage & Flood Control District. The proposed conditions at the site have been estimated for 5yr and 100yr storms using the Rational Method for runoff computations as required by the Drainage Criteria Manual for sites with less than 100 acres. A summary of all runoff calculations has been included in the Attachments to this letter.

The existing conditions at the site are that it is an undeveloped graded pad site. Runoff from the pad portion of the site is directed into a temporary sediment pond that connects to the 24" RCP storm sewer stub for the site. The north, west and south edges of the site slope towards the adjacent roadways so runoff from these areas sheet flows to adjacent curb and gutter. These sheet flows are then conveyed to existing inlets in the street. The temporary sediment pond will be eliminated by the development of the site including on-site drainage facilities that will connect to the existing storm sewer infrastructure and the regional detention/water quality facility.

This site was included in a portion of Subbasin A-3 of the Monument Ridge Development Final Drainage Report. For purposes of this Drainage Letter the Lot 3 site has been divided into drainage subbasins to estimate runoff quantities and determine onsite drainage facility requirements. Runoff has been estimated for both the 5-year and 100-year storm events. Runoff calculations are included as an Attachment to this letter. The Drainage Plan included as an Attachment to this letter shows the drainage subbasins that were utilized to estimate the proposed runoff conditions for the site. A description of the subbasins is as follows:

Subbasin A (0.13 acre) includes the slope area along Baptist Road and the northwest corner of the lot. This area will continue to sheet flow to Baptist Road as anticipated in the original report. This subbasin generates runoff quantities of $Q_5 = 0.1$ cfs and $Q_{100} = 0.4$ cfs. Grading and landscaping of this subbasin should maintain the minimal runoff quantities of this subbasin.

Subbasin B (0.24 acre) represents the majority of the proposed parking lot to the north and west of the proposed building. The parking lot will be graded to drain to a low point at the southwest corner of the parking lot. Runoff quantities of $Q_5 = 1.1$ cfs and $Q_{100} = 2.0$ cfs will be collected at a CDOT Type 13 combination curb/grate inlet and then piped in a 12" HDPE to a manhole in Subbasin D. This would be the upstream end of a private onsite storm sewer.

Subbasin C (0.10 acre) represents the proposed building and some adjacent sidewalk. This subbasin will produce runoff quantities of $Q_5 = 0.5$ cfs and $Q_{100} = 0.8$ cfs. Runoff will be collected at several locations in this subbasin. Roof drains will be located on the east side of the building and will be collected in an 8"

HDPE roof drain lateral that will connect to a proposed 18" x 18" grated inlet near the southeast corner of the proposed building. The grated inlet will intercept nuisance flows from the sidewalk along the east side of the proposed building. A proposed 12" HDPE storm sewer will then extend from the inlet to the proposed manhole in Subbasin D. The manhole is then connected to the existing 24" RCP storm sewer (record) that is stubbed into the site from the Monument Ridge storm sewer. The private onsite storm sewers are to be maintained by the owner of Lot 3.

Subbasin D (0.05 acre) is a small portion of the parking lot near the southerly entrance to the site. This area generates runoff quantities of $Q_5= 0.2$ cfs and $Q_{100}= 0.4$ cfs. This runoff will sheet flow to a low point near the trash enclosure where a CDOT Type 13 combination curb/gutter inlet will collect all subbasin runoff. This inlet connects to the proposed manhole with a 12" HDPE.

Subbasin E (0.17 acre) is the remaining perimeter of the site that sheet flows into the adjacent interior access roads. This area generates runoff quantities of $Q_5= 0.3$ cfs and $Q_{100}= 0.8$ cfs. This runoff will sheet flow into the interior access roads of the Monument Ridge development and then enter the access road storm sewer in accordance with the original report.

Summary Point SP-1 (0.39 acre) represents the runoff entering the Monument Ridge storm sewer system from Subbasins B, C and D. Runoff quantities of $Q_5= 1.8$ cfs and $Q_{100}= 3.2$ cfs will be anticipated at this summary point. The 24" RCP storm sewer will have adequate capacity for these relatively small quantities.

Summary Point SP-2 (0.56 acre) summarizes the total runoff from the portion of Lot 3 that is within Subbasin A-3 of the original drainage report. The runoff quantities of $Q_5= 2.1$ cfs and $Q_{100}= 4.0$ cfs at this summary point will be Lot 3's contribution to the regional detention/water quality facility. The portion of Lot 3 within Subbasin A-3 is approximately 29.5% of Subbasin A-3. Per the original report, Subbasin A-3 generated runoff quantities of $Q_5= 7$ cfs and $Q_{100}= 13$ cfs so that report anticipated $Q_5= 2.1$ cfs and $Q_{100}= 3.8$ cfs from this area. These flows are comparable to the runoff quantities estimated at Summary Point SP-2.

The stormwater management approach for the Monument Ridge development was to provide an interior storm sewer system stubbed into the various lots that conveys runoff to a regional detention/water quality facility. The development and drainage assumptions for Lot 3 are in general compliance with the original drainage report. A copy of the Monument Ridge Drainage Plan prepared by Westworks Engineering is included for reference in the Attachments. Installation of the recommended drainage facilities for Lot 3 will ensure compliance with the original drainage report and satisfy the detention and water quality requirements for the project. The Lot 3, Monument Ridge site is located within the Jackson

Creek Drainage Basin. The site is platted so there are no drainage fees required for the development of the site.

The development of this site in accordance with the requirements of this Drainage Letter will not adversely affect the downstream and surrounding developments. This report is in general conformance with the Preliminary/Final Drainage Report for Monument Ridge which included this site. This drainage analysis was prepared in accordance with the most current City/County Drainage Criteria Manual. If there are any comments or questions regarding any part of this drainage analysis, please contact the undersigned.

Very truly yours,
BASELINE ENGINEERING CORP.



Steven G. Baggs, P. E.

ATTACHMENTS

VICINITY MAP

VICINITY MAP

Lot 3, Monument Ridge Sub



**FLOODPLAIN
MAP**

MAP SCALE 1" = 500'

0 500 1000 FEET

NFIP

PANEL 0287G

FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY,
COLORADO
AND INCORPORATED AREAS

PANEL 287 OF 1300
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:			
COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0287	0
EL PASO COUNTY	080059	0287	0
MONUMENT, TOWN OF	080064	0287	0

Notice: This map was released on 05/15/2020 to make a correction. This version replaces any previous versions. See the Notice-to-User Letter that accompanied this correction for details.

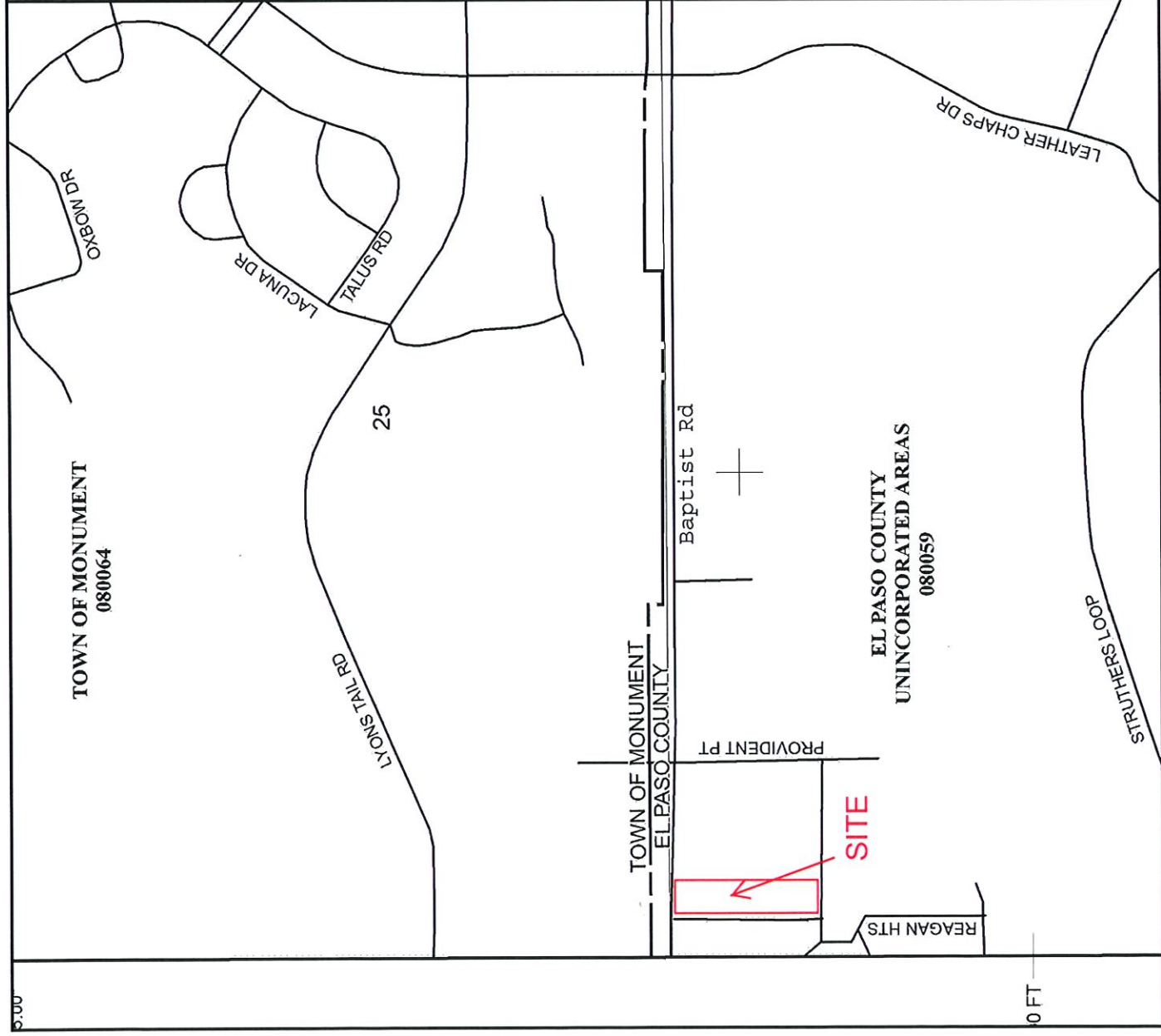
Notice to User: The Map Number shown below should be used when placing map orders. The Community Number should be used on insurance applications for the subject community.

MAP NUMBER
08041C0287G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



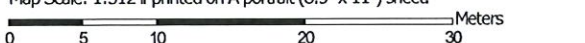
SOILS MAP

Soil Map—El Paso County Area, Colorado
(Lot 3 Monument Ridge Sub)




Soil Map may not be valid at this scale.

Map Scale: 1:512 if printed on A portrait (8.5" x 11") sheet.



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

MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Soil Map Unit Polygons	 Very Stony Spot
 Soil Map Unit Lines	 Wet Spot
 Soil Map Unit Points	 Other
 Special Point Features	 Special Line Features
 Blowout	 Streams and Canals
 Borrow Pit	 Transportation
 Clay Spot	 Rails
 Closed Depression	 Interstate Highways
 Gravel Pit	 US Routes
 Gravelly Spot	 Major Roads
 Landfill	 Local Roads
 Lava Flow	 Background
 Marsh or swamp	 Aerial Photography
 Mine or Quarry	
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

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 18, Jun 5, 2020

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

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	1.0	100.0%
Totals for Area of Interest		1.0	100.0%

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
93	Tomah-Crowfoot complex, 8 to 15 percent slopes	B	1.0	100.0%
Totals for Area of Interest			1.0	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

**HYDROLOGIC &
HYDRAULIC
CALCULATIONS**

RATIONAL METHOD FOR RUNOFF COMPUTATIONS

BASIN	AREA (acres)	GEOMETRY		C		Tc min.	INTENSITY, in/hr		PEAK FLOW cfs	
		Length	Height	5 yr	100 yr		5 yr	100yr	5 yr	100yr
A	0.13	85	8	0.14	0.39	7	4.66	7.83	0.1	0.4
B	0.24	240	5	0.9	0.96	5	5.17	8.68	1.1	2
C	0.1	--	--	0.9	0.96	5	5.17	8.68	0.5	0.8
D	0.05	60	2	0.75	0.85	5	5.17	8.68	0.2	0.4
E	0.17	165	6	0.36	0.56	5	5.17	8.68	0.3	0.8
SP-1	0.39	--	--	0.88	0.95	5	5.17	8.68	1.8	3.2
SP-2	0.56	--	--	--	--	--	--	--	2.1	4

DEVELOPED CONDITIONS
LOT 3, MONUMENT RIDGE
 PROJECT NO. C035006
 DECEMBER 2020

BASELINE ENGINEERING CORPORATION
 ENGINEERING, PLANNING, SURVEYING

TIME OF CONCENTRATION CALCULATIONS

SUBBASIN	OVERLAND FLOW				STREET FLOW				CHANNEL FLOW				STORM SEWER FLOW				T _c TOTAL
	LENGTH FT	HEIGHT FT	SLOPE %	T _c MIN	LENGTH FT	HEIGHT FT	SLOPE %	T _c MIN	LENGTH FT	HEIGHT FT	SLOPE %	T _c MIN	LENGTH FT	HEIGHT FT	SLOPE %	T _c MIN	
A	85	8	9.4	7.3													7
B					240	5	2.1	1.4									5
C	ROOF																5
D	60	2	3.33	3.3													5
E	30	4	13.3	3.1	135	2	1.48	0.92									5

BASELINE ENGINEERING CORPORATION
 ENGINEERING, PLANNING, SURVEYING
DEVELOPED CONDITIONS
LOT 3, MONUMENT RIDGE
 PROJECT NO. CO35006
 DECEMBER 2020

"C" CALCULATIONS

DATE: 12/11/2020

CALCULATED BY: SGB

PROJECT NAME:

Lot 3, Monument Ridge

CHECKED BY: SGB

PROJECT NUMBER:

CO35006

Subbasin A Landscape Area North End of Site

93% LS 7% hardscape

$$C_5 = (0.93)(0.08) + (0.07)(0.90) = 0.14$$

$$C_{100} = (0.93)(0.35) + (0.07)(0.96) = 0.39$$

Subbasin B Parking Lotuse $C_5 = 0.90$

$$C_{100} = 0.96$$

Subbasin C Proposed Bldg & Sidewalkuse $C_5 = 0.90$

$$C_{100} = 0.96$$

Subbasin D Parking Lot Access / Landscaping

18% LS 82% hardscape

$$C_5 = (0.18)(0.08) + (0.82)(0.90) = 0.75$$

$$C_{100} = (0.18)(0.35) + (0.82)(0.96) = 0.85$$

Subbasin E Perimeter Landscaping & Exist Access Rd

66% LS 34% hardscape

$$C_5 = (0.66)(0.08) + (0.34)(0.90) = 0.36$$

$$C_{100} = (0.66)(0.35) + (0.34)(0.96) = 0.56$$

SUMMARY POINT CALCULATIONS

DATE: 12/11/2020

CALCULATED BY: SGB

PROJECT NAME:

Lot 3, Monument Ridge

CHECKED BY: SGB

PROJECT NUMBER:

CO35006

Summary Pt SP-1 (Sub B, C & D) $A = 0.39$ ac

Composite "C" $C_5 = (0.13)(0.75) + (0.87)(0.90) = 0.88$

$C_{100} = (0.13)(0.85) + (0.87)(0.96) = 0.95$

$T_c = 5$ min $\therefore L_5 = 5.17$ in/hr $L_{100} = 8.68$ in/hr

$Q_5 = (0.88)(5.17)(0.39$ ac) $= 1.8$ cfs

$Q_{100} = (0.95)(8.68)(0.39) = 3.2$ cfs

Summary Pt SP-2 (SP-1 & Sub E) $A = 0.56$ ac

T_c 's are the same so add flows

$Q_5 = 1.8$ cfs + 0.3 cfs $= 2.1$ cfs

$Q_{100} = 3.2$ cfs + 0.8 cfs $= 4.0$ cfs

Compare to Original Report

This site is within Sub A-3 of the original Monument Ridge dry report

Sub A-3 is 1.9 ac w/ $Q_5 = 7$ cfs & $Q_{100} = 13$ cfs

Sum Pt SP-2 is the portion of the site within Sub A-3 so at 0.56 ac SP-2 is 29.5% of Sub A-3 therefore:

SP-2 Flows

$Q_5 = 2.1$ cfs

$Q_{100} = 4.0$ cfs

29.5% A-3 Flows

$Q_5 = 2.1$ cfs

$Q_{100} = 3.8$ cfs

The calculated runoff quantities compare favorably to the original report.

DRAINAGE FACILITY CALCULATIONS

DATE: 12/11/2020

CALCULATED BY: SGB

PROJECT NAME:

Lot 3, Monument Ridge

CHECKED BY: SGB

PROJECT NUMBER:

CO35006

Subbasin B

$$Q_5 = 1.1 \text{ cfs} \quad Q_{100} = 2.0 \text{ cfs}$$

Provide combination curb/grate inlet
(C00T Type 13) at low point.

$$Q_{\text{cap}} = 4.2 \text{ cfs} \quad (\text{see inlet calc sheet})$$

Pipe out to MH $Q_{\text{design}} = Q_{100} = 2.0$

$$12" \text{ HDPE out @ } 1\% \text{ min} \quad Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

$$Q = \frac{1.486}{0.012} (0.79) (0.24)^{2/3} (0.01)^{1/2} = 3.9 \text{ cfs} \quad \checkmark$$

Subbasin C

$$Q_5 = 0.5 \text{ cfs} \quad Q_{100} = 0.8 \text{ cfs}$$

Provide 8" R/D Lateral

8" HDPE @ 1% min

$$Q = \frac{1.486}{0.012} (0.35) (0.17)^{2/3} (0.01)^{1/2} = 1.3 \text{ cfs} \quad \checkmark$$

18" x 18" grated inlet (ped safe) for
nuisance flows

Use 12" HDPE @ 1% min $Q_{\text{cap}} = 3.9 \text{ cfs}$ (see above)

Subbasin D

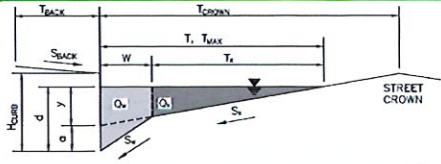
$$Q_5 = 0.2 \quad Q_{100} = 0.4 \text{ cfs}$$

Same Inlet & pipe as used in
Subbasin B \checkmark

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

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

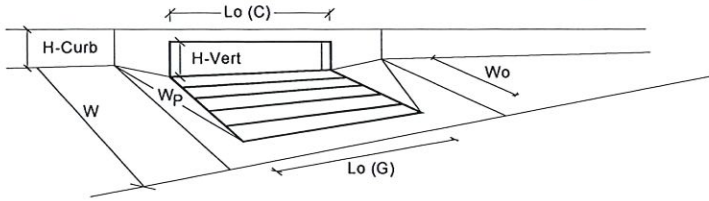
Project: _____ Enter Your Project Name Here
 Inlet ID: _____ Sub B Inlet



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	$T_{BACK} = 0.0$ ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	$S_{BACK} =$ ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	$n_{BACK} =$						
Height of Curb at Gutter Flow Line	$H_{CURB} = 8.00$ inches						
Distance from Curb Face to Street Crown	$T_{CROWN} = 18.0$ ft						
Gutter Width	$W = 2.00$ ft						
Street Transverse Slope	$S_x = 0.023$ 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)	$n_{STREET} = 0.016$						
Max. Allowable Spread for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>ft</th> </tr> <tr> <td>$T_{MAX} = 18.0$</td> <td>$T_{MAX} = 18.0$</td> <td></td> </tr> </table>	Minor Storm	Major Storm	ft	$T_{MAX} = 18.0$	$T_{MAX} = 18.0$	
Minor Storm	Major Storm	ft					
$T_{MAX} = 18.0$	$T_{MAX} = 18.0$						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>inches</th> </tr> <tr> <td>$d_{MAX} = 8.0$</td> <td>$d_{MAX} = 8.0$</td> <td></td> </tr> </table>	Minor Storm	Major Storm	inches	$d_{MAX} = 8.0$	$d_{MAX} = 8.0$	
Minor Storm	Major Storm	inches					
$d_{MAX} = 8.0$	$d_{MAX} = 8.0$						
Check boxes are not applicable in SUMP conditions							
MINOR STORM Allowable Capacity is based on Depth Criterion							
MAJOR STORM Allowable Capacity is based on Depth Criterion							
	<table border="1"> <tr> <th>Minor Storm</th> <th>Major Storm</th> <th>cfs</th> </tr> <tr> <td>$Q_{FLOW} =$ SUMP</td> <td>$Q_{FLOW} =$ SUMP</td> <td></td> </tr> </table>	Minor Storm	Major Storm	cfs	$Q_{FLOW} =$ SUMP	$Q_{FLOW} =$ SUMP	
Minor Storm	Major Storm	cfs					
$Q_{FLOW} =$ SUMP	$Q_{FLOW} =$ SUMP						

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018

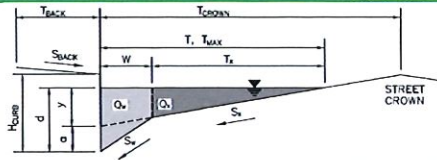


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)	2.00	2.00	inches
Number of Unit Inlets (Grate or Curb Opening)	1	1	
Water Depth at Flowline (outside of local depression)	6.4	6.4	inches
Grate Information	MINOR	MAJOR	Override Depths
Length of a Unit Grate	3.00	3.00	feet
Width of a Unit Grate	1.73	1.73	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	0.60	0.60	
Curb Opening Information	MINOR	MAJOR	
Length of a Unit Curb Opening	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	8.50	3.50	inches
Height of Curb Orifice Throat in Inches	5.25	5.25	inches
Angle of Throat (see USDCM Figure ST-5)	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.66	0.66	
Low Head Performance Reduction (Calculated)	MINOR	MAJOR	
Depth for Grate Midwidth	0.554	0.554	ft
Depth for Curb Opening Weir Equation	0.36	0.36	ft
Combination Inlet Performance Reduction Factor for Long Inlets	1.00	1.00	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	1.00	1.00	
Total Inlet Interception Capacity (assumes clogged condition)	MINOR	MAJOR	
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	4.2	4.2	cfs
Q PEAK REQUIRED =	1.1	2.0	cfs

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

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

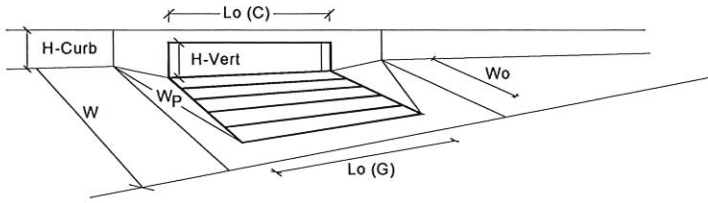
Project: _____
 Inlet ID: _____
 Enter Your Project Name Here _____
 Sub D Inlet



Gutter Geometry (Enter data in the blue cells)							
Maximum Allowable Width for Spread Behind Curb	T _{BACK} = <input style="width: 50px;" type="text" value="0.0"/> ft						
Side Slope Behind Curb (leave blank for no conveyance credit behind curb)	S _{BACK} = <input style="width: 50px;" type="text"/> ft/ft						
Manning's Roughness Behind Curb (typically between 0.012 and 0.020)	n _{BACK} = <input style="width: 50px;" type="text"/>						
Height of Curb at Gutter Flow Line	H _{CURB} = <input style="width: 50px;" type="text" value="8.00"/> inches						
Distance from Curb Face to Street Crown	T _{CRWN} = <input style="width: 50px;" type="text" value="9.0"/> ft						
Gutter Width	W = <input style="width: 50px;" type="text" value="2.00"/> ft						
Street Transverse Slope	S _x = <input style="width: 50px;" type="text" value="0.028"/> ft/ft						
Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft)	S _y = <input style="width: 50px;" type="text" value="0.083"/> ft/ft						
Street Longitudinal Slope - Enter 0 for sump condition	S ₀ = <input style="width: 50px;" type="text" value="0.000"/> ft/ft						
Manning's Roughness for Street Section (typically between 0.012 and 0.020)	n _{STREET} = <input style="width: 50px;" type="text" value="0.016"/>						
Max. Allowable Spread for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50px;">Minor Storm</th> <th style="width: 50px;">Major Storm</th> <th style="width: 20px;">ft</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 40px;" type="text" value="9.0"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="9.0"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	ft	<input style="width: 40px;" type="text" value="9.0"/>	<input style="width: 40px;" type="text" value="9.0"/>	
Minor Storm	Major Storm	ft					
<input style="width: 40px;" type="text" value="9.0"/>	<input style="width: 40px;" type="text" value="9.0"/>						
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50px;">Minor Storm</th> <th style="width: 50px;">Major Storm</th> <th style="width: 20px;">inches</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 40px;" type="text" value="8.0"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="8.0"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	inches	<input style="width: 40px;" type="text" value="8.0"/>	<input style="width: 40px;" type="text" value="8.0"/>	
Minor Storm	Major Storm	inches					
<input style="width: 40px;" type="text" value="8.0"/>	<input style="width: 40px;" type="text" value="8.0"/>						
Check boxes are not applicable in SUMP conditions	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tbody> <tr> <td style="width: 50px; text-align: center;"><input type="checkbox"/></td> <td style="width: 50px; text-align: center;"><input type="checkbox"/></td> </tr> </tbody> </table>	<input type="checkbox"/>	<input type="checkbox"/>				
<input type="checkbox"/>	<input type="checkbox"/>						
MINOR STORM Allowable Capacity is based on Depth Criterion							
MAJOR STORM Allowable Capacity is based on Depth Criterion							
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th style="width: 50px;">Minor Storm</th> <th style="width: 50px;">Major Storm</th> <th style="width: 20px;">cfs</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><input style="width: 40px;" type="text" value="SUMP"/></td> <td style="text-align: center;"><input style="width: 40px;" type="text" value="SUMP"/></td> <td></td> </tr> </tbody> </table>	Minor Storm	Major Storm	cfs	<input style="width: 40px;" type="text" value="SUMP"/>	<input style="width: 40px;" type="text" value="SUMP"/>	
Minor Storm	Major Storm	cfs					
<input style="width: 40px;" type="text" value="SUMP"/>	<input style="width: 40px;" type="text" value="SUMP"/>						

INLET IN A SUMP OR SAG LOCATION

Version 4.06 Released August 2018

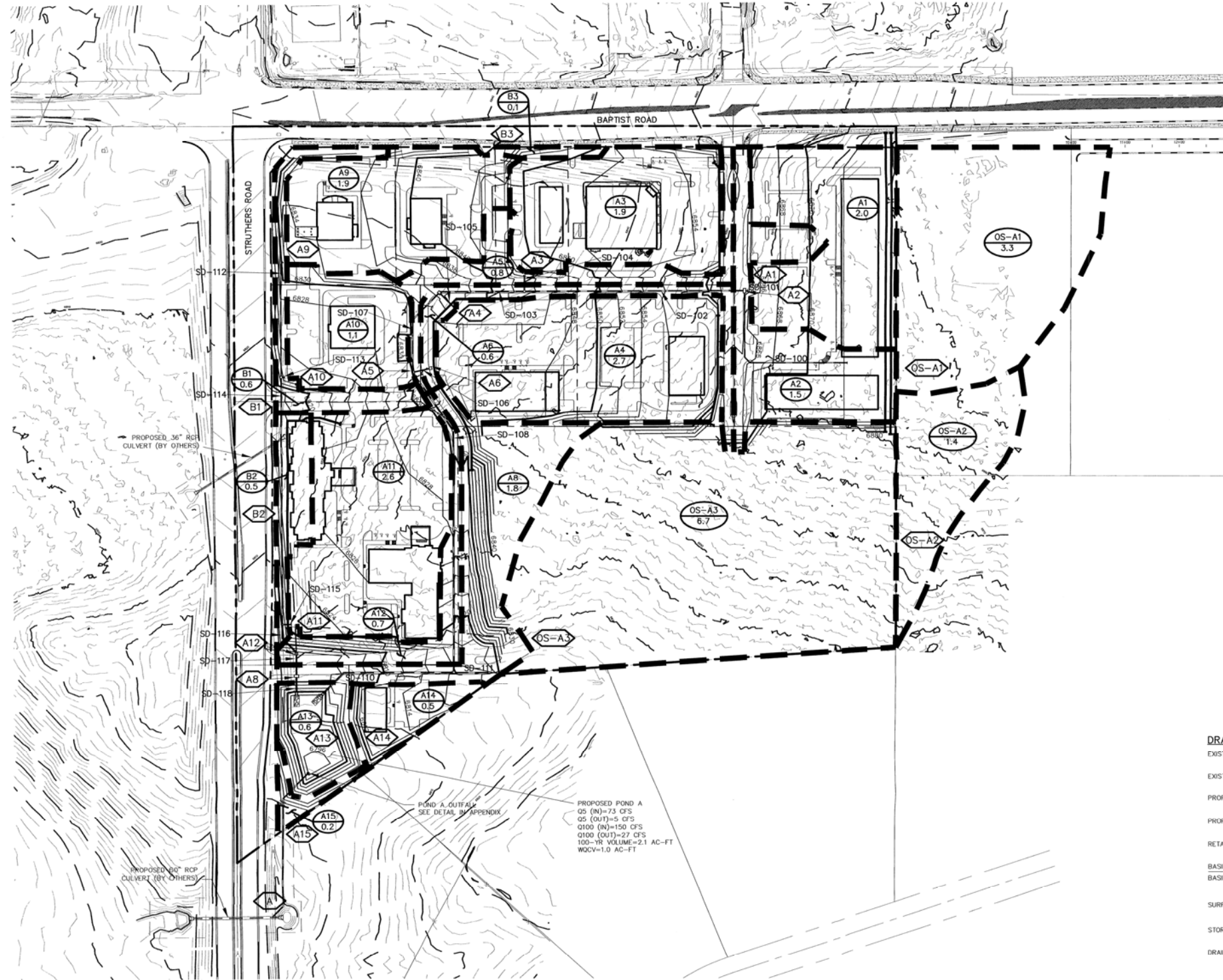


Design Information (Input)	MINOR	MAJOR	
Type of Inlet	CDOT/Denver 13 Combination		
Local Depression (additional to continuous gutter depression 'a' from above)			
Number of Unit Inlets (Grate or Curb Opening)	1	1	
Water Depth at Flowline (outside of local depression)			
Grate Information			
Length of a Unit Grate	3.00	3.00	feet
Width of a Unit Grate	1.73	1.73	feet
Area Opening Ratio for a Grate (typical values 0.15-0.90)	0.43	0.43	
Clogging Factor for a Single Grate (typical value 0.50 - 0.70)	0.50	0.50	
Grate Weir Coefficient (typical value 2.15 - 3.60)	3.30	3.30	
Grate Orifice Coefficient (typical value 0.60 - 0.80)	0.60	0.60	
Curb Opening Information			
Length of a Unit Curb Opening	3.00	3.00	feet
Height of Vertical Curb Opening in Inches	8.50	8.50	inches
Height of Curb Orifice Throat in Inches	5.25	5.25	inches
Angle of Throat (see USDCM Figure ST-5)	0.00	0.00	degrees
Side Width for Depression Pan (typically the gutter width of 2 feet)	2.00	2.00	feet
Clogging Factor for a Single Curb Opening (typical value 0.10)	0.10	0.10	
Curb Opening Weir Coefficient (typical value 2.3-3.7)	3.70	3.70	
Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	0.66	0.66	
Low Head Performance Reduction (Calculated)			
Depth for Grate Midwidth	0.387	0.387	ft
Depth for Curb Opening Weir Equation	0.20	0.20	ft
Combination Inlet Performance Reduction Factor for Long Inlets	0.68	0.68	
Curb Opening Performance Reduction Factor for Long Inlets	1.00	1.00	
Grated Inlet Performance Reduction Factor for Long Inlets	0.68	0.68	
Total Inlet Interception Capacity (assumes clogged condition)			
Inlet Capacity IS GOOD for Minor and Major Storms(>Q PEAK)	1.5	1.5	cfs
Q PEAK REQUIRED	0.2	0.4	cfs

**DRAINAGE
REFERENCE
INFORMATION**

MONUMENT RIDGE DRAINAGE MAP – DEVELOPED CONDITIONS

TOWN OF MONUMENT, EL PASO COUNTY, COLORADO

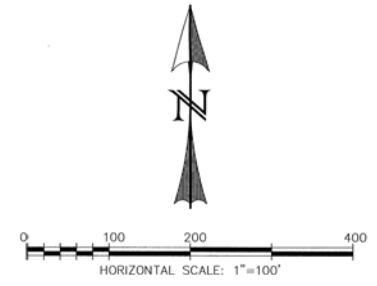


BASIN	Q5 [CFS]	Q100 [CFS]
A1	7	14
A2	5	9
A3	7	13
A4	10	19
A5	3	7
A6	2	5
A7	-	-
A8	7	14
A9	6	13
A10	4	8
A11	9	17
A12	3	5
A13	1	3
A14	2	4
A15	0.5	1
B1	2	4
B2	1	3
B3	0.2	0.4
OS-A1	1	3
OS-A2	3	6
OS-A3	13	28

DESIGN POINT	Q5 [CFS]	Q100 [CFS]	DESCRIPTION
SURFACE			
A1	7	14	FUTURE CONNECTION
A2	5	9	8" SUMP INLET
A3	7	13	FUTURE CONNECTION
A4	10	19	FUTURE CONNECTION
A5	3	7	5" SUMP INLET
A6	2	5	5" SUMP INLET
A7	-	-	NOT USED
A8	7	14	8" SUMP INLET
A9	6	13	FUTURE CONNECTION
A10	4	8	FUTURE CONNECTION
A11	9	17	FUTURE CONNECTION
A12	3	5	5" SUMP INLET
A13	1	3	POND A GROUND SURFACE
A14	2	4	FUTURE CONNECTION
A15	0.5	1	SHEET FLOW TO SOUTH
A	5	27	TOTAL COMBINED FLOW FROM SITE TO SOUTH
B1	2	4	SHEET FLOW INTO STRUTHERS ROAD
B2	1	3	SHEET FLOW INTO STRUTHERS ROAD
B3	0.2	0.4	SHEET FLOW INTO BAPTIST ROAD
OS-A1	1	3	SHEET FLOW ONTO SITE
OS-A2	3	6	SHEET FLOW ONTO SITE
OS-A3	13	28	FUTURE CONNECTION (SINGLE FAMILY RESIDENTIAL)
STORM DRAIN			
SD-100	1	3	18" RCP
SD-101	7	14	18" RCP
SD-102	12	24	24" RCP
SD-103	17	35	24" RCP
SD-104	7	13	24" RCP
SD-105	10	19	24" RCP
SD-106	2	5	18" RCP
SD-107	26	52	30" RCP
SD-108	31	62	30" RCP
SD-109	-	-	NOT USED
SD-110	46	95	36" RCP
SD-111	15	33	24" RCP
SD-112	6	13	18" RCP
SD-113	4	8	18" RCP
SD-114	10	20	24" RCP
SD-115	9	17	24" RCP
SD-116	19	38	30" RCP
SD-117	21	43	30" RCP
SD-118	28	55	36" RCP

DRAINAGE MAP LEGEND

- EXISTING MAJOR CONTOUR (10')
- EXISTING MINOR CONTOUR (2')
- PROPOSED MAJOR CONTOUR (10')
- PROPOSED MINOR CONTOUR (2')
- RETAINING WALL
- BASIN IDENTIFIER
- BASIN AREA [AC]
- SURFACE DESIGN POINT IDENTIFIER
- STORM DRAIN DESIGN POINT IDENTIFIER
- DRAINAGE BASIN BOUNDARY



PROPOSED POND A
Q5 (N)=73 CFS
Q5 (O1)=5 CFS
Q100 (N)=150 CFS
Q100 (O1)=27 CFS
100-YR VOLUME=2.1 AC-FT
WCV=1.9 AC-FT

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV.</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table>	REV.	DESCRIPTION	DATE										<p>REVIEW:</p> <p>STREET DESIGN: _____ DATE _____</p> <p>ROUGH CUT REVIEW: _____ DATE _____</p> <p>FINAL REVIEW: _____ DATE _____</p> <p>DRAINAGE DESIGN: _____ DATE _____</p>	<p>DESIGN DATA:</p> <p>SIDEWALKS: WIDTH: _____ LOCATION: <input type="checkbox"/> Attached <input type="checkbox"/> Detached</p> <p>ASPHALT THICKNESS: _____ AC Surface _____ AC Base _____</p> <p>AGC. BASE THICKNESS: _____ Class 6 _____ Class 5 _____ Class 2 _____</p> <p>CURB TYPE: <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3</p> <p>R/W WIDTH: _____ F/C-F/C _____</p> <p>STREET TYPE: _____ HVEEM _____</p>	<p>PREPARED FOR:</p> <p style="text-align: center;">ESI</p> <p style="text-align: center;">15 NORTH NEVADA AVENUE COLORADO SPRINGS, CO 80903</p>	<p>WESTWORKS ENGINEERING</p> <p style="font-size: 8px;">943 OSAGE AVENUE, MANitou SPRINGS, CO 80829 (719) 685-1670</p>	<p>MONUMENT RIDGE</p> <hr/> <p>DRAINAGE MAP DEVELOPED CONDITIONS</p>	<p>DRAWN BY: CDK</p> <p>SCALE: 1"=100'</p> <p>JOB NUMBER: 90537</p> <p>DATE: 3/14/06</p> <p>SHEET: 2 OF 2</p>
REV.	DESCRIPTION	DATE																

MAP POCKET

DESIGNED BY: XXX
 DRAWN BY: LJA
 CHECKED BY: KAS

DATE: _____
 PREPARED BY: _____

REVISION DESCRIPTION

EL PASO COUNTY

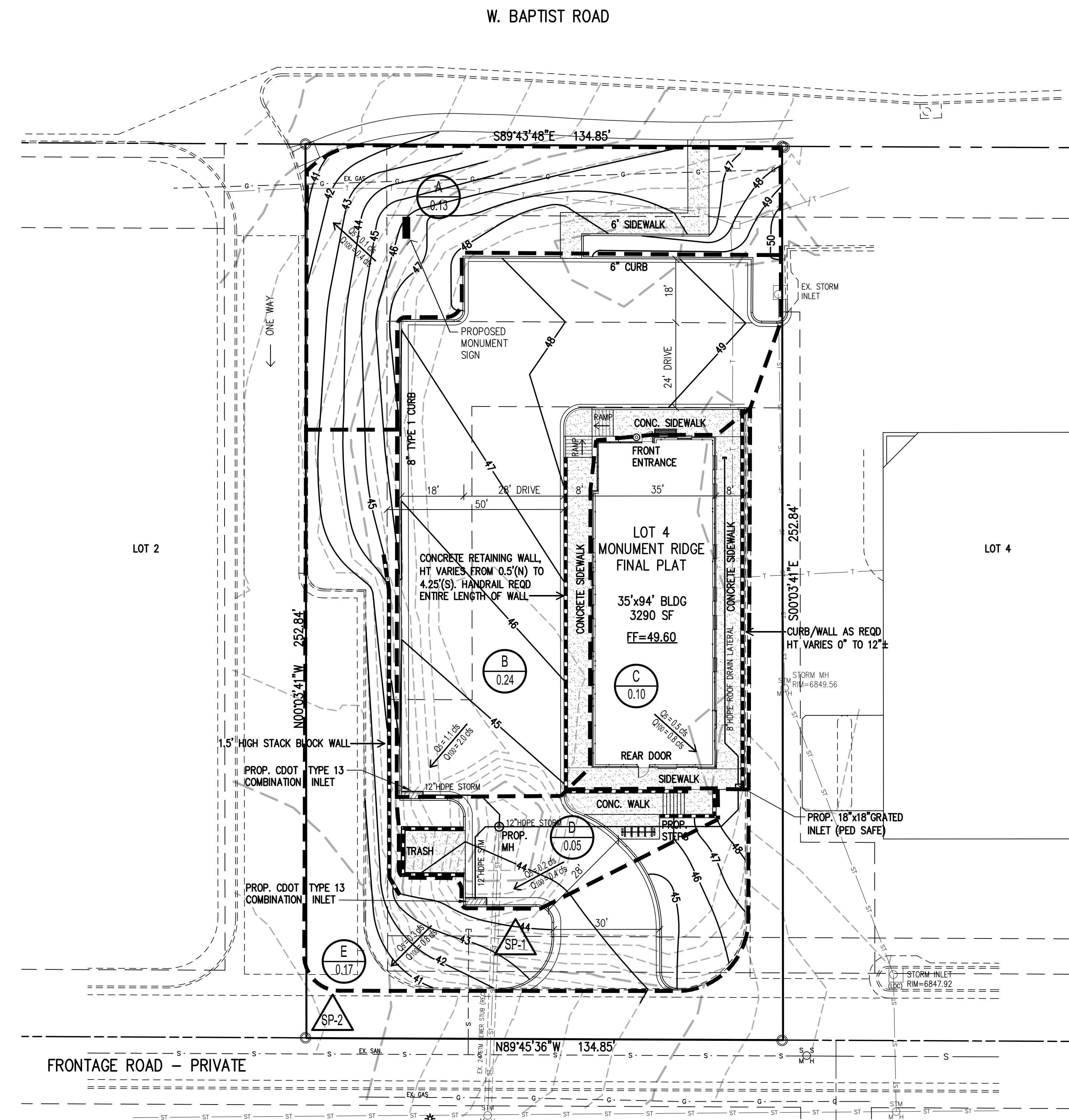
WMG DEVELOPMENT
 DRAINAGE PLAN
 745 W. BAPTIST ROAD

MONUMENT, COLORADO

PREPARED UNDER THE DIRECT SUPERVISION OF

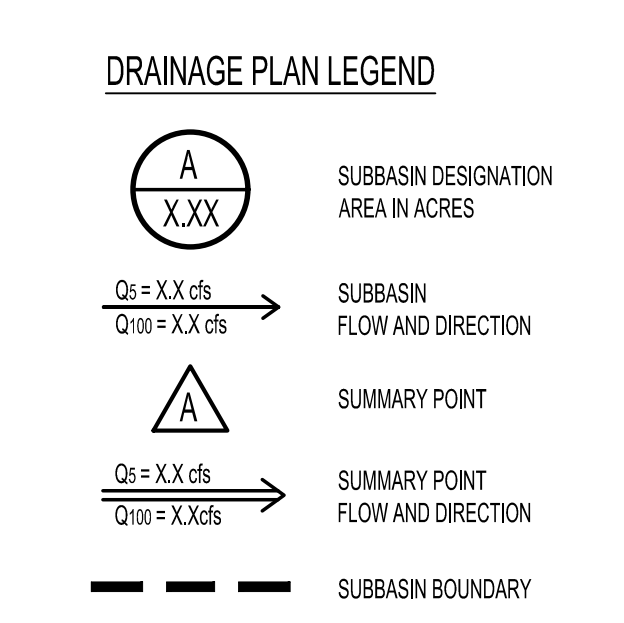
PRELIMINARY NOT FOR CONSTRUCTION

FOR AND ON BEHALF OF
 BASELINE CORPORATION
 INITIAL SUBMITTAL: XX/XX/XX
 DRAWING SIZE: 24" X 36"
 SURVEY FIRM: SURVEY DATE: 04-24-20
 BEC/OWA: 04-24-20
 JOB NO.: 35006
 DRAWING NAME: 35006 Concept 3 RevOP.dwg
 SHEET 1 OF XX
 DRG-1

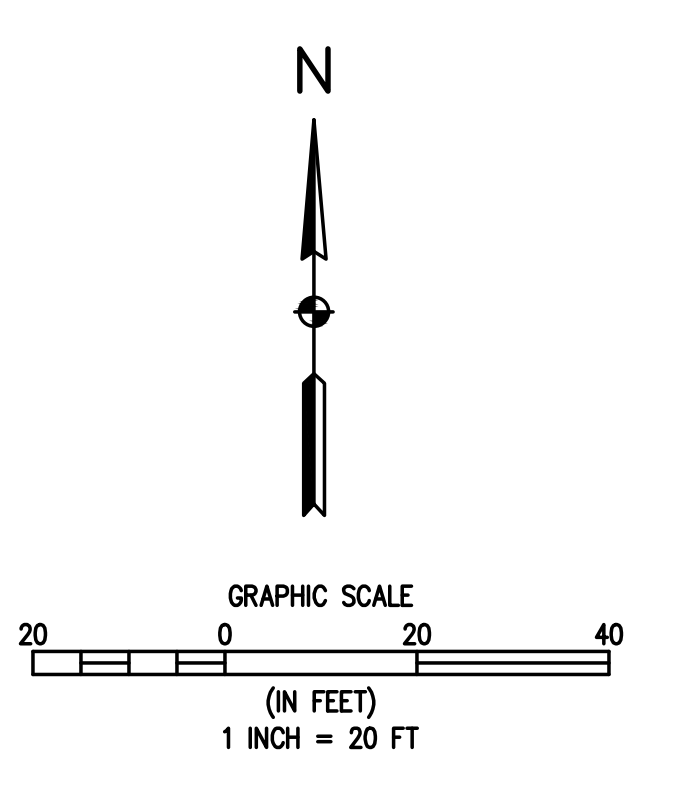


SUBBASIN	AREA, AC	Q5 CFS	Q100 CFS
A	0.13	0.1	0.4
B	0.24	1.1	2.0
C	0.10	0.5	0.8
D	0.05	0.2	0.4
E	0.17	0.3	0.8

SUMMARY POINT TABLE			
SUM PT	AREA, AC	Q5 CFS	Q100 CFS
SP-1	0.39	1.8	3.2
SP-2	0.56	2.1	4.0



NOTES
 1. CONTOURS (1 FT INTERVAL) ARE FROM FIELD SURVEY COMPLETED APRIL 24, 2020.
 2. PROJECT BENCH MARK IS A 3 1/2" CDOT BRASS DISK IN THE TOP OF THE WEST END OF THE NORTH PARAPET WALL OF THE BAPTIST ROAD BRIDGE OVER INTERSTATE 25. ELEVATION 6862.51 NAVD88.



R:\35006 Monument\WMG_Dental\VPD SITE PLAN\35006 Concept 3 RevOP.dwg, 12/17/2020 3:25:05 PM, Linda Arnold