PERCEPTION
DESIGN GROUP, INC.

April 11, 2026

City of Parker
Engineering Department
20120 East Mainstreet
Parker, CO 80138

Re: Lot 3A, Parker Pointe Subdivision, Filing No. 1, Amendment No. 1
Final Drainage Letter

Dear Engineering Staff:

The purpose of this letter is to confirm that the proposed grading and drainage improvements associated with the above referenced property is in conformance with the "Final Drainage Report for Parker Pointe Parker, Colorado", prepared by Perception Design Group Inc., and dated November 28, 2018. (PDG report).

The Huntington Bank Parker project improvements include the construction of a new building for a bank with a drive-thru and parking lot on 1.3541 acres.

The soil for the site is a mix of Sampson loam and Bresser-Truckton sandy loams. Both soils are in the hydrologic soil group B. The soil report is in the appendix of this letter. The site is located in Zone X shown on FIRM Map Number 08035C0182G dated March 16, 2016.

The subject land was broken into several basins for analysis as part of the PDG report including the Lots 14 and a portion of Lot 13 for future development. The subject land was included in the analysis of the overall Parker Pointe – Filing No. 1 Parker, Colorado in the PDG report as Basins of a portion of Lot 14, Lot 13, U2, U3, a portion of IN1 and a portion of IN2 for a total of 1.35 acres and assuming a future imperviousness value of 95% with all basins' runoff directed to the existing detention pond on the northern boundary included in the ILC report. The hydraulic analysis was completed using the latest NOAA 14-point rainfall values and the latest equations from MHFD Table 6.5.

Sub Basin IN1 consists of the existing eastern portion of Declan Drive. Runoff is directed to the Existing Inlet 1 (10' Type R Inlet) that will be removed just north of the southern access drive to the site that is connected to the existing storm sewer system that drains into the existing detention pond.

Sub Basin IN2 consists of the southeast corner of the site located at the existing northwest corner of Declan Drive and Napa Avenue. The runoff is directed to the existing Inlet 2 (Type R Inlet) located at the southern end of Declan Drive along the western curb. The inlet is connected to the existing storm sewer system that drains into the existing detention pond.

Sub Basin IN3 consists of the southeast corner of the access drive, the southern parking areas and the drive-thru lanes. The runoff is directed to Inlet 3 (5' Type R Inlet) located along the southeast corner of the southern parking area. The inlet is connected to the existing storm sewer system that drains into the existing detention pond.

Sub Basin IN4 consists of the southwest corner of the access drive and a small portion of sidewalk. The runoff is directed to Inlet 4 (5' Type R Inlet) located on the southwest curb of the southwest corner of the access drive. The inlet is connected to the existing storm sewer system that drains into the existing detention pond.

Sub Basin IN5 consists of the northern portion of the access drive, northern parking areas, the northern portion and landscaping around the building and a portion of the landscaping north of the access drive. The runoff is directed to Inlet 5 (Type 13 Combination Inlet) located on the northwest curb of the northwest corner of the access drive. The inlet is connected to the existing storm sewer system that drains into the existing detention pond.

Sub Basin B is the northern landscaped portion of Lot 3A that is directed north this is due to the grading restraints between the two lots.

Sub Basin R consists of the roof that will be connected to roof drains that are connected to the proposed 18" RCP pipe along the western access drive. The pipe is connected to the existing storm sewer system that drains into the existing detention pond.

Sub Basin U3 consists of 0.19 acres on the west border of the site. This follows historic drainage patterns and flows into South Parker Road because this area contains an existing large gas line, telephone, fiber optic and electric lines the grading in this area in not able to be changed to be captured into the regional detention pond. Basin U1 is 0.05 acres of the original Basin U3 from the PDG Report. The remainder 0.14 acres of the basin is landscaped area acting as a grass buffer limiting any runoff. This was not able to be captured due to the constraints of the site but this area was included in the existing detention pond at a 95% impervious compared with the impervious value of 20% for landscaping. The remainder of the runoff follows the path of Basin U3 from the PDG Report "Basin U3 is on-site area that is not tributary to the detention/ water quality facility. Runoff from this basin adjacent to Parker Road flows overland into Parker Road. Detention and water quality are not provided for this basin."

Sub Basin U2 consists of 0.17 acres on the northern half of the existing private drive to the south of the site named Napa Avenue, the existing sidewalk and a portion of the landscaping on the southern border of the site. This basin matches the existing basin EXU2 from the approved PDG Report exactly. From the PDG Report "Basin U2 is on-site area that is not tributary to the detention / water quality facility. This basin quantifies runoff escaping the site down the access road to Parker Road. Detention is not provided for this basin, however, water quality is provided in the grass swale referenced above in the PR1 basin description." From the PDG Report the PR1 basin description is as follows "Basin PR1 combines with Basins U2 and PR2 to define runoff to the new pair of inlets located at the low point of Parker Road. Basin PR1 is separated to quantify new paved area requiring water quality treatment. Treatment for Basin PR1 combined with Basin U2 is provided in a grass swale in the ROW of Parker Road leading down to Kinney Creek."

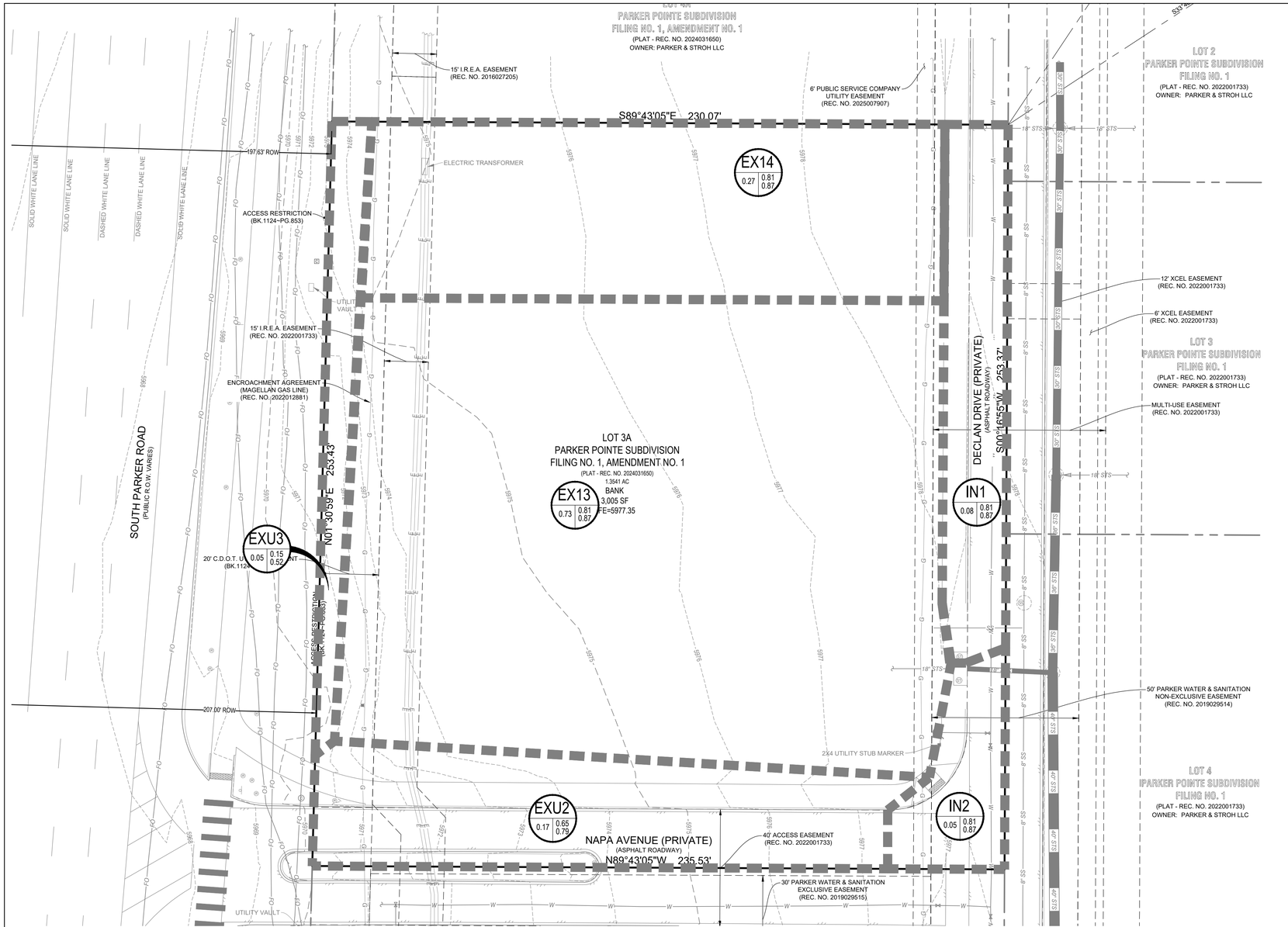
Runoff Comparison Table:

Basin	Area (Ac)	Imp. (%)	5-yr Coefficient	100-year Coefficient	5-yr Runoff (cfs)	100-yr Runoff (cfs)
PDG MASTER BASIN						
EX13	0.73	95.00	0.81	0.87	2.21	4.98
EX14	0.27	95.00	0.81	0.87	0.82	1.84
EXU3	0.05	20.00	0.15	0.52	0.03	0.20
EXU2	0.17	77.67	0.65	0.79	0.41	1.05
EXIN1	0.08	95.00	0.81	0.87	0.24	0.55
EXIN2	0.05	95.00	0.81	0.87	0.15	0.34
TOTAL	1.35	90.14	0.77	0.85	3.94	8.96
PDG Huntington BASIN						
IN1	0.09	95.00	0.81	0.87	0.27	0.61
IN2	0.05	95.00	0.81	0.87	0.15	0.34
IN3	0.34	73.19	0.61	0.77	0.77	2.05
IN4	0.04	91.68	0.78	0.85	0.12	0.27
IN5	0.34	73.00	0.61	0.77	0.77	2.05
B	0.06	20.00	0.15	0.52	0.03	0.24
R	0.07	95.00	0.81	0.87	0.21	0.48
U3	0.19	20.00	0.15	0.52	0.11	0.77
U2	0.17	77.72	0.65	0.79	0.41	1.05
TOTAL	1.35	67.79	0.56	0.74	2.85	7.88

The proposed grading of the site is directing 73% via the storm system to the existing detention basin providing Water Quality and detention. The remainder of the site is landscaped and directed to an existing grass swale in the ROW of Parker Road leading down to Kinney Creek. As the tributary area to the pond is similar to the assumptions in the PDG report, and the runoff and imperviousness was reduced from 90% to 68% for the site. Since the runoff and imperviousness is less, the site is deemed in compliance with the Parker Pointe – Filing No 1 report. No changes are required to the existing pond or the existing storm sewer system.

Sincerely,

Jerry W. Davidson, P.E.
For and on Behalf of
Perception Design Group, Inc.



LEGEND

- PROPERTY LINE
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- PROPOSED SIDEWALK
- PROPOSED HANDICAP RAMP
- PROPOSED CONCRETE PAVEMENT
- PROPOSED STORM SEWER
- STORM SEWER MANHOLE
- STORM SEWER INLET
- 5340 EXISTING CONTOUR
- 42 PROPOSED CONTOUR
- PROPOSED RETAINING WALL
- 1 DESIGN POINT
- R1 / 0.20 / 0.75 / 0.85 BASIN DESIGNATION, 5 YR RUNOFF COEFFICIENT, 100 YR RUNOFF COEFFICIENT, BASIN AREA (IN ACRES)
- BASIN BOUNDARY LINE
- FLOW DIRECTION
- E/T/G/FO EXISTING ELECTRIC/TELEPHONE/GAS/FIBER LINE
- ST 18"STS EXISTING STORM SEWER WITH MANHOLE
- S 8"SS EXISTING SANITARY SEWER WITH MANHOLE
- 6"WTR EXISTING WATERLINE WITH HYDRANT

PARKER WATER AND SANITATION DISTRICT

THE DISTRICT INSPECTOR MUST BE NOTIFIED AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION. CALL PARKER WATER AND SANITATION DISTRICT AT 303-841-4627. THE DISTRICT WILL PROVIDE PERIODIC INSPECTIONS OF THE WORK. 24 HOUR NOTICE TO THE INSPECTOR IS REQUIRED FOR SCHEDULING INSPECTIONS.
ANY WORK ACCOMPLISHED WITHOUT THE APPROVAL OF THE INSPECTOR WILL BE SUBJECT TO REJECTION.
REVIEWED FOR CONFORMANCE TO PARKER WATER AND SANITATION DISTRICT STANDARDS.

BY:_____
(DISTRICT REPRESENTATIVE)

DATE:_____

APPROVED FOR CONSTRUCTION:
PARKER WATER AND SANITATION DISTRICT
BY:_____
(DISTRICT ENGINEER)

DATE:_____

ALL FIRE HYDRANTS SHALL BE INSTALLED ACCORDING TO WATER UTILITY STANDARDS. THE NUMBER AND LOCATION OF THE FIRE HYDRANTS AS SHOWN ON THE OVERALL UTILITY PLAN ARE CORRECT AS SPECIFIED BY THE TOWN OF PARKER, COMMUNITY DEVELOPMENT DEPARTMENT.

_____
FIRE CODE OFFICIAL OR DESIGNATED REPRESENTATIVE

(NOTE - UNDERGROUND FIRE LINE (UFL) SUBMITTAL DOCUMENTS MUST MEET THE REQUIREMENTS OF NFPA 24 WHEN SUBMITTING FOR REVIEW.)

THE TOWN OF PARKER REVIEW CONSTITUTES GENERAL COMPLIANCE WITH THE TOWN'S STANDARDS AND APPROVED VARIANCES, SUBJECT TO THESE PLANS BEING STAMPED, SIGNED, AND DATED BY THE PROFESSIONAL ENGINEER OF RECORD. REVIEW BY THE TOWN DOES NOT CONSTITUTE APPROVAL OF THE PLAN DESIGN OR ACCURACY AND CORRECTNESS OF ENGINEERING CALCULATIONS. ERRORS IN THE DESIGN OR CALCULATIONS REMAIN THE RESPONSIBILITY OF THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE ARE AFFIXED TO THIS DOCUMENT.

THIS REVIEW DOES NOT CONSTITUTE APPROVAL OF ANY PRIVATE ON-SITE IMPROVEMENTS WHICH MAY BE SHOWN. CONSTRUCTION CANNOT COMMENCE UNTIL ALL REQUIRED DRAINAGE/TRAFFIC REPORT(S), FINAL DEVELOPMENT PLAN(S), SPECIAL REVIEW(S), GRADING PERMIT, AND/OR OTHER PERMITS ARE COMPLETE, APPROVED AND ON FILE WITH THE TOWN OF PARKER

_____
TOWN OF PARKER, DIRECTOR OF ENGINEERING

COLORADO 811 KNOW WHAT'S BELOW. CALL BEFORE YOU DIG.

THE TYPE, SIZE, LOCATION, AND NUMBER OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES ON THE SITE, AND OFFSITE IN WORK AREAS. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY CONTRACTOR PRIOR TO DATE OF CONSTRUCTION. FOR INFORMATION CONTACT: UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) – 1- 800-922-1987. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY SIZE AND HORIZONTAL AND VERTICAL LOCATIONS OF EXISTING FACILITIES PRIOR TO CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING IMPROVEMENTS AND UTILITIES AND SHALL REPAIR ANY DAMAGE AT HIS EXPENSE.

GRAPHIC SCALE
20 0 10 20 40
1 INCH = 20 FEET

PERCEPTION DESIGN GROUP, INC.
6901 SOUTH PIERCE STREET, SUITE 220. LITTLETON, CO 80128 303-232-8068
WWW.PERCEPTIONDESIGNGROUP.COM

PREPARED UNDER THE DIRECT SUPERVISION OF
JERRY W. DAVIDSON, P.E.
COLORADO REG # 30226
FOR AND ON BEHALF OF
PERCEPTION DESIGN GROUP, INC.

REVISIONS	DESCRIPTION	DATE
1	1ST SUBMITTAL	09/17/25
2	2ND SUBMITTAL	04/03/26

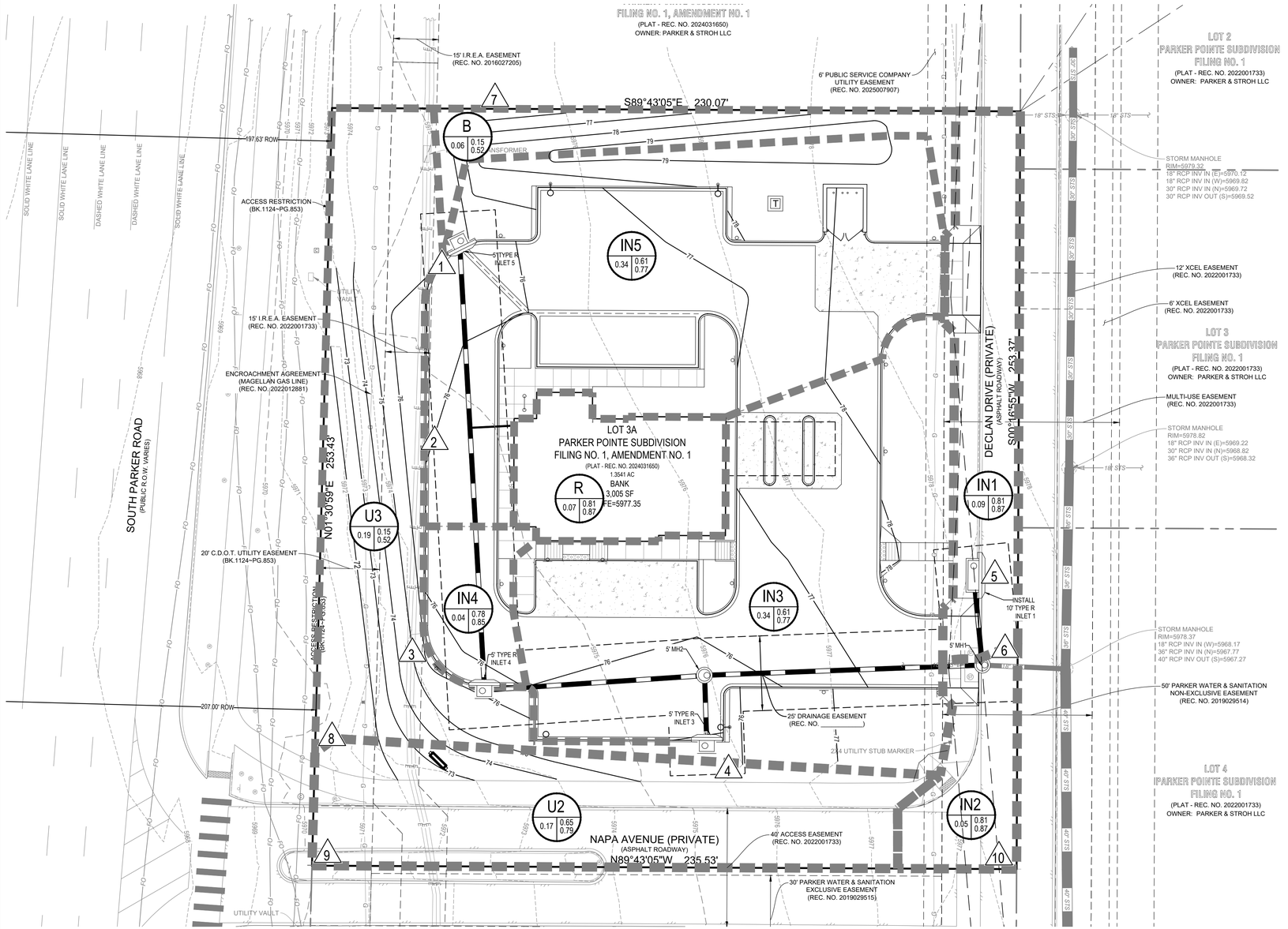
EXISTING DRAINAGE PLAN

HUNTINGTON NATIONAL BANK

LOT 3A, PARKER POINTE SUBDIVISION FILING NO. 1, AMENDMENT NO. 1
LOCATED IN THE NORTHEAST 1/4 OF SECTION 3, TOWNSHIP 6 SOUTH,
RANGE 66 WEST OF THE 6TH P.M., TOWN OF PARKER, COUNTY OF DOUGLAS, STATE OF COLORADO

Design By: CLN
Approved By: JWD
Project No.: 2025-005

SHEET
1 OF 2



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DRAINAGE MAP

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Design By: CLN
Approved By: JWD
Project No.: 2025-005

SHEET
2 OF 2

NOAA Atlas 14, Volume 8, Version 2
Location name: Parker, Colorado, USA*
Latitude: 39.4771°, Longitude: -104.759°
Elevation: 5960 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.225** (0.186-0.276)	**0.284** (0.234-0.348)	**0.384** (0.315-0.471)	**0.469** (0.383-0.579)	**0.593** (0.468-0.759)	**0.692** (0.532-0.896)	**0.794** (0.588-1.05)	**0.902** (0.638-1.22)	**1.05** (0.712-1.46)	**1.16** (0.768-1.64)
10-min	**0.330** (0.272-0.404)	**0.416** (0.343-0.509)	**0.562** (0.461-0.689)	**0.687** (0.561-0.847)	**0.868** (0.685-1.11)	**1.01** (0.778-1.31)	**1.16** (0.861-1.54)	**1.32** (0.934-1.79)	**1.54** (1.04-2.14)	**1.71** (1.12-2.40)
15-min	**0.402** (0.332-0.492)	**0.507** (0.418-0.621)	**0.685** (0.563-0.841)	**0.838** (0.684-1.03)	**1.06** (0.835-1.36)	**1.24** (0.949-1.60)	**1.42** (1.05-1.88)	**1.61** (1.14-2.19)	**1.87** (1.27-2.61)	**2.08** (1.37-2.93)
30-min	**0.530** (0.437-0.648)	**0.669** (0.552-0.819)	**0.904** (0.743-1.11)	**1.11** (0.904-1.36)	**1.40** (1.10-1.79)	**1.63** (1.25-2.11)	**1.87** (1.38-2.48)	**2.12** (1.50-2.88)	**2.47** (1.67-3.43)	**2.74** (1.80-3.85)
60-min	**0.667** (0.551-0.816)	**0.827** (0.682-1.01)	**1.10** (0.907-1.36)	**1.35** (1.10-1.66)	**1.71** (1.35-2.20)	**2.00** (1.54-2.60)	**2.31** (1.71-3.06)	**2.64** (1.87-3.58)	**3.09** (2.10-4.31)	**3.45** (2.28-4.86)
2-hr	**0.804** (0.667-0.977)	**0.985** (0.817-1.20)	**1.30** (1.08-1.59)	**1.59** (1.31-1.95)	**2.02** (1.61-2.58)	**2.37** (1.84-3.06)	**2.74** (2.05-3.62)	**3.15** (2.25-4.26)	**3.71** (2.54-5.15)	**4.17** (2.77-5.82)
3-hr	**0.902** (0.751-1.09)	**1.09** (0.906-1.32)	**1.43** (1.18-1.73)	**1.74** (1.43-2.11)	**2.20** (1.76-2.81)	**2.59** (2.02-3.34)	**3.01** (2.26-3.96)	**3.47** (2.49-4.68)	**4.11** (2.83-5.68)	**4.64** (3.09-6.44)
6-hr	**1.10** (0.920-1.32)	**1.31** (1.10-1.58)	**1.70** (1.41-2.05)	**2.05** (1.70-2.48)	**2.59** (2.09-3.29)	**3.04** (2.39-3.89)	**3.53** (2.67-4.62)	**4.06** (2.94-5.44)	**4.82** (3.34-6.61)	**5.43** (3.65-7.49)
12-hr	**1.34** (1.13-1.60)	**1.60** (1.35-1.92)	**2.07** (1.73-2.47)	**2.48** (2.06-2.98)	**3.10** (2.50-3.88)	**3.60** (2.84-4.56)	**4.14** (3.15-5.36)	**4.72** (3.43-6.26)	**5.54** (3.86-7.51)	**6.19** (4.18-8.47)
24-hr	**1.63** (1.38-1.93)	**1.94** (1.64-2.30)	**2.47** (2.08-2.93)	**2.93** (2.45-3.50)	**3.60** (2.93-4.46)	**4.15** (3.28-5.20)	**4.72** (3.60-6.04)	**5.33** (3.89-6.99)	**6.17** (4.32-8.29)	**6.83** (4.65-9.27)
2-day	**1.93** (1.64-2.28)	**2.27** (1.93-2.67)	**2.84** (2.41-3.35)	**3.34** (2.81-3.95)	**4.05** (3.30-4.97)	**4.62** (3.68-5.74)	**5.22** (4.00-6.62)	**5.85** (4.30-7.59)	**6.71** (4.73-8.93)	**7.38** (5.06-9.94)
3-day	**2.10** (1.79-2.46)	**2.46** (2.10-2.89)	**3.08** (2.62-3.62)	**3.61** (3.05-4.26)	**4.37** (3.57-5.32)	**4.97** (3.96-6.13)	**5.59** (4.30-7.04)	**6.23** (4.60-8.05)	**7.11** (5.04-9.41)	**7.80** (5.37-10.4)
4-day	**2.22** (1.90-2.60)	**2.61** (2.23-3.05)	**3.27** (2.78-3.83)	**3.83** (3.24-4.50)	**4.62** (3.78-5.60)	**5.24** (4.19-6.44)	**5.88** (4.54-7.39)	**6.55** (4.84-8.42)	**7.45** (5.29-9.82)	**8.16** (5.63-10.9)
7-day	**2.55** (2.19-2.96)	**2.97** (2.55-3.45)	**3.68** (3.15-4.28)	**4.28** (3.64-5.01)	**5.14** (4.23-6.20)	**5.82** (4.67-7.10)	**6.51** (5.05-8.12)	**7.24** (5.38-9.25)	**8.22** (5.87-10.8)	**8.99** (6.24-11.9)
10-day	**2.85** (2.46-3.30)	**3.29** (2.83-3.81)	**4.02** (3.45-4.67)	**4.66** (3.97-5.42)	**5.55** (4.58-6.67)	**6.27** (5.05-7.62)	**7.00** (5.45-8.70)	**7.76** (5.79-9.88)	**8.81** (6.31-11.5)	**9.62** (6.71-12.7)
20-day	**3.74** (3.24-4.29)	**4.24** (3.67-4.87)	**5.07** (4.37-5.84)	**5.78** (4.96-6.68)	**6.78** (5.63-8.07)	**7.57** (6.14-9.12)	**8.38** (6.57-10.3)	**9.22** (6.92-11.6)	**10.4** (7.48-13.4)	**11.2** (7.90-14.7)
30-day	**4.49** (3.90-5.13)	**5.08** (4.41-5.81)	**6.04** (5.23-6.93)	**6.85** (5.90-7.88)	**7.97** (6.63-9.42)	**8.84** (7.19-10.6)	**9.72** (7.63-11.9)	**10.6** (7.99-13.3)	**11.8** (8.55-15.1)	**12.7** (8.97-16.6)
45-day	**5.44** (4.75-6.20)	**6.19** (5.39-7.05)	**7.39** (6.42-8.43)	**8.37** (7.22-9.58)	**9.68** (8.06-11.3)	**10.7** (8.69-12.7)	**11.6** (9.17-14.1)	**12.6** (9.52-15.7)	**13.9** (10.1-17.7)	**14.8** (10.5-19.2)
60-day	**6.26** (5.47-7.10)	**7.17** (6.26-8.14)	**8.62** (7.50-9.80)	**9.77** (8.45-11.2)	**11.3** (9.40-13.1)	**12.4** (10.1-14.6)	**13.5** (10.6-16.2)	**14.5** (11.0-17.9)	**15.8** (11.5-20.0)	**16.7** (11.9-21.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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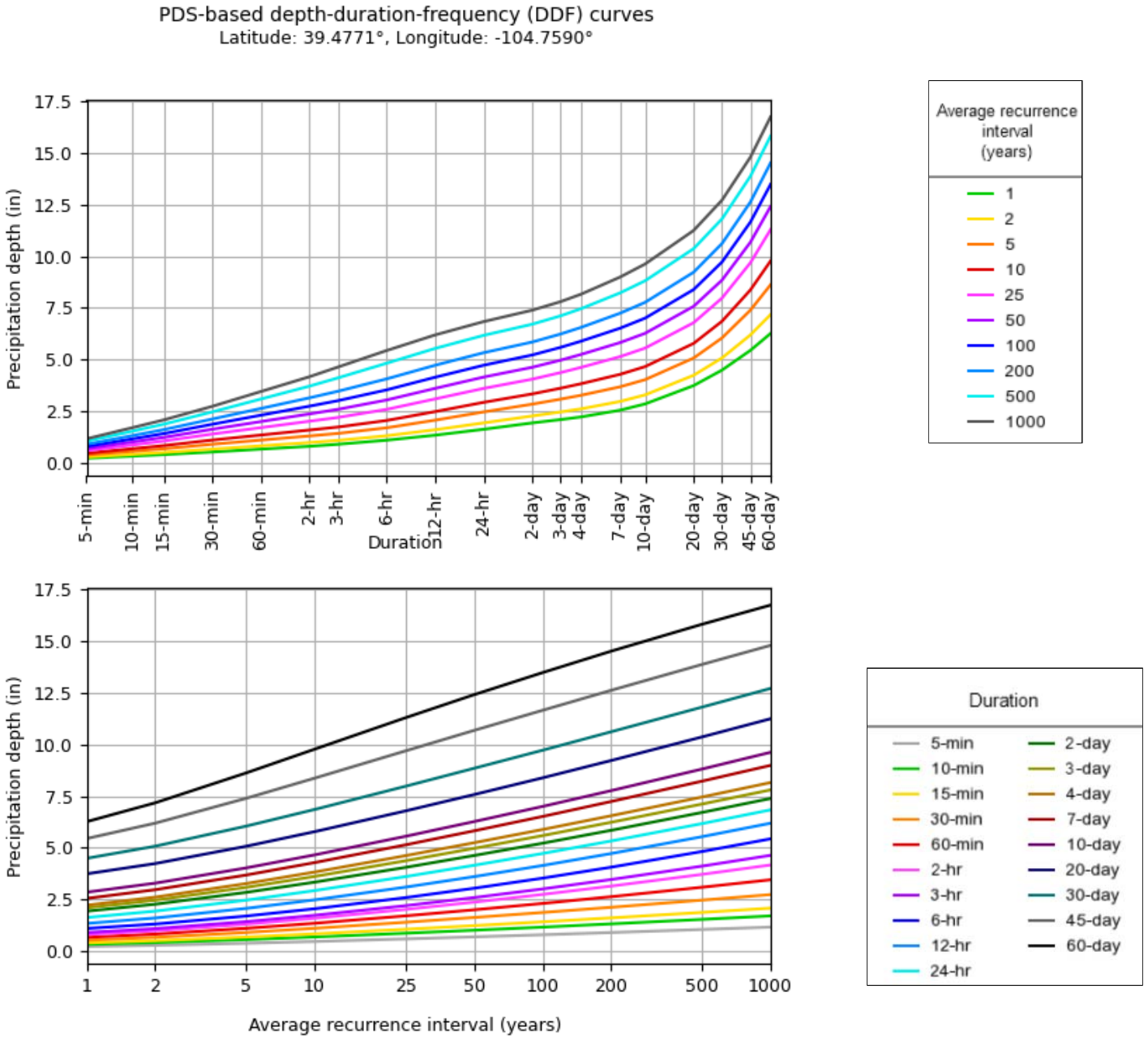
PF graphical



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Created (GMT): Fri Sep 12 21:19:18 2025

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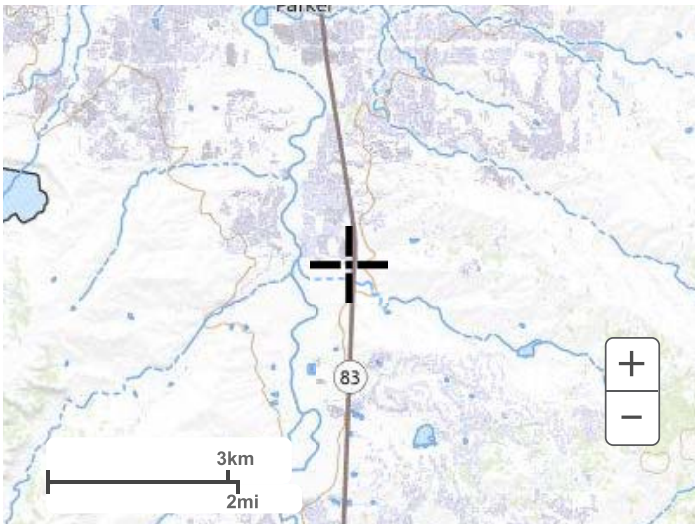
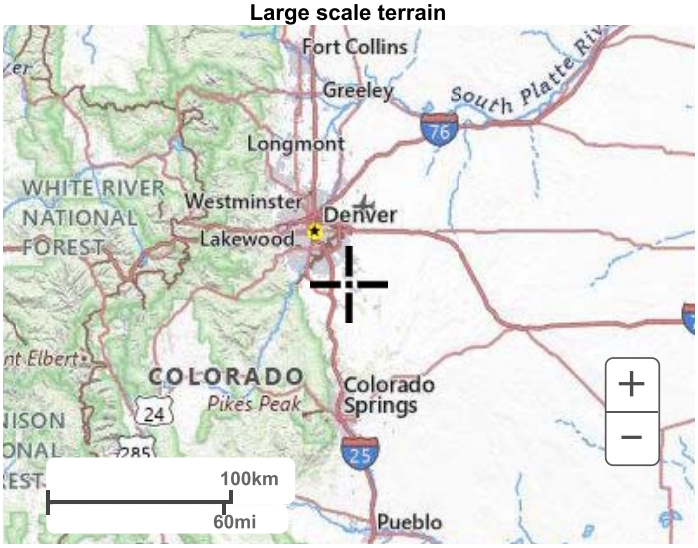
Maps & aerials

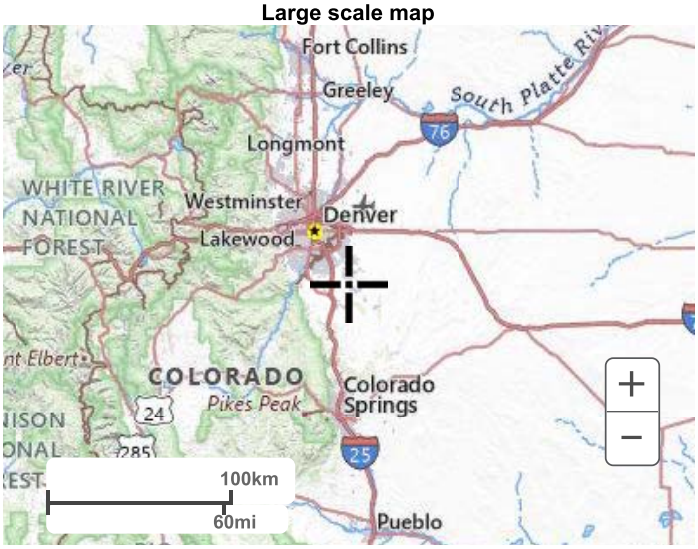
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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Questions?: HDSC.Questions@noaa.gov

Perception Design Group, Inc.
6901 South Pierce Street, Suite 315
Littleton, Colorado 80128
(303) 232-8088 Fax (303) 232-5255

Designed by: JWD
Date: 7-Apr-26
Job Number: 2025-005

Project: Huntington Parker

RAINFALL INTENSITIES

RAINFALL INTENSITY, I = (28.5 * P1)/[(10 + Tc)^0.786]

TIME OF CONCENTRATION, Tc =	**5**	**MINUTES**
2-YEAR ONE-HOUR RAINFALL, P1 =	**0.83**	**INCHES**
I (2-YEAR) =	**2.81**	**INCHES/HOUR**
5-YEAR ONE-HOUR RAINFALL, P1 =	**1.10**	**INCHES**
I (5-YEAR) =	**3.73**	**INCHES/HOUR**
10-YEAR ONE-HOUR RAINFALL, P1 =	**1.35**	**INCHES**
I (100-YEAR) =	**4.58**	**INCHES/HOUR**
100-YEAR ONE-HOUR RAINFALL, P1 =	**2.31**	**INCHES**
I (100-YEAR) =	**7.84**	**INCHES/HOUR**

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Project: Huntington Parker

COMPOSITE RUNOFF COEFFICIENTS - TYPE B SOIL

	ROOF	PAVEMENT	LANDSCAPING	GRAVEL	OPEN WATER	NATIVE GRASS	FUT. DEVELOP.			
Catchment	Area (Ac.)	Area (Ac.)	Area (Ac.)	Area (Ac.)	Area (Ac.)	Area (Ac.)	Area (Ac.)	Catchment Area	Composite Imperviousness	Composite C
	Imperviousness = 95%	Imperviousness = 95%	Imperviousness = 20%	Imperviousness = 60%	Imperviousness = 100%	Imperviousness = 5%	Imperviousness = 95%	(Ac.)	%	
EX13 (5-Year)	0.00	0.00	0.00	0.00	0.00	0.00	0.73	**0.73**	**95.00%**	**0.81**
EX13 (100-Year)	0.00	0.00	0.00	0.00	0.00	0.00	0.73	**0.73**	**95.00%**	**0.87**
EX14 (5-Year)	0.00	0.00	0.00	0.00	0.00	0.00	0.27	**0.27**	**95.00%**	**0.81**
EX14 (100-Year)	0.00	0.00	0.00	0.00	0.00	0.00	0.27	**0.27**	**95.00%**	**0.87**
EXU3 (5-Year)	0.00	0.00	0.05	0.00	0.00	0.00	0.00	**0.05**	**20.00%**	**0.15**
EXU3 (100-Year)	0.00	0.00	0.05	0.00	0.00	0.00	0.00	**0.05**	**20.00%**	**0.52**
EXU2 (5-Year)	0.00	0.13	0.04	0.00	0.00	0.00	0.00	**0.17**	**77.67%**	**0.65**
EXU2 (100-Year)	0.00	0.13	0.04	0.00	0.00	0.00	0.00	**0.17**	**77.67%**	**0.79**
EXIN1 (5-Year)	0.00	0.08	0.00	0.00	0.00	0.00	0.00	**0.08**	**95.00%**	**0.81**
EXIN1 (100-Year)	0.00	0.08	0.00	0.00	0.00	0.00	0.00	**0.08**	**95.00%**	**0.87**
EXIN2 (5-Year)	0.00	0.05	0.00	0.00	0.00	0.00	0.00	**0.05**	**95.00%**	**0.81**
EXIN2 (100-Year)	0.00	0.05	0.00	0.00	0.00	0.00	0.00	**0.05**	**95.00%**	**0.87**
EX TOTAL (5-Year)	0.00	0.26	0.09	0.00	0.00	0.00	1.00	**1.35**	**90.14%**	**0.77**
EX TOTAL (100-Year)	0.00	0.26	0.09	0.00	0.00	0.00	1.00	**1.35**	**90.14%**	**0.85**

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Designed by: JWD
Date: 7-Apr-26
Job Number: 2025-005

Project: Huntington Parker

COMPOSITE RUNOFF COEFFICIENTS - TYPE B SOIL

	ROOF	PAVEMENT	LANDSCAPING	GRAVEL	OPEN WATER	NATIVE GRASS			
Catchment	Area (Ac.)	Area (Ac.)	Area (Ac.)	Area (Ac.)	Area (Ac.)	Area (Ac.)	Catchment Area	Composite Imperviousness	Composite C
	Imperviousness = 95%	Imperviousness = 95%	Imperviousness = 20%	Imperviousness = 60%	Imperviousness = 100%	Imperviousness = 5%	(Ac.)	%	
IN1 (5-Year)	0.00	0.09	0.00	0.00	0.00	0.00	**0.09**	**95.00%**	**0.81**
IN1 (100-Year)	0.00	0.09	0.00	0.00	0.00	0.00	**0.09**	**95.00%**	**0.87**
IN2 (5-Year)	0.00	0.05	0.00	0.00	0.00	0.00	**0.05**	**95.00%**	**0.81**
IN2 (100-Year)	0.00	0.05	0.00	0.00	0.00	0.00	**0.05**	**95.00%**	**0.87**
IN3 (5-Year)	0.00	0.24	0.10	0.00	0.00	0.00	**0.34**	**73.19%**	**0.61**
IN3 (100-Year)	0.00	0.24	0.10	0.00	0.00	0.00	**0.34**	**73.19%**	**0.77**
IN4 (5-Year)	0.00	0.04	0.00	0.00	0.00	0.00	**0.04**	**91.68%**	**0.78**
IN4 (100-Year)	0.00	0.04	0.00	0.00	0.00	0.00	**0.04**	**91.68%**	**0.85**
IN5 (5-Year)	0.00	0.24	0.10	0.00	0.00	0.00	**0.34**	**73.00%**	**0.61**
IN5 (100-Year)	0.00	0.24	0.10	0.00	0.00	0.00	**0.34**	**73.00%**	**0.77**
B (5-Year)	0.00	0.00	0.06	0.00	0.00	0.00	**0.06**	**20.00%**	**0.15**
B (100-Year)	0.00	0.00	0.06	0.00	0.00	0.00	**0.06**	**20.00%**	**0.52**
R (5-Year)	0.07	0.00	0.00	0.00	0.00	0.00	**0.07**	**95.00%**	**0.81**
R (100-Year)	0.07	0.00	0.00	0.00	0.00	0.00	**0.07**	**95.00%**	**0.87**
Total Pond (5-Year)	0.07	0.66	0.26	0.00	0.00	0.00	**0.99**	**75.37%**	**0.63**
Total Pond (100-Year)	0.07	0.66	0.26	0.00	0.00	0.00	**0.99**	**75.37%**	**0.78**
U3 (5-Year)	0.00	0.00	0.19	0.00	0.00	0.00	**0.19**	**20.00%**	**0.15**
U3 (100-Year)	0.00	0.00	0.19	0.00	0.00	0.00	**0.19**	**20.00%**	**0.52**
U2 (5-Year)	0.00	0.13	0.04	0.00	0.00	0.00	**0.17**	**77.72%**	**0.65**
U2 (100-Year)	0.00	0.13	0.04	0.00	0.00	0.00	**0.17**	**77.72%**	**0.79**
Total Site (5-Year)	0.07	0.79	0.49	0.00	0.00	0.00	**1.35**	**67.76%**	**0.56**
Total Site (100-Year)	0.07	0.79	0.49	0.00	0.00	0.00	**1.35**	**67.76%**	**0.74**

Perception Design Group, Inc.
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Designed by: JWD
Date: 7-Apr-26
Job Number: 2025-005

Project: Huntington Parker

RUNOFF CALCULATIONS

(RATIONAL METHOD)

Design Storm: 5-Yr.

		Direct Runoff						
	Design	Basin	Area	Runoff	CA	Tc	I	Q
	Point	Desig.	(Acres)	Coefficient		(min)	(in/hr)	(cfs)
		EX13	0.73	0.81	0.59	5.0	3.73	2.21
		EX14	0.27	0.81	0.22	5.0	3.73	0.82
		EXU3	0.05	0.15	0.01	5.0	3.73	0.03
		EXU2	0.17	0.65	0.11	5.0	3.73	0.41
		EXIN1	0.08	0.81	0.06	5.0	3.73	0.24
		EXIN2	0.05	0.81	0.04	5.0	3.73	0.15
		TOTAL	1.35	0.75	1.01	5.0	3.73	3.85
	5	IN1	0.09	0.81	0.07	5.0	3.73	0.27
	10	IN2	0.05	0.81	0.04	5.0	3.73	0.15
	4	IN3	0.34	0.61	0.21	5.0	3.73	0.77
	3	IN4	0.04	0.78	0.03	5.0	3.73	0.12
	1	IN5	0.34	0.61	0.21	5.0	3.73	0.77
	7	B	0.06	0.15	0.01	5.0	3.73	0.03
	2	R	0.07	0.81	0.06	5.0	3.73	0.21
	8	U3	0.19	0.15	0.03	5.0	3.73	0.11
	9	U2	0.17	0.65	0.11	5.0	3.73	0.41
		Total	1.35	0.56	0.76	5.0	3.73	2.85

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Designed by: JWD
Date: 7-Apr-26
Job Number: 2025-005

Project: Huntington Parker

RUNOFF CALCULATIONS

(RATIONAL METHOD)

Design Storm: 100-Yr.

		Direct Runoff						
	Design	Basin	Area	Runoff	CA	Tc	I	Q
	Point	Desig.	(Acres)	Coefficient		(min)	(in/hr)	(cfs)
		EX13	0.73	0.87	0.64	5.0	7.84	4.98
		EX14	0.27	0.87	0.23	5.0	7.84	1.84
		EXU1	0.05	0.52	0.03	5.0	7.84	0.20
		EXU2	0.17	0.86	0.15	5.0	7.84	1.15
		EXIN1	0.08	0.87	0.07	5.0	7.84	0.55
		EXIN2	0.05	0.87	0.04	5.0	7.84	0.34
		TOTAL	1.35	0.87	1.17	5.0	7.84	9.06
	5	IN1	0.09	0.87	0.08	5.0	7.84	0.61
	10	IN2	0.05	0.87	0.04	5.0	7.84	0.34
	4	IN3	0.34	0.77	0.26	5.0	7.84	2.05
	3	IN4	0.04	0.85	0.03	5.0	7.84	0.27
	1	IN5	0.34	0.77	0.26	5.0	7.84	2.05
	7	B	0.06	0.52	0.03	5.0	7.84	0.24
	2	R	0.07	0.87	0.06	5.0	7.84	0.48
	8	U1	0.19	0.52	0.10	5.0	7.84	0.77
	9	U2	0.17	0.79	0.13	5.0	7.84	1.05
		TOTAL	1.35	0.74	1.00	5.0	7.84	7.88

Perception Design Group, Inc.
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Designed by: JWD
Date: 25-Sep-25
Job Number: 2025-005

Project: Huntington Parker

STORM SEWER DESIGN -- MANNING'S EQUATION

5-YEAR STORM

Contributing Basins	Pipe Location Design Points	Q req'd (cfs)	Slope (%)	n	Diam (in)	Q calc (cfs)	V (Full Flow) (fps)	Friction Slope (%)	Normal Depth (ft)	V (Actual) (fps)	EGL V^2/2g
IN5	1	0.77	0.50	0.013	18	7.45	0.44	0.01	0.33	2.74	0.12
R	2	0.21	1.00	0.011	6	0.66	1.07	0.10	0.18	1.90	0.06
IN5+R	1-2	0.98	0.50	0.013	18	7.45	0.55	0.01	0.37	2.92	0.13
IN4+IN5+R	2-3	1.10	0.50	0.013	18	7.45	0.62	0.01	0.39	3.02	0.14
IN3+IN4+IN5+R	3-4	1.87	0.50	0.013	18	7.45	1.06	0.03	0.52	3.33	0.17
IN1	5-6	0.27	0.50	0.013	18	7.45	0.15	0.00	0.21	1.69	0.04
IN1+IN3+IN4+IN5+R	4-6	2.14	0.50	0.013	18	7.45	1.21	0.04	0.56	3.66	0.21

100-YEAR STORM

Contributing Basins	Pipe Location Design Points	Q req'd (cfs)	Slope (%)	n	Diam (in)	Q calc (cfs)	V (Full Flow) (fps)	Friction Slope (%)	Normal Depth (ft)	V (Actual) (fps)	EGL V^2/2g
IN5	1	2.05	0.50	0.013	18	7.45	1.16	0.04	0.53	3.55	0.20
R	2	0.48	1.00	0.011	6	0.66	2.44	0.52	0.26	2.39	0.09
IN5+R	1-2	2.53	0.50	0.013	18	7.45	1.43	0.06	0.59	3.78	0.22
IN4+IN5+R	2-3	2.80	0.50	0.013	18	7.45	1.58	0.07	0.62	3.87	0.23
IN3+IN4+IN5+R	3-4	4.85	0.50	0.013	18	7.45	2.74	0.21	0.87	4.47	0.31
IN1	5-6	0.61	0.50	0.013	18	7.45	0.35	0.00	0.30	2.18	0.07
IN1+IN3+IN4+IN5+R	4-6	5.46	0.50	0.013	18	7.45	3.09	0.27	0.95	4.59	0.33

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Huntington National Bank
Minor:
Major:

Worksheet Protected

INLET NAME	Inlet 3	Inlet 4
Inlet Application (Street or Area)	STREET	STREET
Hydraulic Condition	In Sump	In Sump
Inlet Type	CDOT Type R Curb Opening	CDOT Type R Curb Opening
Number of Inlet Units	1	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.77	0.12
Major Peak Flow, Q (cfs)	2.05	0.27

Bypass (Carry-Over) Flow from Upstream Inlets must be organized from upstream (left) to downstream (right) in order for by

Receive Bypass Flow from:		
Bypass Flow Description (Optional):		
Minor Bypass Flow Received, Q_b (cfs)		
Major Bypass Flow Received, Q_b (cfs)		

CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	0.77	0.12
Major Total Design Peak Flow, Q (cfs)	2.05	0.27
Minor Inlet Interception Capacity, Q_a (cfs)	5.38	5.38
Major Inlet Interception Capacity, Q_a (cfs)	5.38	5.38
Minor Flow Bypassed Downstream, Qb (cfs)	N/A	N/A
Major Flow Bypassed Downstream, Qb (cfs)	N/A	N/A
Minor Flow Capture Percentage, C%	100%	100%
Major Flow Capture Percentage, C%	100%	100%

MHFD-Inlet, Version 6.00 (August 2025)

INLET MANAGEMENT

Project: Huntington National Bank
Minor:
Major:

Worksheet Protected

INLET NAME	Inlet 5
Inlet Application (Street or Area)	STREET
Hydraulic Condition	In Sump
Inlet Type	CDOT Type R Curb Opening
Number of Inlet Units	1

USER-DEFINED INPUT

User-Defined Peak Flows

Minor Peak Flow, Q (cfs)	0.77
Major Peak Flow, Q (cfs)	2.05

Bypass (Carry-Over) Flow from Upstream ypass flows to be linked.

Receive Bypass Flow from:	
Bypass Flow Description (Optional):	
Minor Bypass Flow Received, Q_b (cfs)	
Major Bypass Flow Received, Q_b (cfs)	

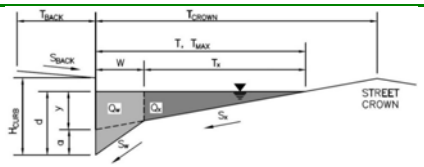
CALCULATED OUTPUT

Minor Total Design Peak Flow, Q (cfs)	0.77
Major Total Design Peak Flow, Q (cfs)	2.05
Minor Inlet Interception Capacity, Q_a (cfs)	5.38
Major Inlet Interception Capacity, Q_a (cfs)	5.38
Minor Flow Bypassed Downstream, Qb (cfs)	N/A
Major Flow Bypassed Downstream, Qb (cfs)	N/A
Minor Flow Capture Percentage, C%	100%
Major Flow Capture Percentage, C%	100%

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

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

Project: **Huntington National Bank**
Inlet ID: **Inlet 3**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		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} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	42.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.040	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	

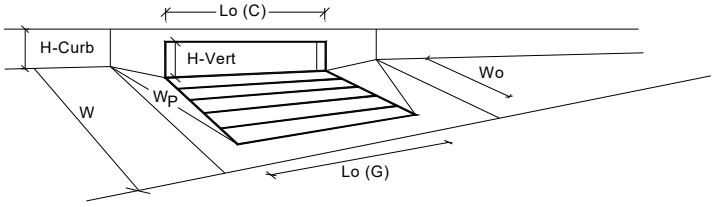
		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	42.0	42.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

MINOR STORM Allowable Capacity is not applicable to Sump Condition
MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



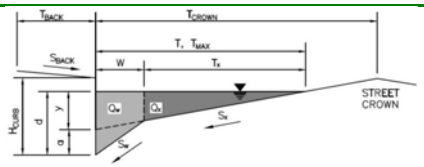
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	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
Open Area 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) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	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} =	0.33	0.33	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**5.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.8	2.1	cfs

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

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

Project: **Huntington National Bank**

Inlet ID: **Inlet 4**



Gutter Geometry:

Maximum Allowable Width for Spread Behind Curb	T_{BACK} =		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} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.024	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	24.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

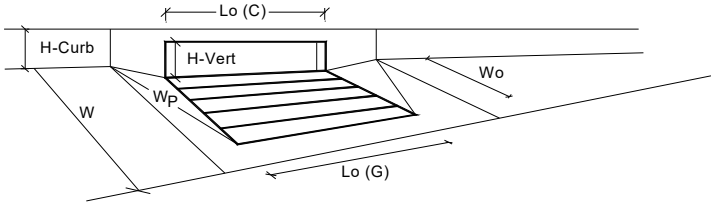
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



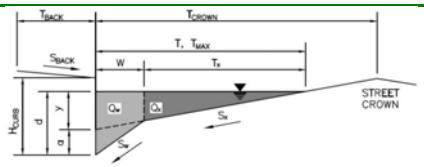
Design Information (Input)		MINOR	MAJOR	
Type of Inlet	Type =	CDOT Type R Curb Opening		
Local Depression (additional to continuous gutter depression 'a' from above)	a_{local} =	3.00	3.00	inches
Number of Unit Inlets (Grate or Curb Opening)	No =	1	1	
Water Depth at Flowline (outside of local depression)	Ponding Depth =	6.0	6.0	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
Open Area 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) =	5.00	5.00	feet
Height of Vertical Curb Opening in Inches	H_{vert} =	6.00	6.00	inches
Height of Curb Orifice Throat in Inches	H_{throat} =	6.00	6.00	inches
Angle of Throat	Theta =	63.40	63.40	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} =	0.33	0.33	ft
Grated Inlet Performance Reduction Factor for Long Inlets	RF_{Grate} =	N/A	N/A	
Curb Opening Performance Reduction Factor for Long Inlets	RF_{Curb} =	1.00	1.00	
Combination Inlet Performance Reduction Factor for Long Inlets	$RF_{Combination}$ =	N/A	N/A	
		MINOR	MAJOR	
Total Inlet Interception Capacity (assumes clogged condition)	**Q_a =**	**5.4**	**5.4**	**cfs**
Inlet Capacity IS GOOD for Minor and Major Storms (>Q Peak)	$Q_{PEAK\ REQUIRED}$ =	0.1	0.3	cfs

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

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

Project: **Huntington National Bank**

Inlet ID: **Inlet 5**



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Height of Curb at Gutter Flow Line	H_{CURB} =	6.00	inches
Distance from Curb Face to Street Crown	T_{CROWN} =	24.0	ft
Gutter Width	W =	2.00	ft
Street Transverse Slope	S_X =	0.018	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	

		Minor Storm	Major Storm	
Max. Allowable Spread for Minor & Major Storm	T_{MAX} =	24.0	24.0	ft
Max. Allowable Depth at Gutter Flowline for Minor & Major Storm	d_{MAX} =	6.0	6.0	inches
Check boxes are not applicable in SUMP conditions		☐	☐	

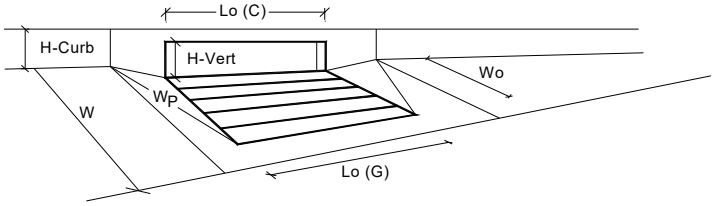
MINOR STORM Allowable Capacity is not applicable to Sump Condition

MAJOR STORM Allowable Capacity is not applicable to Sump Condition

	Minor Storm	Major Storm	
Q_{allow} =	**SUMP**	**SUMP**	**cfs**

INLET IN A SUMP OR SAG LOCATION

MHFD-Inlet, Version 6.00 (August 2025)



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Curb Opening Orifice Coefficient (typical value 0.60 - 0.70)	C_o (C) =	0.67	0.67	
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Depth for Grate Midwidth	d_{Grate} =	N/A	N/A	ft
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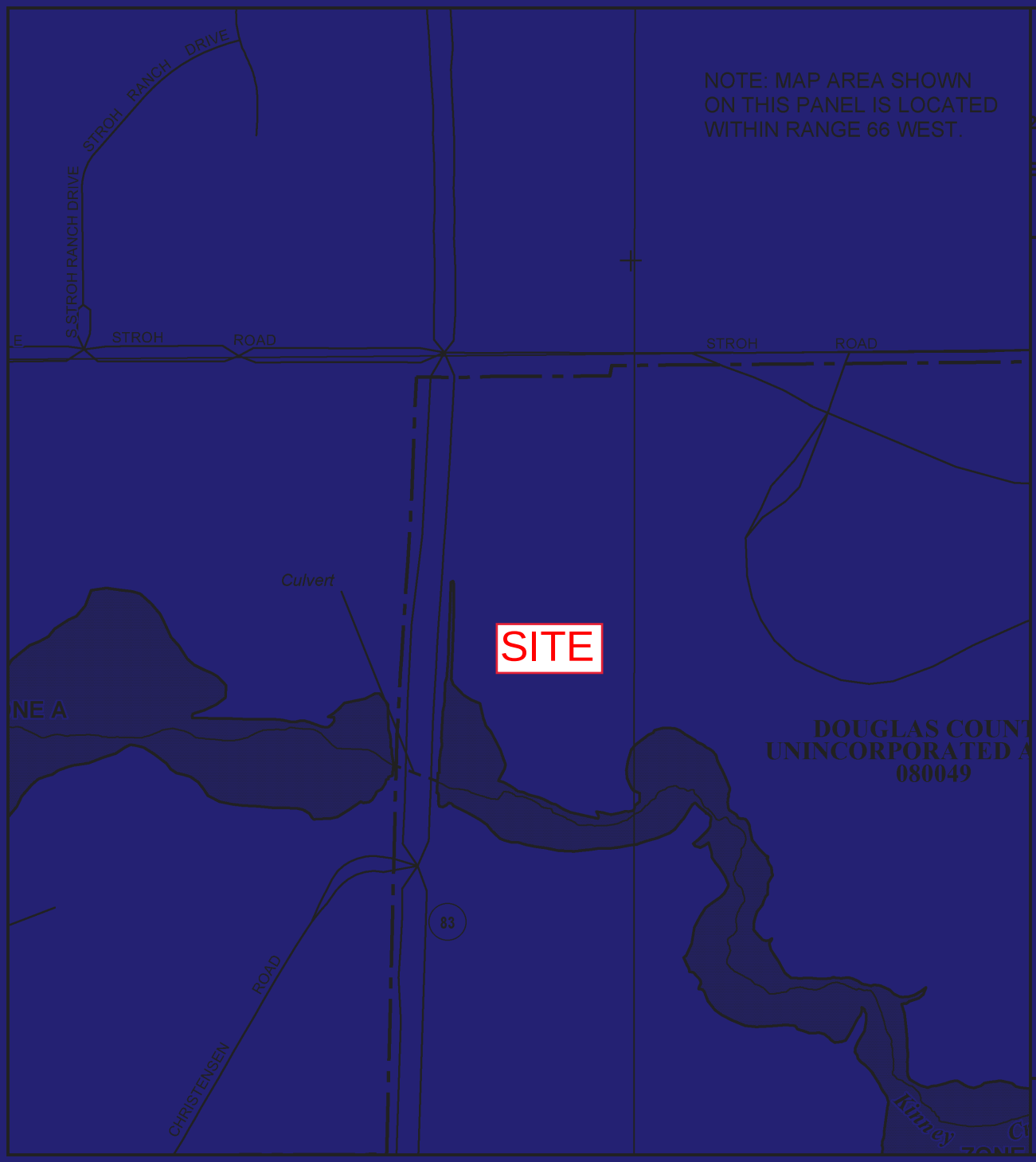


MAP SCALE 1" = 500'

250 0 500 1000

FEET

METERS

NFIP

PANEL 0182G

FIRM

FLOOD INSURANCE RATE MAP

DOUGLAS COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 182 OF 495

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
DOUGLAS COUNTY	080049	0182	G
PARKER, TOWN OF	080310	0182	G

NATIONAL FLOOD INSURANCE PROGRAM

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

MAP NUMBER
08035C0182G
MAP REVISED
MARCH 16, 2016

Federal Emergency Management Agency

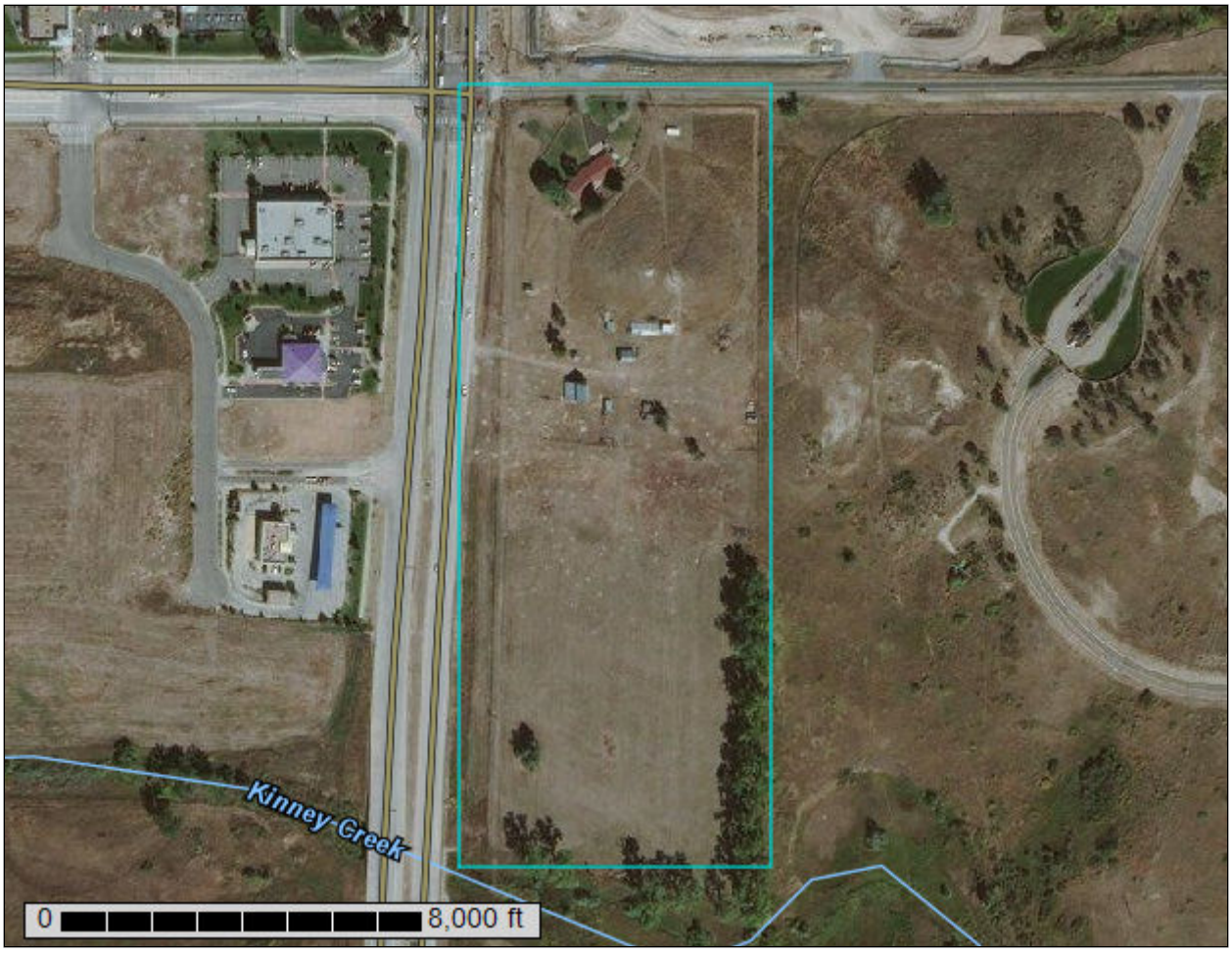
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Castle Rock Area, Colorado



September 18, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


104° 45' 33" W
104° 45' 17" W
520720
520780
520840
520900
520960
521020
521080
39° 28' 44" N
39° 28' 27" N
4369940
4369880
4369820
4369760
4369700
4369640
4369580
4369520
4369460
Stroh
E Stroh Rd
BtE
Sa
83
Lu
Sd
Sd
Soil Map may not be valid at this scale.
N
Map Scale: 1:2,470 if printed on A portrait (8.5" x 11") sheet.
Meters
0
35
70
140
210
Feet
0
100
200
400
600
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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 9, Sep 22, 2016

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

Date(s) aerial images were photographed: Jul 17, 2015—Mar 9, 2017

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

Castle Rock Area, Colorado (CO622)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
BtE	Bresser-Truckton sandy loams, 5 to 25 percent slopes	6.1	34.7%
Lu	Loamy alluvial land, dark surface	2.8	16.0%
Sa	Sampson loam	8.7	49.1%
Sd	Sandy alluvial land	0.0	0.2%
Totals for Area of Interest		**17.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Castle Rock Area, Colorado

BtE—Bresser-Truckton sandy loams, 5 to 25 percent slopes

Map Unit Setting

National map unit symbol: jqy9
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Bresser and similar soils: 50 percent
Truckton and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bresser

Setting

Landform: Terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy eolian deposits

Typical profile

H1 - 0 to 8 inches: sandy loam
H2 - 8 to 30 inches: sandy clay loam
H3 - 30 to 60 inches: loamy sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: Sandy Foothill (R049BY210CO)
Hydric soil rating: No

Description of Truckton

Setting

Landform: Terraces
Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkosic sedimentary rock

Typical profile

H1 - 0 to 4 inches: sandy loam
H2 - 4 to 19 inches: sandy loam
H3 - 19 to 60 inches: sandy loam

Properties and qualities

Slope: 10 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Blakeland

Percent of map unit: 5 percent
Hydric soil rating: No

Newlin

Percent of map unit: 5 percent
Hydric soil rating: No

Stapleton

Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls

Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Lu—Loamy alluvial land, dark surface

Map Unit Setting

National map unit symbol: jqzc
Elevation: 7,000 to 8,000 feet

Mean annual precipitation: 17 to 19 inches
Mean annual air temperature: 44 to 46 degrees F
Frost-free period: 115 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Loamy alluvial land, dark surface: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Loamy Alluvial Land, Dark Surface

Setting

Landform: Flood plains, swales
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 20 inches: sandy loam
H2 - 20 to 40 inches: stratified loamy sand to clay loam
H3 - 40 to 60 inches: sand and gravel

Properties and qualities

Slope: 0 to 4 percent
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Frequent
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: Loamy Foothill 14-19 P.Z. (R049XC202CO)
Hydric soil rating: No

Minor Components

Sandy alluvial land

Percent of map unit: 14 percent
Hydric soil rating: No

Fluvaquentic haplustolls

Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

Sa—Sampson loam

Map Unit Setting

National map unit symbol: jr02
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sampson and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sampson

Setting

Landform: Stream terraces on drainageways
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Weathered alluvium derived from arkose

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 28 inches: clay loam
H3 - 28 to 38 inches: loam
H4 - 38 to 60 inches: silt loam

Properties and qualities

Slope: 1 to 4 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: Loamy Foothill 14-19 P.Z. (R049XC202CO)

Hydric soil rating: No

Minor Components

Englewood
Percent of map unit: 8 percent
Hydric soil rating: No

Bresser
Percent of map unit: 7 percent
Hydric soil rating: No

Loamy alluvial land
Percent of map unit: 4 percent
Hydric soil rating: No

Aquic haplustolls
Percent of map unit: 1 percent
Landform: Swales
Hydric soil rating: Yes

Sd—Sandy alluvial land

Map Unit Setting
National map unit symbol: jr03
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 120 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition
Sandy alluvial land: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sandy Alluvial Land

Setting
Landform: Swales, drainageways
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Weathered alluvium derived from arkose

Typical profile
H1 - 0 to 20 inches: loamy sand
H2 - 20 to 60 inches: stratified sand to sandy loam

Properties and qualities
Slope: 1 to 5 percent
Natural drainage class: Excessively drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (2.00 to 20.00 in/hr)
Depth to water table: About 60 inches
Frequency of flooding: Frequent
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Loamy alluvial land

Percent of map unit: 8 percent
Hydric soil rating: No

Loamy alluvial land, dark surface

Percent of map unit: 8 percent
Hydric soil rating: No

Bresser

Percent of map unit: 4 percent
Hydric soil rating: No

Truckton

Percent of map unit: 4 percent
Hydric soil rating: No

Fluvaquentic haplustolls

Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

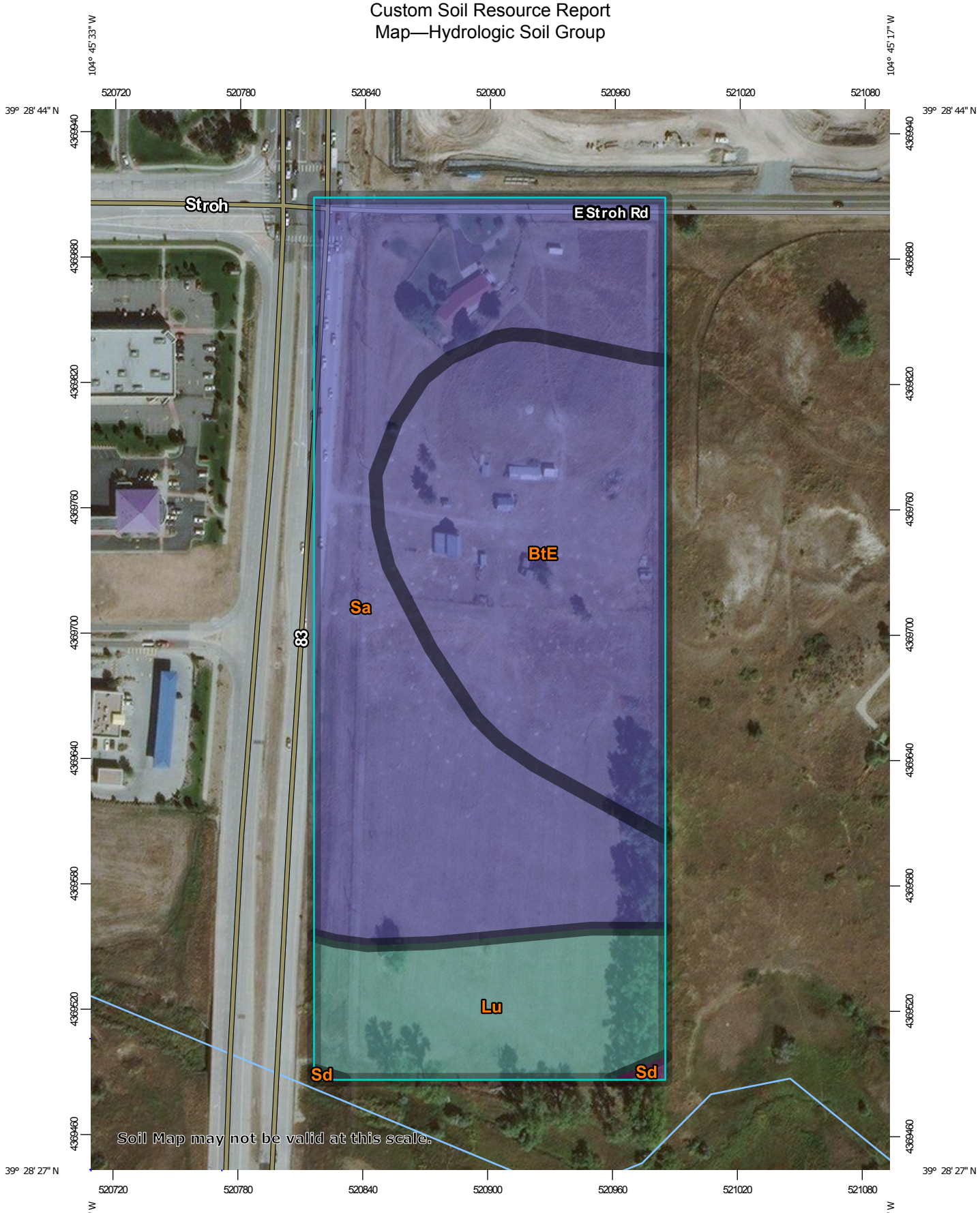
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:2,470 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

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 1:20,000.

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: Castle Rock Area, Colorado
Survey Area Data: Version 9, Sep 22, 2016

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

Date(s) aerial images were photographed: Jul 17, 2015—Mar 9, 2017

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.

Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Castle Rock Area, Colorado (CO622)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
BtE	Bresser-Truckton sandy loams, 5 to 25 percent slopes	B	6.1	34.7%
Lu	Loamy alluvial land, dark surface	C	2.8	16.0%
Sa	Sampson loam	B	8.7	49.1%
Sd	Sandy alluvial land	A	0.0	0.2%
Totals for Area of Interest			**17.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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FINAL DRAINAGE REPORT
PARKER POINTE
PARKER, COLORADO

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JOB #2015-015

NOVEMBER 28, 2018

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Checked by: JWD
Date: 18-Sep-17
Job Number: 2015-015

Project: Parker Pointe

COMPOSITE RUNOFF COEFFICIENTS

TYPE B SOILS

	FUTURE COMMERCIAL		**DRIVES/WALKS/ROOF**		**LANDSCAPING**				
Catchment	Area (Ac.)	C	Area (Ac.)	C	Area (Ac.)	C	Composite C	Catchment Area (Ac.)	Imperviousness
	Imperviousness = 95%		Imperviousness = 100%		Imperviousness = 2%				
H1 (5 YR)	0.00	0.81	0.00	0.90	10.52	0.09	**0.09**	10.52	2.0%
H1 (100 YR)	0.00	0.88	0.00	0.96	10.52	0.36	**0.36**	10.52	
L1 (5 YR)	0.71	0.81	0.00	0.90	0.00	0.09	**0.81**	0.71	95.0%
L1 (100 YR)	0.71	0.88	0.00	0.96	0.00	0.36	**0.88**	0.71	
L2 (5 YR)	0.50	0.81	0.00	0.90	0.00	0.09	**0.81**	0.50	95.0%
L2 (100 YR)	0.50	0.88	0.00	0.96	0.00	0.36	**0.88**	0.50	
L2A (5 YR)	0.19	0.81	0.00	0.90	0.00	0.09	**0.81**	0.19	95.0%
L2A (100 YR)	0.19	0.88	0.00	0.96	0.00	0.36	**0.88**	0.19	
L3 (5 YR)	0.43	0.81	0.00	0.90	0.00	0.09	**0.81**	0.43	95.0%
L3 (100 YR)	0.43	0.88	0.00	0.96	0.00	0.36	**0.88**	0.43	
L3A (5 YR)	0.16	0.81	0.00	0.90	0.00	0.09	**0.81**	0.16	95.0%
L3A (100 YR)	0.16	0.88	0.00	0.96	0.00	0.36	**0.88**	0.16	
L4 (5 YR)	0.63	0.81	0.00	0.90	0.00	0.09	**0.81**	0.63	95.0%
L4 (100 YR)	0.63	0.88	0.00	0.96	0.00	0.36	**0.88**	0.63	
L4A (5 YR)	0.24	0.81	0.00	0.90	0.00	0.09	**0.81**	0.24	95.0%
L4A (100 YR)	0.24	0.88	0.00	0.96	0.00	0.36	**0.88**	0.24	

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COMPOSITE RUNOFF COEFFICIENTS

TYPE B SOILS

	FUTURE COMMERCIAL		**DRIVES/WALKS/ROOF**		**LANDSCAPING**				
Catchment	Area (Ac.)	C	Area (Ac.)	C	Area (Ac.)	C	Composite C	Catchment Area (Ac.)	Imperviousness
	Imperviousness = 95%		Imperviousness = 100%		Imperviousness = 2%				
L5 (5 YR)	0.63	0.81	0.00	0.90	0.00	0.09	**0.81**	0.63	95.0%
L5 (100 YR)	0.63	0.88	0.00	0.96	0.00	0.36	**0.88**	0.63	
L5A (5 YR)	0.24	0.81	0.00	0.90	0.00	0.09	**0.81**	0.24	95.0%
L5A (100 YR)	0.24	0.88	0.00	0.96	0.00	0.36	**0.88**	0.24	
L6 (5 YR)	0.78	0.81	0.00	0.90	0.00	0.09	**0.81**	0.78	95.0%
L6 (100 YR)	0.78	0.88	0.00	0.96	0.00	0.36	**0.88**	0.78	
L7 (5 YR)	0.68	0.81	0.00	0.90	0.00	0.09	**0.81**	0.68	95.0%
L7 (100 YR)	0.68	0.88	0.00	0.96	0.00	0.36	**0.88**	0.68	
L8 (5 YR)	0.87	0.81	0.00	0.90	0.00	0.09	**0.81**	0.87	95.0%
L8 (100 YR)	0.87	0.88	0.00	0.96	0.00	0.36	**0.88**	0.87	
L9 (5 YR)	0.71	0.81	0.00	0.90	0.00	0.09	**0.81**	0.71	95.0%
L9 (100 YR)	0.71	0.88	0.00	0.96	0.00	0.36	**0.88**	0.71	
L10 (5 YR)	0.88	0.81	0.00	0.90	0.00	0.09	**0.81**	0.88	95.0%
L10 (100 YR)	0.88	0.88	0.00	0.96	0.00	0.36	**0.88**	0.88	
L11 (5 YR)	0.92	0.81	0.00	0.90	0.00	0.09	**0.81**	0.92	95.0%
L11 (100 YR)	0.92	0.88	0.00	0.96	0.00	0.36	**0.88**	0.92	

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COMPOSITE RUNOFF COEFFICIENTS

TYPE B SOILS

	FUTURE COMMERCIAL		DRIVES/WALKS/ROOF		LANDSCAPING				
Catchment	Area (Ac.)	C	Area (Ac.)	C	Area (Ac.)	C	Composite C	Catchment Area (Ac.)	Imperviousness
	Imperviousness = 95%		Imperviousness = 100%		Imperviousness = 2%				
L12 (5 YR)	0.56	0.81	0.00	0.90	0.00	0.09	**0.81**	0.56	95.0%
L12 (100 YR)	0.56	0.88	0.00	0.96	0.00	0.36	**0.88**	0.56	
L13 (5 YR)	0.73	0.81	0.00	0.90	0.00	0.09	**0.81**	0.73	95.0%
L13 (100 YR)	0.73	0.88	0.00	0.96	0.00	0.36	**0.88**	0.73	
L14 (5 YR)	0.73	0.81	0.00	0.90	0.00	0.09	**0.81**	0.73	95.0%
L14 (100 YR)	0.73	0.88	0.00	0.96	0.00	0.36	**0.88**	0.73	
L15 (5 YR)	0.72	0.81	0.00	0.90	0.00	0.09	**0.81**	0.72	95.0%
L15 (100 YR)	0.72	0.88	0.00	0.96	0.00	0.36	**0.88**	0.72	
IN1 (5 YR)	0.00	0.81	0.26	0.90	0.00	0.09	**0.90**	0.26	100.0%
IN1 (100 YR)	0.00	0.88	0.26	0.96	0.00	0.36	**0.96**	0.26	
IN2 (5 YR)	0.00	0.81	0.53	0.90	0.00	0.09	**0.90**	0.53	100.0%
IN2 (100 YR)	0.00	0.88	0.53	0.96	0.00	0.36	**0.96**	0.53	
IN3 (5 YR)	0.00	0.81	0.11	0.90	0.00	0.09	**0.90**	0.11	100.0%
IN3 (100 YR)	0.00	0.88	0.11	0.96	0.00	0.36	**0.96**	0.11	
OS1 (5 YR)	0.00	0.81	1.21	0.90	22.13	0.09	**0.13**	23.34	7.1%
OS1 (100 YR)	0.00	0.88	1.21	0.96	22.13	0.36	**0.39**	23.34	
SR1 (5 YR)	0.00	0.81	0.40	0.90	3.35	0.09	**0.18**	3.75	12.5%

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COMPOSITE RUNOFF COEFFICIENTS

TYPE B SOILS

	FUTURE COMMERCIAL		DRIVES/WALKS/ROOF		LANDSCAPING				
Catchment	Area (Ac.)	C	Area (Ac.)	C	Area (Ac.)	C	Composite C	Catchment Area (Ac.)	Imperviousness
	Imperviousness = 95%		Imperviousness = 100%		Imperviousness = 2%				
SR1 (100 YR)	0.00	0.88	0.40	0.96	3.35	0.36	**0.42**	3.75	
AREA TO POND	11.31	0.88	2.51	0.96	25.48	0.36	0.55	**39.30**	**35.0%**
U1 (5 YR)	0.00	0.81	0.00	0.90	1.37	0.09	**0.09**	1.37	2.0%
U1 (100 YR)	0.00	0.88	0.00	0.96	1.37	0.36	**0.36**	1.37	
U2 (2 YR)	0.00	0.79	0.24	0.89	0.06	0.02	**0.72**	0.30	
U2 (5 YR)	0.00	0.81	0.24	0.90	0.06	0.09	**0.74**	0.30	80.4%
U2 (100 YR)	0.00	0.88	0.24	0.96	0.06	0.36	**0.84**	0.30	
U3 (5 YR)	0.00	0.81	0.00	0.90	0.17	0.09	**0.09**	0.17	2.0%
U3 (100 YR)	0.00	0.88	0.00	0.96	0.17	0.36	**0.36**	0.17	
U4 (5 YR)	0.00	0.81	0.14	0.90	0.09	0.09	**0.58**	0.23	61.7%
U4 (100 YR)	0.00	0.88	0.14	0.96	0.09	0.36	**0.73**	0.23	
POND DESIGN NUMBERS	11.31	0.88	2.89	0.96	27.17	0.36	0.54	**41.37**	**34.3%**
SR2 (5 YR)	0.00	0.81	0.31	0.90	0.01	0.09	**0.87**	0.32	96.9%
SR2 (100 YR)	0.00	0.88	0.31	0.96	0.01	0.36	**0.94**	0.32	
PR1 (2 YR)	0.00	0.79	0.35	0.89	0.07	0.02	**0.75**	0.42	
PR1 (5 YR)	0.00	0.81	0.35	0.90	0.07	0.09	**0.77**	0.42	83.7%
PR1 (100 YR)	0.00	0.88	0.35	0.96	0.07	0.36	**0.86**	0.42	

Perception Design Group, Inc.
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(303) 232-8088 Fax (303) 232-5255

Designed by: JWD
Checked by: JWD
Date: 18-Sep-17
Job Number: 2015-015

Project: Parker Pointe

COMPOSITE RUNOFF COEFFICIENTS

TYPE B SOILS

	FUTURE COMMERCIAL		**DRIVES/WALKS/ROOF**		**LANDSCAPING**				
Catchment	Area (Ac.)	C	Area (Ac.)	C	Area (Ac.)	C	Composite C	Catchment Area (Ac.)	Imperviousness
	Imperviousness = 95%		Imperviousness = 100%		Imperviousness = 2%				
PR2 (5 YR)	0.00	0.81	0.91	0.90	0.00	0.09	**0.90**	0.91	100.0%
PR2 (100 YR)	0.00	0.88	0.91	0.96	0.00	0.36	**0.96**	0.91	
PR3 (2 YR)	0.00	0.79	0.22	0.89	0.00	0.02	**0.89**	0.22	

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Project: Parker Pointe

RUNOFF CALCULATIONS

(RATIONAL METHOD)

Design Storm: 5-Yr.

		Direct Runoff						
	Design	Basin	Area	Runoff	CA	Tc	I	Q
	Point	Desig.	(Acres)	Coefficient		(min)	(in/hr)	(cfs)
		H1	10.52	0.09	0.95	26.0	2.30	2.18
		L1	0.71	0.81	0.58	5.0	4.70	2.70
		L2	0.50	0.81	0.41	5.0	4.70	1.90
		L2A	0.19	0.81	0.15	5.0	4.70	0.72
		L3	0.43	0.81	0.35	5.0	4.70	1.64
		L3A	0.16	0.81	0.13	5.0	4.70	0.61
		L4	0.63	0.81	0.51	5.0	4.70	2.40
		L4A	0.24	0.81	0.19	5.0	4.70	0.91
		L5	0.63	0.81	0.51	5.0	4.70	2.40
		L5A	0.24	0.81	0.19	5.0	4.70	0.91
		L6	0.78	0.81	0.63	5.0	4.70	2.97
		L7	0.68	0.81	0.55	5.0	4.70	2.59
		L8	0.87	0.81	0.70	5.0	4.70	3.31
		L9	0.71	0.81	0.58	5.0	4.70	2.70
		L10	0.88	0.81	0.71	5.0	4.70	3.35
		L11	0.92	0.81	0.75	5.0	4.70	3.50
		L12	0.56	0.81	0.45	5.0	4.70	2.13
		L13	0.73	0.81	0.59	5.0	4.70	2.78
		L14	0.73	0.81	0.59	5.0	4.70	2.78
		L15	0.72	0.81	0.58	5.0	4.70	2.74
		IN1	0.26	0.90	0.23	5.0	4.70	1.10
		IN2	0.53	0.90	0.48	5.0	4.70	2.24
		IN3	0.11	0.9	0.10	5.0	4.70	0.47
		SR1	3.75	0.18	0.68	22.4	2.60	1.76
		SR2	0.32	0.87	0.28	5.0	4.70	1.31
		PR1	0.42	0.77	0.32	5.0	4.70	1.52
		PR2	0.91	0.96	0.87	5.0	4.70	4.11
		U1	1.37	0.09	0.12	5.0	4.70	0.58
		U2	0.3	0.74	0.22	5.0	4.70	1.04
		U3	0.17	0.09	0.02	5.0	4.70	0.07
		U4	0.23	0.58	0.13	5.0	4.70	0.63
		OS1	23.34	0.13	3.03	25.5	2.50	7.59

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Job Number: 2015-015

Project: Parker Pointe

RUNOFF CALCULATIONS

(RATIONAL METHOD)

Design Storm: 100-Yr.

		Direct Runoff						
	Design	Basin	Area	Runoff	CA	Tc	I	Q
	Point	Desig.	(Acres)	Coefficient		(min)	(in/hr)	(cfs)
		H1	10.52	0.36	3.79	26.0	4.50	17.04
		L1	0.71	0.88	0.62	5.0	8.85	5.53
		L2	0.50	0.88	0.44	5.0	8.85	3.89
		L2A	0.19	0.88	0.17	5.0	8.85	1.48
		L3	0.43	0.88	0.38	5.0	8.85	3.35
		L3A	0.16	0.88	0.14	5.0	8.85	1.25
		L4	0.63	0.88	0.55	5.0	8.85	4.91
		L4A	0.24	0.88	0.21	5.0	8.85	1.87
		L5	0.63	0.88	0.55	5.0	8.85	4.91
		L5A	0.24	0.88	0.21	5.0	8.85	1.87
		L6	0.78	0.88	0.69	5.0	8.85	6.07
		L7	0.68	0.88	0.60	5.0	8.85	5.30
		L8	0.87	0.88	0.77	5.0	8.85	6.78
		L9	0.71	0.88	0.62	5.0	8.85	5.53
		L10	0.88	0.88	0.77	5.0	8.85	6.85
		L11	0.92	0.88	0.81	5.0	8.85	7.16
		L12	0.56	0.88	0.49	5.0	8.85	4.36
		L13	0.73	0.88	0.64	5.0	8.85	5.69
		L14	0.73	0.88	0.64	5.0	8.85	5.69
		L15	0.72	0.88	0.63	5.0	8.85	5.61
		IN1	0.26	0.96	0.25	5.0	8.85	2.21
		IN2	0.53	0.96	0.51	5.0	8.85	4.50
		IN3	0.11	0.96	0.11	5.0	8.85	0.93
		SR1	3.75	0.42	1.58	22.4	4.90	7.72
TOTAL FLOW TO FOREBAY								103.45
		OS1	23.34	0.39	9.10	25.5	4.50	40.96
TOTAL TO POND			39.30					144.41
		U1	1.37	0.36	0.49	25.5	4.50	2.22
		U2	0.3	0.84	0.25	25.5	4.50	1.13
		U3	0.17	0.36	0.06	25.5	4.50	0.28
		U4	0.23	0.73	0.17	25.5	4.50	0.76
UN-CAPTURED SITE RUNOFF								4.38
		SR2	0.32	0.94	0.30	5.0	8.85	2.66
		PR1	0.42	0.86	0.36	5.0	8.85	3.20
		PR2	0.91	0.96	0.87	5.0	8.85	7.73

Design Procedure Form: Grass Swale (GS)

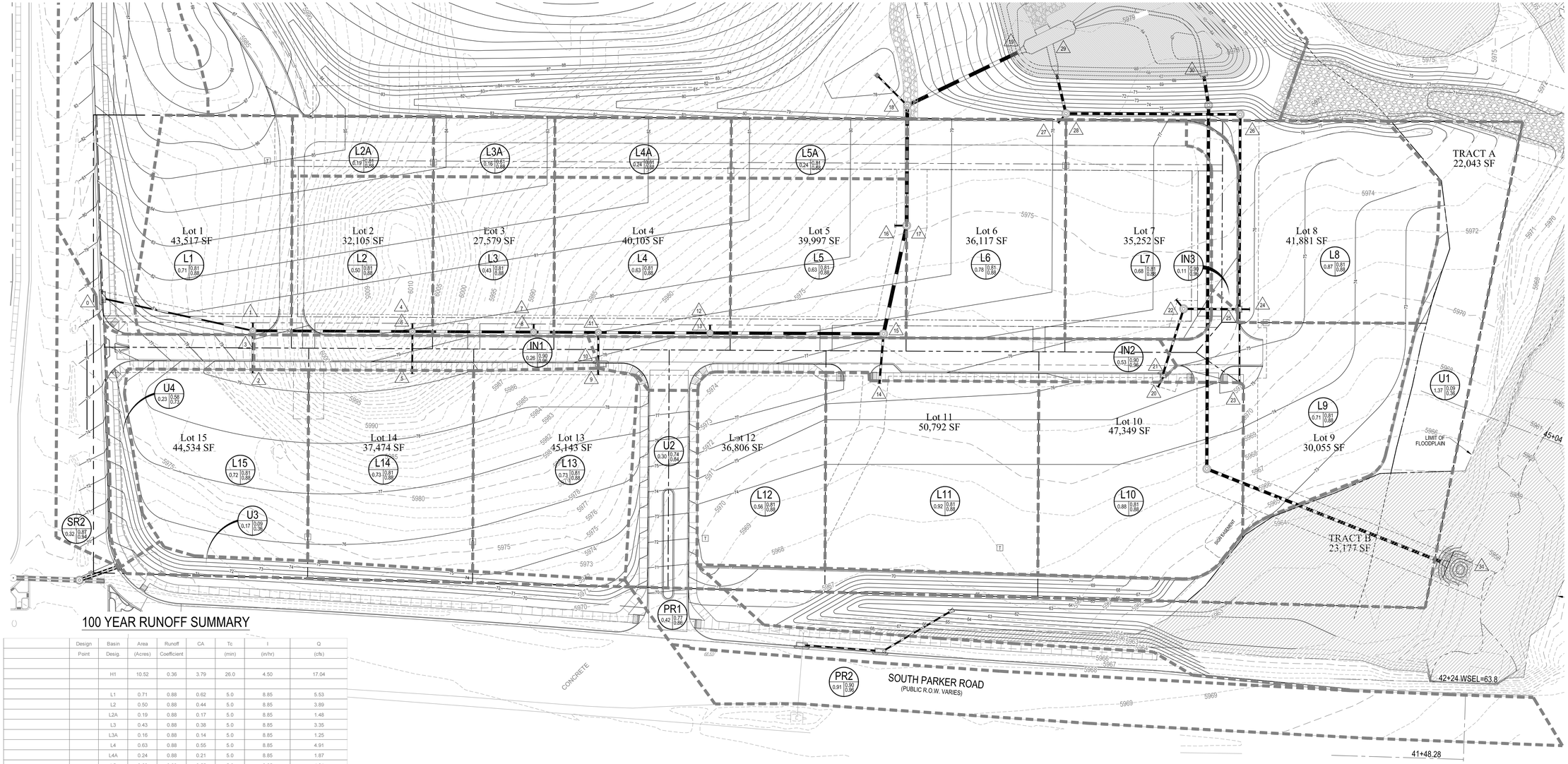
UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

Designer: Jerry Davidson
Company: Perception Design Group, Inc.
Date: June 25, 2018
Project: Parker Pointe
Location: BASINS PR1 AND U2

1. Design Discharge for 2-Year Return Period	Q_2 = 1.80 cfs
2. Hydraulic Residence Time	
A) : Length of Grass Swale	L_S = 375.0 ft
B) Calculated Residence Time (based on design velocity below)	T_{HR} = 6.7 minutes
3. Longitudinal Slope (vertical distance per unit horizontal)	
A) Available Slope (based on site constraints)	S_{avail} = 0.005 ft / ft
B) Design Slope	S_D = 0.005 ft / ft
4. Swale Geometry	
A) Channel Side Slopes (Z = 4 min., horiz. distance per unit vertical)	Z = 4.00 ft / ft
B) Bottom Width of Swale (enter 0 for triangular section)	W_B = 1.00 ft
5. Vegetation A) Type of Planting (seed vs. sod, affects vegetal retardance factor)	Choose One: (●) Grass From Seed ( ) Grass From Sod
6. Design Velocity (1 ft / s maximum)	V_2 = 0.93 ft / s
7. Design Flow Depth (1 foot maximum)	D_2 = 0.58 ft
A) Flow Area	A_2 = 1.9 sq ft
B) Top Width of Swale	W_T = 5.6 ft
C) Froude Number (0.50 maximum)	F = 0.28
D) Hydraulic Radius	R_H = 0.33
E) Velocity-Hydraulic Radius Product for Vegetal Retardance	VR = 0.31
F) Manning's n (based on SCS vegetal retardance curve E for seeded grass)	n = 0.054
G) Cumulative Height of Grade Control Structures Required	H_D = 0.00 ft
8. Underdrain (Is an underdrain necessary?)	Choose One: (●) YES ( ) NO — AN UNDERDRAIN IS REQUIRED IF THE DESIGN SLOPE < 2.0%
9. Soil Preparation (Describe soil amendment)	
10. Irrigation	Choose One: ( ) Temporary ( ) Permanent

Notes:

SEE SHEET DP3



100 YEAR RUNOFF SUMMARY

Design Point	Basin Desig.	Area (Acres)	Runoff Coefficient	CA	Tc (min)	I (in/hr)	Q (cfs)
	H1	10.52	0.36	3.79	26.0	4.50	17.04
	L1	0.71	0.88	0.62	5.0	8.85	5.53
	L2	0.50	0.88	0.44	5.0	8.85	3.89
	L2A	0.19	0.88	0.17	5.0	8.85	1.48
	L3	0.43	0.88	0.38	5.0	8.85	3.35
	L3A	0.16	0.88	0.14	5.0	8.85	1.25
	L4	0.63	0.88	0.55	5.0	8.85	4.91
	L4A	0.24	0.88	0.21	5.0	8.85	1.87
	L5	0.63	0.88	0.55	5.0	8.85	4.91
	L5A	0.24	0.88	0.21	5.0	8.85	1.87
	L6	0.78	0.88	0.69	5.0	8.85	6.07
	L7	0.68	0.88	0.60	5.0	8.85	5.30
	L8	0.87	0.88	0.77	5.0	8.85	6.78
	L9	0.71	0.88	0.62	5.0	8.85	5.53
	L10	0.88	0.88	0.77	5.0	8.85	6.85
	L11	0.92	0.88	0.81	5.0	8.85	7.16
	L12	0.56	0.88	0.49	5.0	8.85	4.36
	L13	0.73	0.88	0.64	5.0	8.85	5.69
	L14	0.73	0.88	0.64	5.0	8.85	5.69
	L15	0.72	0.88	0.63	5.0	8.85	5.61
	IN1	0.26	0.96	0.25	5.0	8.85	2.21
	IN2	0.53	0.96	0.51	5.0	8.85	4.50
	IN3	0.11	0.96	0.11	5.0	8.85	0.93
	SR1	3.75	0.42	1.58	22.4	4.90	7.72
TOTAL FLOW TO FOREBAY							103.45
	OS1	23.34	0.39	9.10	25.5	4.50	40.96
TOTAL TO POND		39.30					144.41
	U1	1.37	0.36	0.49	25.5	4.50	2.22
	U2	0.3	0.84	0.25	25.5	4.50	1.13
	U3	0.17	0.36	0.06	25.5	4.50	0.28
	U4	0.23	0.73	0.17	25.5	4.50	0.76
UN-CAPTURED SITE RUNOFF							4.38
	SR2	0.32	0.94	0.30	5.0	8.85	2.66
	PR1	0.42	0.86	0.36	5.0	8.85	3.20
	PR2	0.91	0.96	0.87	5.0	8.85	7.73

DETENTION SUMMARY

ZONE	VOLUME	ELEVATION	RELEASE RATE
WQCV	0.566 AC-FT		41 HOURS
EURV+WQCV	1.472 AC-FT	5968.03	70 HOURS
100 YEAR	2.753 AC-FT	5970.05	36.7 CFS

LEGEND

- 5340 — EXISTING CONTOUR
- 42 — PROPOSED CONTOUR
- R1 / 0.20 / 0.75 / 0.83 — BASIN DESIGNATION, 5 YR RUNOFF COEFFICIENT, 100 YR RUNOFF COEFFICIENT, BASIN AREA
- BASIN BOUNDARY LINE
- 1 — DESIGN POINT

GRAPHIC SCALE

40 0 20 40 80

(IN FEET)
1 inch = 40 ft.

BENCHMARK

BENCHMARK: DOUGLAS COUNTY SURVEY CONTROL MONUMENT TT15A – 3" DIAMETER DOUGLAS COUNTY GIS ALUMINUM CAP AT THE NE CORNER OF STROH ROAD AND SOUTH PARKER ROAD (US HIGHWAY 83)
ELEVATION: 5970.79 FEET (NAVD 1988 DATUM)

THE TOWN OF PARKER REVIEW CONSTITUTES GENERAL COMPLIANCE WITH THE TOWN'S STANDARDS AND APPROVED VARIANCES, SUBJECT TO THESE PLANS BEING STAMPED, SIGNED, AND DATED BY THE PROFESSIONAL ENGINEER OF RECORD. REVIEW BY THE TOWN DOES NOT CONSTITUTE APPROVAL OF THE PLAN DESIGN OR ACCURACY AND CORRECTNESS OF ENGINEERING CALCULATIONS. ERRORS IN THE DESIGN OR CALCULATIONS REMAIN THE RESPONSIBILITY OF THE REGISTERED PROFESSIONAL ENGINEER WHOSE STAMP AND SIGNATURE ARE AFFIXED TO THIS DOCUMENT.

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TOWN OF PARKER, DIRECTOR OF ENGINEERING — DATE

PERCEPTION
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PREPARED UNDER THE DIRECT SUPERVISION OF
JERRY W. DAVIDSON, P.E.
COLORADO REG # 30226
FOR AND ON BEHALF OF
PERCEPTION DESIGN GROUP, INC.

DATE	DESCRIPTION
11/01/18	SIXTH SUBMITTAL
08/31/18	FOURTH SUBMITTAL
05/25/18	THIRD SUBMITTAL
03/19/18	PWSD SUBMITTAL
02/28/18	SECOND SUBMITTAL
10/24/17	INITIAL SUBMITTAL

REVISIONS

DRAINAGE PLAN WEST

PARKER POINTE
LOTS 1 THRU 15 AND TRACTS A AND B, PARKER POINTE FILING NO. 1
SOUTHEAST CORNER PARKER ROAD AND STROH ROAD
PARKER, COLORADO

design by: JWD
approved by: JWD
project no.: 2015-015
date: 10/01/17

SHEET
DP2