

Board of Supervisors Work Session

July 2018

Rainfall totals May 21 – June 19

PF tabular

PF graphical

Supplementary information

 Print page

PDS-based 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	0.289 (0.260-0.321)	0.344 (0.309-0.382)	0.415 (0.373-0.460)	0.472 (0.423-0.524)	0.541 (0.481-0.597)	0.595 (0.526-0.656)	0.645 (0.567-0.714)	0.693 (0.603-0.768)	0.757 (0.650-0.842)	0.803 (0.682-0.898)
10-min	0.457 (0.412-0.509)	0.545 (0.490-0.606)	0.660 (0.594-0.733)	0.748 (0.670-0.829)	0.852 (0.759-0.942)	0.933 (0.825-1.03)	1.01 (0.887-1.12)	1.08 (0.941-1.20)	1.17 (1.01-1.31)	1.24 (1.05-1.39)
15-min	0.569 (0.512-0.633)	0.682 (0.613-0.757)	0.828 (0.745-0.919)	0.939 (0.842-1.04)	1.07 (0.955-1.19)	1.18 (1.04-1.30)	1.27 (1.12-1.41)	1.36 (1.18-1.51)	1.47 (1.27-1.64)	1.56 (1.32-1.74)
30-min	0.773 (0.696-0.860)	0.933 (0.839-1.04)	1.17 (1.05-1.29)	1.35 (1.21-1.49)	1.57 (1.40-1.74)	1.75 (1.55-1.93)	1.92 (1.68-2.12)	2.09 (1.82-2.31)	2.30 (1.98-2.56)	2.47 (2.10-2.76)
60-min	0.959 (0.863-1.07)	1.17 (1.05-1.29)	1.49 (1.34-1.65)	1.74 (1.56-1.93)	2.08 (1.85-2.30)	2.35 (2.08-2.59)	2.62 (2.30-2.90)	2.90 (2.52-3.21)	3.28 (2.81-3.65)	3.57 (3.03-3.99)
2-hr	1.15 (1.04-1.28)	1.39 (1.26-1.55)	1.77 (1.60-1.97)	2.09 (1.88-2.31)	2.51 (2.24-2.78)	2.86 (2.54-3.16)	3.22 (2.83-3.56)	3.59 (3.13-3.98)	4.11 (3.54-4.59)	4.53 (3.85-5.08)
3-hr	1.24 (1.12-1.38)	1.49 (1.34-1.66)	1.88 (1.69-2.10)	2.21 (1.98-2.46)	2.66 (2.37-2.95)	3.03 (2.68-3.36)	3.42 (3.00-3.79)	3.83 (3.32-4.26)	4.39 (3.77-4.91)	4.85 (4.10-5.44)
6-hr	1.53 (1.38-1.71)	1.83 (1.65-2.05)	2.29 (2.05-2.56)	2.69 (2.40-3.00)	3.24 (2.88-3.61)	3.72 (3.28-4.13)	4.22 (3.67-4.69)	4.76 (4.09-5.30)	5.52 (4.67-6.19)	6.16 (5.13-6.93)
12-hr	1.88 (1.70-2.12)	2.24 (2.02-2.52)	2.79 (2.51-3.14)	3.29 (2.94-3.70)	4.01 (3.54-4.49)	4.63 (4.06-5.19)	5.31 (4.60-5.95)	6.06 (5.17-6.81)	7.15 (5.96-8.08)	8.09 (6.62-9.18)
24-hr	2.18 (2.00-2.40)	2.63 (2.41-2.89)	3.30 (3.02-3.63)	3.87 (3.53-4.24)	4.69 (4.25-5.12)	5.37 (4.83-5.87)	6.10 (5.44-6.66)	6.88 (6.07-7.51)	7.98 (6.94-8.73)	8.87 (7.63-9.73)
2-day	2.53 (2.33-2.77)	3.05 (2.80-3.34)	3.82 (3.51-4.18)	4.46 (4.08-4.86)	5.36 (4.87-5.83)	6.10 (5.50-6.63)	6.88 (6.16-7.48)	7.70 (6.83-8.38)	8.84 (7.75-9.64)	9.74 (8.45-10.6)
3-day	2.69 (2.48-2.93)	3.24 (2.99-3.52)	4.05 (3.74-4.41)	4.72 (4.34-5.13)	5.67 (5.19-6.15)	6.45 (5.86-6.99)	7.27 (6.56-7.87)	8.13 (7.28-8.81)	9.32 (8.26-10.1)	10.3 (9.01-11.2)
4-day	2.84 (2.63-3.08)	3.42 (3.17-3.71)	4.28 (3.96-4.64)	4.99 (4.60-5.39)	5.98 (5.50-6.46)	6.80 (6.22-7.34)	7.66 (6.97-8.27)	8.56 (7.73-9.24)	9.81 (8.77-10.6)	10.8 (9.56-11.7)
7-day	3.29 (3.06-3.55)	3.95 (3.67-4.25)	4.87 (4.53-5.25)	5.62 (5.21-6.04)	6.63 (6.14-7.16)	7.49 (6.88-8.06)	8.34 (7.63-8.98)	9.22 (8.38-9.93)	10.4 (9.40-11.3)	11.4 (10.2-12.3)
10-day	3.78 (3.53-4.06)	4.52 (4.22-4.86)	5.51 (5.13-5.91)	6.27 (5.84-6.72)	7.32 (6.79-7.84)	8.14 (7.52-8.71)	8.96 (8.24-9.59)	9.78 (8.96-10.5)	10.9 (9.90-11.7)	11.7 (10.6-12.6)
20-day	5.14 (4.82-5.49)	6.09 (5.72-6.50)	7.26 (6.81-7.73)	8.17 (7.65-8.70)	9.39 (8.78-10.0)	10.3 (9.61-11.0)	11.3 (10.5-12.0)	12.2 (11.3-13.0)	13.4 (12.3-14.4)	14.3 (13.1-15.4)
30-day	6.34 (6.00-6.71)	7.47 (7.07-7.90)	8.72 (8.25-9.22)	9.67 (9.14-10.2)	10.9 (10.3-11.6)	11.9 (11.1-12.6)	12.8 (12.0-13.5)	13.6 (12.7-14.5)	14.7 (13.7-15.7)	15.5 (14.4-16.5)
45-day	7.91 (7.49-8.35)	9.29 (8.81-9.81)	10.7 (10.1-11.3)	11.8 (11.1-12.4)	13.1 (12.4-13.8)	14.1 (13.3-14.8)	15.0 (14.1-15.8)	15.9 (14.9-16.7)	16.9 (15.9-17.9)	17.6 (16.5-18.6)
60-day	9.48 (9.02-9.98)	11.1 (10.6-11.7)	12.6 (12.0-13.3)	13.8 (13.1-14.5)	15.2 (14.4-15.9)	16.2 (15.3-17.0)	17.1 (16.2-18.0)	17.9 (17.0-18.9)	18.9 (17.9-20.0)	19.6 (18.4-20.7)

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.

JUNE 3

JUNE 1-3

30-DAY
TOTAL

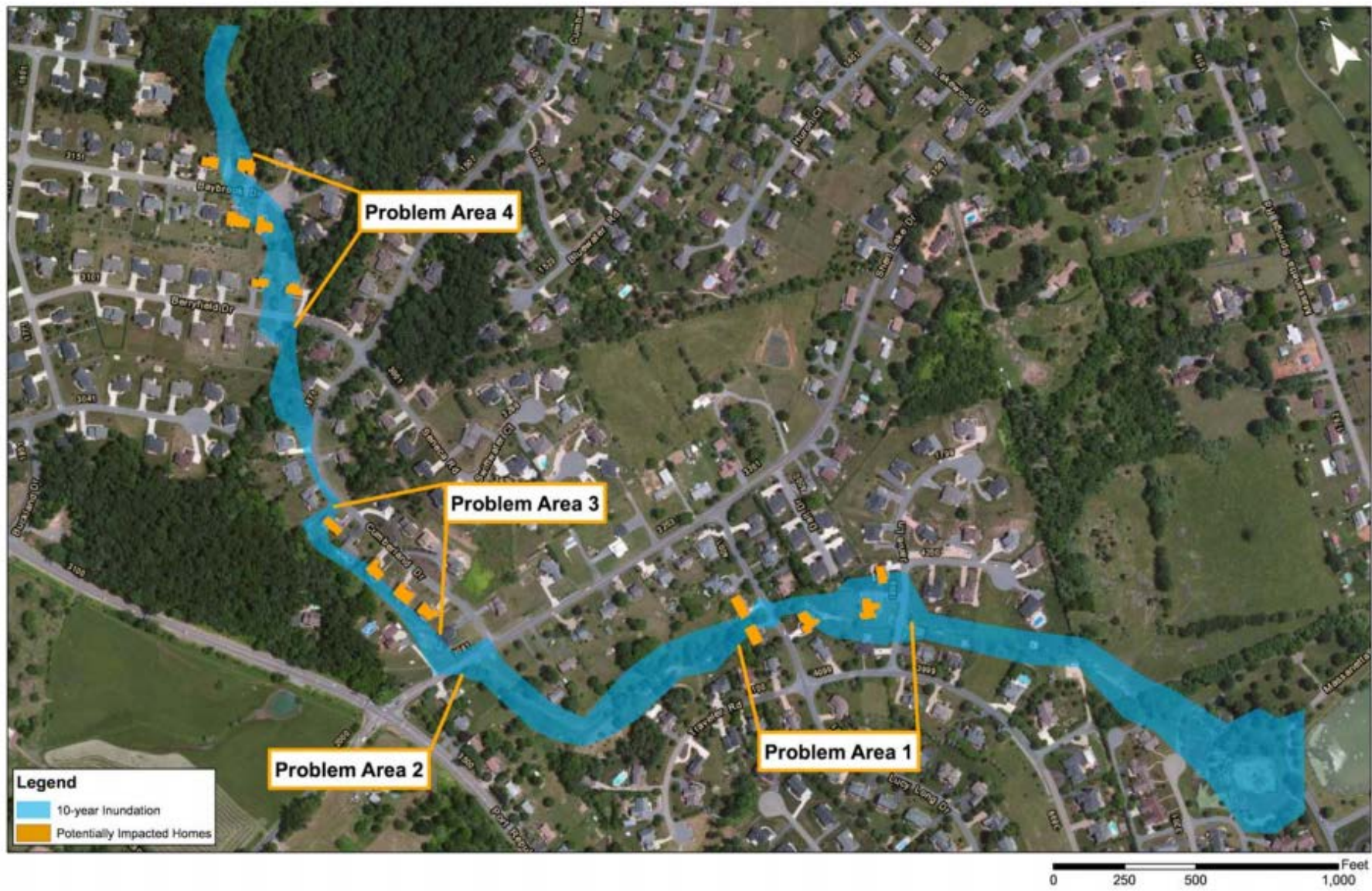


Figure 5: Inundation Map

Flooding at Baybrook Dr.



Flooding at Berryfield Dr.



Flooding at Cumberland Dr.



Flooding at Shen Lake Dr



Flooding at Janie Ln.



Ordinance Amendments

- County can look at higher standards for development through the stormwater and floodplain ordinance within this drainage area
- Require lot grading plans, minimum home elevations
- Officially map the 100-year floodplain, regulate as such

Funding Options

- Drainage & Flooding District Fees
- Grants

Financing

- \$2.73 million in total improvements
- 1200 homes in watershed
- \$2,275/ home
- Over 10 years \$227.50/year/home or \$18.95 per month
 - This would not include ongoing maintenance costs which would add another 10-20%

Grant Funding

- In 2017, Rockingham Co. applied for a grant through the Virginia Dept. of Emergency Management to construct 1 new stormwater management facility in the watershed and retrofit two existing facilities
- Total project request was for \$730,000
- \$547,500 from FEMA, \$182,500 County Funding
- Will apply for the 2018 cycle