

# STORMWATER MANAGEMENT REPORT

FOR

55 RAILROAD AVENUE  
CHESHIRE, CT

PREPARED FOR

TOWN OF CHESHIRE

May 3, 2021

RECEIVED  
Town of Cheshire  
MAY 04 2021  
Planning Dept



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## **PROJECT DESCRIPTION**

The proposed project is at 55 Railroad Avenue, Cheshire, CT. The parcel is 0.29+/- acres and is located in the I-1 zone. The site is owned by the Town of Cheshire and it is currently vacant with the remains of a paved driveway and the former house that has been demolished. The proposal includes the construction of a bituminous parking area to provide overflow parking for the Farmington Canal Heritage Trail and parking which is located across the street. A landscaped rain garden is also proposed adjacent to the parking which will provide treatment and attenuation of stormwater flows.

There are no wetland soils on the site and it is located outside of mapped FEMA 100 year flood zone.

## **EXISTING DRAINAGE**

The site is currently covered by grass and a portion of the existing drive remaining from the former residential use. The soils are mapped as Udorthents-Urban land complex within Hydrologic Soil Group B. Soil testing including a percolation test were completed by Stuart Somers Co. on April 23, 2020 and witnessed by the Town of Cheshire Engineering Department. The soils were determined to be a well drained sandy soil with some gravel with a percolation rate of 1 inch in 5 minutes.

The majority of the site (0.241 acres) drains with a gentle slope towards the northerly corner of the site. The remainder of the lot (0.044 acres) drains toward Railroad Avenue. The site was divided into these two areas for the Existing Conditions drainage analysis. The delineation of the existing areas are included on the attached Watershed Map.

## **PROPOSED DRAINAGE**

In order to analyze the proposed stormwater flows from the subject property and compare to the existing, two similar drainage outlet points ("Out Road" and "Out North") were analyzed. The area draining to the north was divided into two sub-areas, "Area to Basin", 0.165 acres and "Bypass Area", 0.076 acres.

The Area to Basin includes the proposed bituminous parking area and the rain garden. The proposed parking area is proposed to be curbed and will sheet flow from the south to the north and outlet to the rain garden through a paved leak-off. The rain garden is a shallow basin (1'+/-) with a stone trench in the bottom for infiltration. A yard drain will be installed 3" above the finished grade to collect stormwater and drain to the stone trench through 6" diameter underdrains. The outlet from the basin is a 1 foot wide grass weir set 6" below the top of the berm. This allows the flow that is not infiltrated to sheet flow from the basin. The area that bypasses the basin is lawn area that also flows to the north.

The Area to the Road remains at 0.044 acres and contains the proposed driveway entrance to the site. The proposed drainage sub-areas are depicted on the attached watershed map.

## **PEAK FLOWS**

Peak flows for the site were calculated using the TR-20 method in HydroCAD. Runoff coefficients are based on values given in the Connecticut Department of Transportation (CTDOT) Drainage

Manual. Rainfall intensities are those from NOAA and are included in Appendix D. Times of concentration were determined through analysis of the site and from charts also contained in the CTDOT Drainage Manual. The drainage areas for the project site were determined through analysis of topographic mapping.

## **SUMMARY AND CONCLUSION**

As shown in the attached calculations, the rain garden basin will reduce the peak flows leaving the site from the existing conditions. In addition, the required water quality volume is provided within the rain garden. A summary of peak flows for existing and proposed conditions is provided below.

The PondPack calculation results are included after this narrative. A summary of peak flows for existing and proposed conditions is provided below.

STORM EVENT	EXISTING CONDITIONS (CFS)	PROPOSED CONDITIONS (CFS)	DIFFERENCE
10-yr	0.5	0.4	-0.1
25-yr	0.7	0.6	-0.1
50-yr	0.9	0.8	-0.1
100-yr	1.1	1.0	-0.1

TABLE NO. 1: OUT NORTH DESIGN POINT - PEAK FLOW COMPARISON

STORM EVENT	EXISTING CONDITIONS (CFS)	PROPOSED CONDITIONS (CFS)	DIFFERENCE
10-yr	0.1	0.1	0
25-yr	0.1	0.1	0
50-yr	0.2	0.2	0
100-yr	0.2	0.2	0

TABLE NO. 2: OUT ROAD DESIGN POINT - PEAK FLOW COMPARISON

## **EROSION & SEDIMENTATION CONTROL PLAN**

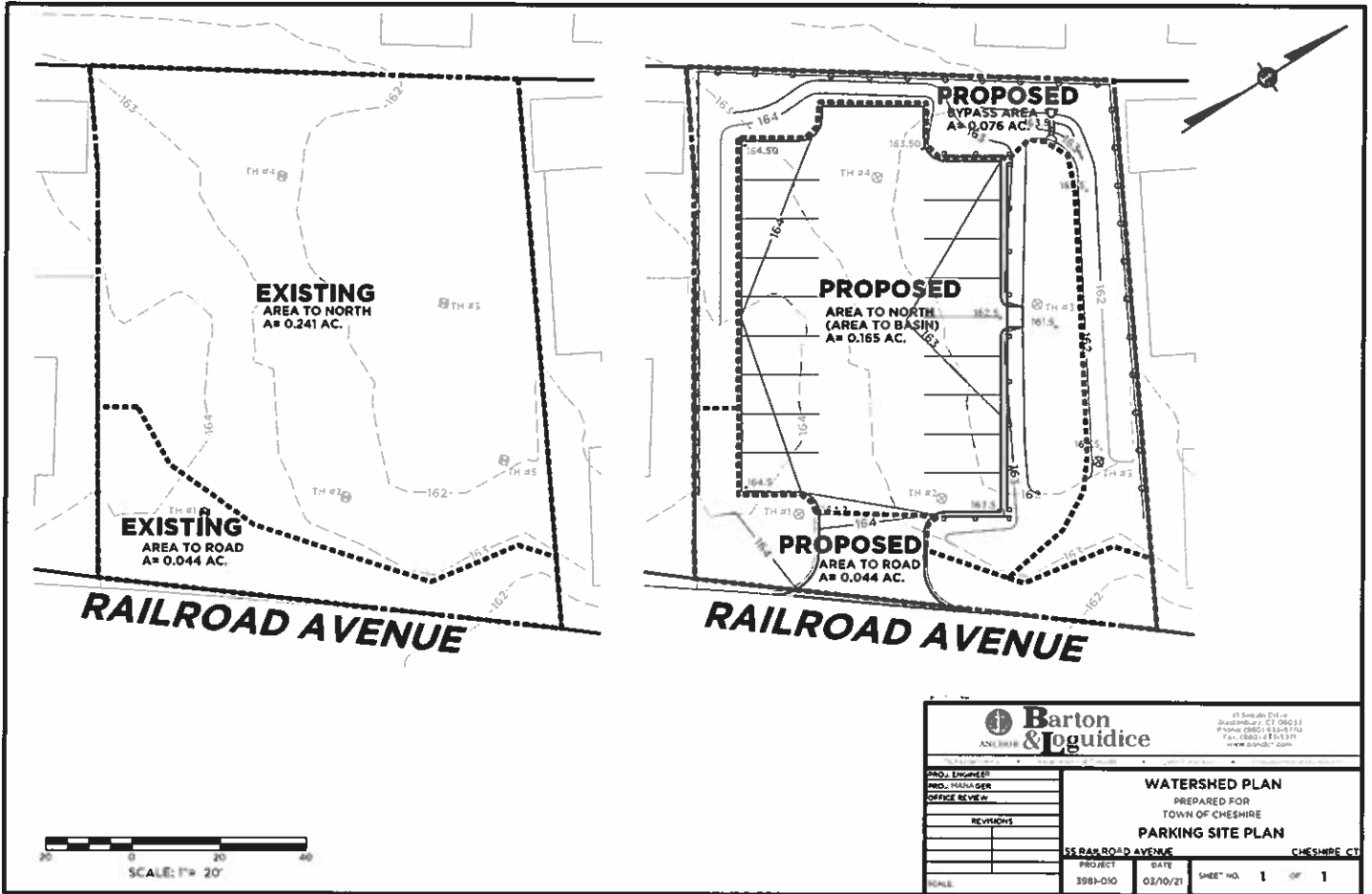
The potential impact of the project on the surrounding areas is related to the temporary transport of soils and sediments associated with the construction phases of the project. The impact of the project on the surrounding areas will be controlled as specified in the plan set or as required to meet field conditions. The proposed plan complies with the 2002 CT Guidelines for Soil Erosion and Sediment Control.

## **APPENDIX A**

### **DRAINAGE AREA MAPPING**







		41 Sennett Rd. Shelton, CT 06484 Phone: (203) 834-4740 Fax: (203) 834-5571 www.bartonloguidice.com	
PRO. ENGINEER PRO. MANAGER OFFICE REVIEW REVISIONS		<b>WATERSHED PLAN</b> PREPARED FOR TOWN OF CHESHIRE <b>PARKING SITE PLAN</b>	
PROJECT: 3981-010 DATE: 03/10/21 SHEET NO. 1 OF 1		CHESHIRE, CT	



## **APPENDIX B**

### **PONDPACK RESULTS**



Subsection: Master Network Summary

**Catchments Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)
AREA TO NORTH	Pre-Development 10 YR	10	0.044	12.150	0.49
AREA TO NORTH	Post-Development 10 YR	10	0.056	12.150	0.61
AREA TO NORTH	Pre-Development 25 YR	25	0.062	12.150	0.71
AREA TO NORTH	Post-Development 25 YR	25	0.072	12.150	0.77
AREA TO NORTH	Pre-Development 50 YR	50	0.077	12.150	0.87
AREA TO NORTH	Post-Development 50 YR	50	0.084	12.150	0.89
AREA TO NORTH	Pre-Development 100 YR	100	0.093	12.150	1.06
AREA TO NORTH	Post-Development 100 YR	100	0.097	12.150	1.02
AREA TO ROAD	Pre-Development 10 YR	10	0.008	12.150	0.09
AREA TO ROAD	Post-Development 10 YR	10	0.009	12.150	0.10
AREA TO ROAD	Pre-Development 25 YR	25	0.012	12.150	0.13
AREA TO ROAD	Post-Development 25 YR	25	0.012	12.150	0.14
AREA TO ROAD	Pre-Development 50 YR	50	0.015	12.150	0.17
AREA TO ROAD	Post-Development 50 YR	50	0.015	12.150	0.17
AREA TO ROAD	Pre-Development 100 YR	100	0.018	12.150	0.20
AREA TO ROAD	Post-Development 100 YR	100	0.018	12.150	0.20
BYPASS AREA	Post-Development 10 YR	10	0.010	12.150	0.11
BYPASS AREA	Post-Development 25 YR	25	0.015	12.150	0.17
BYPASS AREA	Post-Development 50 YR	50	0.020	12.150	0.22
BYPASS AREA	Post-Development 100 YR	100	0.024	12.150	0.28

**Node Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)
OUT NORTH	Pre-Development 10 YR	10	0.044	12.150	0.49

## Subsection: Master Network Summary

### Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)
OUT NORTH	Post-Development 10 YR	10	0.019	12.250	0.39
OUT NORTH	Pre-Development 25 YR	25	0.062	12.150	0.71
OUT NORTH	Post-Development 25 YR	25	0.031	12.200	0.63
OUT NORTH	Pre-Development 50 YR	50	0.077	12.150	0.87
OUT NORTH	Post-Development 50 YR	50	0.041	12.200	0.79
OUT NORTH	Pre-Development 100 YR	100	0.093	12.150	1.06
OUT NORTH	Post-Development 100 YR	100	0.052	12.200	0.96
OUT ROAD	Pre-Development 10 YR	10	0.008	12.150	0.09
OUT ROAD	Post-Development 10 YR	10	0.009	12.150	0.10
OUT ROAD	Pre-Development 25 YR	25	0.012	12.150	0.13
OUT ROAD	Post-Development 25 YR	25	0.012	12.150	0.14
OUT ROAD	Pre-Development 50 YR	50	0.015	12.150	0.17
OUT ROAD	Post-Development 50 YR	50	0.015	12.150	0.17
OUT ROAD	Pre-Development 100 YR	100	0.018	12.150	0.20
OUT ROAD	Post-Development 100 YR	100	0.018	12.150	0.20

### Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
RAIN GARDEN (IN)	Post-Development 10 YR	10	0.056	12.150	0.61	(N/A)	(N/A)
RAIN GARDEN (OUT)	Post-Development 10 YR	10	0.009	12.250	0.30	162.08	0.012
RAIN GARDEN (IN)	Post-Development 25 YR	25	0.072	12.150	0.77	(N/A)	(N/A)

Subsection: Master Network Summary

**Pond Summary**

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft <sup>3</sup> /s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
RAIN GARDEN (OUT)	Post- Development 25 YR	25	0.016	12.200	0.47	162.13	0.013
RAIN GARDEN (IN)	Post- Development 50 YR	50	0.084	12.150	0.89	(N/A)	(N/A)
RAIN GARDEN (OUT)	Post- Development 50 YR	50	0.022	12.200	0.59	162.16	0.014
RAIN GARDEN (IN)	Post- Development 100 YR	100	0.097	12.150	1.02	(N/A)	(N/A)
RAIN GARDEN (OUT)	Post- Development 100 YR	100	0.028	12.200	0.71	162.20	0.015

# EXISTING CONDITIONS

## Table of Contents

AREA TO NORTH	10 YR	
	Runoff CN-Area	1
AREA TO ROAD	10 YR	
	Runoff CN-Area	2



Subsection: Runoff CN-Area  
Label: AREA TO NORTH

Return Event: 10 years  
Storm Event: 10 YR

**Runoff Curve Number Data**

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.198	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.043	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.241	(N/A)	(N/A)	67.538

Subsection: Runoff CN-Area  
Label: AREA TO ROAD

Return Event: 10 years  
Storm Event: 10 YR

**Runoff Curve Number Data**

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.035	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.009	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN -->	(N/A)	0.044	(N/A)	(N/A)	68.701

## PROPOSED CONDITIONS

### Table of Contents

AREA TO NORTH	10 YR	
	Runoff CN-Area	1
AREA TO ROAD	10 YR	
	Runoff CN-Area	2
BYPASS AREA	10 YR	
	Runoff CN-Area	3
RAIN GARDEN	Elevation-Area Volume Curve	4

Subsection: Runoff CN-Area  
Label: AREA TO NORTH

Return Event: 10 years  
Storm Event: 10 YR

**Runoff Curve Number Data**

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.045	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.120	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.165	(N/A)	(N/A)	87.909

Subsection: Runoff CN-Area  
 Label: AREA TO ROAD

Return Event: 10 years  
 Storm Event: 10 YR

**Runoff Curve Number Data**

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.033	0.0	0.0	61.000
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil B	98.000	0.011	0.0	0.0	98.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.044	(N/A)	(N/A)	70.292

Subsection: Runoff CN-Area  
Label: BYPASS AREA

Return Event: 10 years  
Storm Event: 10 YR

**Runoff Curve Number Data**

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil B	61.000	0.076	0.0	0.0	61.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.076	(N/A)	(N/A)	61.000

Subsection: Elevation-Area Volume Curve  
 Label: RAIN GARDEN

Return Event: 10 years  
 Storm Event: 10 YR

Elevation (ft)	Planimeter (ft <sup>2</sup> )	Area (acres)	A1+A2+sqr (A1*A2) (acres)	Volume (ac-ft)	Volume (Total) (ac-ft)
161.00	0.0	0.000	0.000	0.000	0.000
162.00	0.0	0.028	0.028	0.009	0.009
162.50	0.0	0.040	0.101	0.017	0.026





## **APPENDIX C**

### **WATER QUALITY VOLUME CALCULATION**



05/03/21

## REQUIRED TREATMENT STRUCTURE SIZING - FLOW TO BASIN

## Compute Water Quality Volume

$$WQV = \frac{(I \times R \times A)}{12}$$

WQV = Water Quality Volume (acre-feet)

R = Volumetric Runoff Coefficient,  $0.050 + 0.009(I)$ 

I = Percent Impervious Cover, Impervious Area / Total Area

DA = Drainage Area (Acres)

IA = Impervious Area (Acres)

DA = 0.165 acres

IA = 0.120 acres

## Determine Percent Impervious Cover (I)

I = 73%

## Calculate Volumetric Runoff Coefficient (R)

R = 0.70

## Calculate Required Water Quality Volume

WQV = 0.010 acre-feet



## **APPENDIX D**

### **NOAA PRECIPITATION FREQUENCY ESTIMATES**





NOAA Atlas 14, Volume 10, Version 3  
 Location name: Cheshire, Connecticut, USA\*  
 Latitude: 41.5245°, Longitude: -72.8942°  
 Elevation: 201.71 ft\*\*  
 \* source: ESRI Maps  
 \*\* source: USGS



### POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF\\_tabular](#) | [PF\\_graphical](#) | [Maps & aeriels](#)

### PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup>										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.341 (0.266-0.428)	0.412 (0.322-0.518)	0.528 (0.411-0.667)	0.625 (0.484-0.794)	0.758 (0.567-1.01)	0.858 (0.630-1.17)	0.963 (0.685-1.37)	1.08 (0.729-1.58)	1.25 (0.808-1.89)	1.38 (0.876-2.15)
10-min	0.483 (0.377-0.607)	0.584 (0.456-0.734)	0.749 (0.583-0.945)	0.886 (0.686-1.13)	1.07 (0.804-1.43)	1.22 (0.892-1.66)	1.36 (0.971-1.94)	1.53 (1.03-2.24)	1.77 (1.15-2.68)	1.96 (1.24-3.04)
15-min	0.568 (0.444-0.714)	0.687 (0.536-0.864)	0.881 (0.685-1.11)	1.04 (0.806-1.32)	1.26 (0.946-1.69)	1.43 (1.05-1.95)	1.61 (1.14-2.28)	1.80 (1.21-2.63)	2.08 (1.35-3.15)	2.31 (1.46-3.58)
30-min	0.783 (0.612-0.983)	0.943 (0.736-1.19)	1.21 (0.937-1.52)	1.42 (1.10-1.81)	1.72 (1.29-2.30)	1.95 (1.43-2.66)	2.18 (1.55-3.10)	2.44 (1.65-3.57)	2.83 (1.83-4.29)	3.14 (1.99-4.87)
60-min	0.997 (0.780-1.25)	1.20 (0.936-1.51)	1.53 (1.19-1.93)	1.80 (1.39-2.29)	2.18 (1.63-2.90)	2.46 (1.80-3.36)	2.76 (1.96-3.92)	3.09 (2.08-4.51)	3.57 (2.32-5.42)	3.97 (2.51-6.16)
2-hr	1.31 (1.03-1.64)	1.57 (1.23-1.96)	1.98 (1.55-2.49)	2.33 (1.81-2.94)	2.80 (2.11-3.71)	3.16 (2.33-4.29)	3.53 (2.53-5.00)	3.96 (2.68-5.74)	4.57 (2.97-6.89)	5.07 (3.22-7.82)
3-hr	1.52 (1.20-1.89)	1.82 (1.43-2.26)	2.30 (1.81-2.87)	2.70 (2.11-3.39)	3.25 (2.46-4.29)	3.66 (2.71-4.95)	4.10 (2.94-5.78)	4.59 (3.12-6.64)	5.31 (3.46-7.98)	5.91 (3.76-9.07)
6-hr	1.93 (1.54-2.39)	2.32 (1.84-2.87)	2.95 (2.33-3.66)	3.47 (2.73-4.33)	4.19 (3.19-5.51)	4.73 (3.52-6.37)	5.30 (3.84-7.45)	5.97 (4.06-8.57)	6.95 (4.54-10.4)	7.77 (4.96-11.9)
12-hr	2.38 (1.91-2.92)	2.89 (2.31-3.55)	3.72 (2.97-4.59)	4.41 (3.50-5.48)	5.36 (4.11-7.02)	6.07 (4.56-8.15)	6.83 (4.99-9.59)	7.74 (5.29-11.1)	9.11 (5.97-13.5)	10.3 (6.58-15.6)
24-hr	2.80 (2.26-3.41)	3.46 (2.78-4.21)	4.52 (3.63-5.54)	5.41 (4.31-6.67)	6.63 (5.12-8.65)	7.53 (5.70-10.1)	8.51 (6.28-12.0)	9.73 (6.67-13.8)	11.6 (7.65-17.2)	13.3 (8.53-20.0)
2-day	3.16 (2.57-3.82)	3.96 (3.21-4.80)	5.28 (4.26-6.42)	6.37 (5.11-7.79)	7.86 (6.13-10.2)	8.96 (6.85-12.0)	10.2 (7.60-14.3)	11.8 (8.08-16.6)	14.3 (9.42-21.0)	16.5 (10.6-24.7)
3-day	3.43 (2.80-4.14)	4.32 (3.51-5.21)	5.76 (4.67-6.98)	6.96 (5.61-8.49)	8.62 (6.74-11.2)	9.82 (7.54-13.1)	11.2 (8.37-15.7)	12.9 (8.90-18.2)	15.8 (10.4-23.1)	18.3 (11.8-27.3)
4-day	3.68 (3.01-4.42)	4.62 (3.77-5.56)	6.16 (5.01-7.44)	7.44 (6.01-9.05)	9.20 (7.21-11.9)	10.5 (8.06-13.9)	11.9 (8.95-16.7)	13.8 (9.51-19.3)	16.8 (11.1-24.5)	19.5 (12.6-29.0)
7-day	4.39 (3.60-5.24)	5.43 (4.46-6.50)	7.15 (5.85-8.59)	8.57 (6.96-10.4)	10.5 (8.28-13.5)	12.0 (9.23-15.8)	13.5 (10.2-18.8)	15.6 (10.8-21.7)	18.8 (12.5-27.3)	21.7 (14.0-32.1)
10-day	5.09 (4.20-6.06)	6.20 (5.11-7.39)	8.01 (6.57-9.58)	9.51 (7.75-11.5)	11.6 (9.12-14.8)	13.1 (10.1-17.1)	14.8 (11.1-20.3)	16.8 (11.7-23.4)	20.1 (13.4-29.0)	22.9 (14.8-33.8)
20-day	7.30 (6.06-8.63)	8.48 (7.03-10.0)	10.4 (8.60-12.4)	12.0 (9.85-14.4)	14.2 (11.2-17.9)	15.9 (12.2-20.4)	17.6 (13.1-23.7)	19.6 (13.7-27.0)	22.6 (15.1-32.3)	25.0 (16.3-36.7)
30-day	9.15 (7.63-10.8)	10.4 (8.63-12.2)	12.3 (10.2-14.6)	14.0 (11.5-16.7)	16.3 (12.9-20.3)	18.0 (13.9-22.9)	19.8 (14.7-26.2)	21.7 (15.2-29.7)	24.3 (16.3-34.7)	26.4 (17.2-38.6)
45-day	11.4 (9.58-13.4)	12.7 (10.6-14.9)	14.7 (12.3-17.4)	16.4 (13.6-19.5)	18.8 (14.9-23.2)	20.6 (15.9-26.0)	22.4 (16.6-29.3)	24.2 (17.1-33.0)	26.6 (17.9-37.7)	28.3 (18.5-41.2)
60-day	13.3 (11.2-15.6)	14.6 (12.3-17.1)	16.7 (14.0-19.7)	18.5 (15.3-21.9)	20.9 (16.6-25.7)	22.8 (17.6-28.6)	24.6 (18.2-32.0)	26.4 (18.6-35.8)	28.5 (19.3-40.4)	30.1 (19.7-43.7)

<sup>1</sup> 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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