

Rainfall Atlas 14: Replacement of Technical Paper 40

Watershed Partner's Seventh Annual Boat Trip

June 12, 2013

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Presentation Agenda

1. Discuss Technical Paper 40 and the development of Atlas 14
2. Discuss the results of Atlas 14
3. Discuss the possible impacts of Atlas 14
4. Discuss actions of various organizations to Atlas 14
 - a. Federal agencies have switched to Atlas 14
 - b. MnDOT has switched to Atlas 14
 - c. The cities of Woodbury, Farmington and Lakeview are gathering information to assess impacts on:
 - i. Storm sewers
 - ii. Detention ponds
 - iii. Overland flows

Handouts

- TP 40/Atlas 14 comparison tables for Minnesota locations analyzed by Barr Engineering
- Map of Minnesota showing percent change from TP 40 to Atlas 14 at analyzed stations across the state
- Map of Twin Cities metro counties showing the locations of Atlas 14 stations Barr Engineering has analyzed
- Maps of Twin Cities metro counties comparing the TP 40 and Atlas 14 lines of constant rainfall depth for the 2- and 100-year, 24-hour events.

Minnesota Locations
TP 40/Atlas 14 comparisons by Barr Engineering

24-Hour Duration Event
Final: Revised April 26, 2013

Albert Lea			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	3.0	3.0	0
5	3.8	3.8	0
10	4.4	4.6	5
50	5.6	6.8	21
100	6.3	7.8	24
100yr/24hr 90% Confidence Interval [in]:			5.9 - 10.3

Alexandria			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.5	2.6	4
5	3.3	3.1	-6
10	3.9	3.7	-5
50	5.1	5.2	2
100	5.6	6.0	7
100yr/24hr 90% Confidence Interval [in]:			4.9 - 7.1

Arden Hills			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.2	0
50	5.3	6.3	19
100	6.0	7.4	23
100yr/24hr 90% Confidence Interval [in]:			5.4 - 10.2

Austin			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	3.0	3.0	0
5	3.8	3.8	0
10	4.4	4.5	2
50	5.6	6.7	20
100	6.3	7.8	24
100yr/24hr 90% Confidence Interval [in]:			5.8 - 10.4

Bloomington			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.2	0
50	5.3	6.3	19
100	6.0	7.5	25
100yr/24hr 90% Confidence Interval [in]:			5.5 - 10.3

Brainerd			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.5	2.7	8
5	3.3	3.3	0
10	3.9	3.9	0
50	5.0	5.5	10
100	5.5	6.3	15
100yr/24hr 90% Confidence Interval [in]:			4.7 - 8.2

Cedar/East Bethel			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.7	2.8	4
5	3.5	3.6	3
10	4.1	4.2	2
50	5.3	6.1	15
100	5.9	7.0	19
100yr/24hr 90% Confidence Interval [in]:			5.3 - 9.2

Decker/St. Charles			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.9	3.0	3
5	3.7	3.7	0
10	4.3	4.5	5
50	5.4	6.7	24
100	6.1	7.8	28
100yr/24hr 90% Confidence Interval [in]:			5.8 - 10.4

Dodge Center			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.9	2.9	0
5	3.7	3.7	0
10	4.3	4.5	5
50	5.5	6.7	22
100	6.1	7.9	30
100yr/24hr 90% Confidence Interval [in]:			5.9 - 10.7

Duluth Airport			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.5	2.7	8
5	3.3	3.3	0
10	3.8	3.9	3
50	4.8	5.6	17
100	5.3	6.3	19
100yr/24hr 90% Confidence Interval [in]:			4.9 - 8.1

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Duluth Harbor			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.5	2.6	4
5	3.3	3.3	0
10	3.8	3.9	3
50	4.8	5.5	15
100	5.3	6.3	19
100yr/24hr 90% Confidence Interval [in]:			4.8 - 8.0

Elgin			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.9	3.0	3
5	3.7	3.8	3
10	4.3	4.5	5
50	5.4	6.8	26
100	6.1	7.9	30
100yr/24hr 90% Confidence Interval [in]:			5.9 - 10.7

Elk River			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.7	2.9	7
5	3.5	3.6	3
10	4.1	4.2	2
50	5.3	6.1	15
100	5.9	7.0	19
100yr/24hr 90% Confidence Interval [in]:			5.2 - 9.1

Farmington			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.2	0
50	5.3	6.3	19
100	6.0	7.4	23
100yr/24hr 90% Confidence Interval [in]:			5.6 - 9.8

Golden Valley			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.9	4
5	3.6	3.6	0
10	4.2	4.3	2
50	5.3	6.4	21
100	6.0	7.4	23
100yr/24hr 90% Confidence Interval [in]:			5.7 - 9.7

Grand Marais			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.4	2.4	0
5	3.1	3.0	-3
10	3.5	3.5	0
50	4.5	4.9	9
100	4.8	5.6	17
100yr/24hr 90% Confidence Interval [in]:			4.2 - 7.3

Grand Rapids			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.4	2.6	8
5	3.2	3.3	3
10	3.7	3.9	5
50	4.7	5.5	17
100	5.3	6.3	19
100yr/24hr 90% Confidence Interval [in]:			4.7 - 8.1

International Falls			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.3	2.4	4
5	3.0	2.9	-3
10	3.5	3.4	-3
50	4.5	4.7	4
100	5.0	5.3	6
100yr/24hr 90% Confidence Interval [in]:			4.1 - 6.7

Inver Grove Heights			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.2	0
50	5.3	6.3	19
100	6.0	7.4	23
100yr/24hr 90% Confidence Interval [in]:			5.5 - 10.3

Jordan			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.9	4
5	3.6	3.6	0
10	4.2	4.2	0
50	5.4	6.3	17
100	6.0	7.3	22
100yr/24hr 90% Confidence Interval [in]:			5.4 - 9.8

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Mankato			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.9	2.9	0
5	3.7	3.6	-3
10	4.2	4.3	2
50	5.5	6.2	13
100	6.1	7.2	18
100yr/24hr 90% Confidence Interval [in]:			5.4 - 9.4

Minneapolis/St Paul International Airport			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.2	0
50	5.3	6.4	21
100	6.0	7.5	25
100yr/24hr 90% Confidence Interval [in]:			5.9 - 9.5

Minnnetonka			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.9	4
5	3.6	3.6	0
10	4.2	4.3	2
50	5.3	6.4	21
100	6.0	7.4	23
100yr/24hr 90% Confidence Interval [in]:			5.5 - 10.0

Montevideo			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.6	2.6	0
5	3.4	3.2	-6
10	4.0	3.8	-5
50	5.2	5.5	6
100	5.7	6.4	12
100yr/24hr 90% Confidence Interval [in]:			4.9 - 8.7

Moorhead			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.3	2.5	9
5	3.1	3.1	0
10	3.6	3.8	6
50	4.6	5.6	22
100	5.3	6.5	23
100yr/24hr 90% Confidence Interval [in]:			4.8 - 8.5

Mound			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.9	4
5	3.6	3.6	0
10	4.2	4.2	0
50	5.3	6.2	17
100	6.0	7.3	22
100yr/24hr 90% Confidence Interval [in]:			5.5 - 9.5

Pine Springs			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.2	0
50	5.3	6.2	17
100	6.0	7.3	22
100yr/24hr 90% Confidence Interval [in]:			5.4 - 9.8

Rochester Airport			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.9	2.9	0
5	3.7	3.7	0
10	4.3	4.5	5
50	5.5	6.7	22
100	6.1	7.8	28
100yr/24hr 90% Confidence Interval [in]:			6.0 - 10.4

Roesemount			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.1	-2
50	5.3	6.3	19
100	6.0	7.4	23
100yr/24hr 90% Confidence Interval [in]:			5.5 - 10.2

St Cloud			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.6	2.7	4
5	3.4	3.4	0
10	4.1	4.0	-2
50	5.2	5.6	8
100	5.8	6.4	10
100yr/24hr 90% Confidence Interval [in]:			5.0 - 7.9

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St. Paul			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.8	0
5	3.6	3.5	-3
10	4.2	4.2	0
50	5.3	6.3	19
100	6.0	7.4	23
100yr/24hr 90% Confidence Interval [in]:			5.6 - 9.9

Thief River Falls			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.2	2.5	14
5	3.0	3.2	7
10	3.5	3.8	9
50	4.5	5.5	22
100	5.1	6.3	24
100yr/24hr 90% Confidence Interval [in]:			4.7 - 8.3

Warroad			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.2	2.3	5
5	2.9	2.8	-3
10	3.4	3.4	0
50	4.5	5.0	11
100	5.0	5.8	16
100yr/24hr 90% Confidence Interval [in]:			4.5 - 7.6

Winona			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.9	2.9	0
5	3.7	3.6	-3
10	4.3	4.3	0
50	5.4	6.3	17
100	6.1	7.3	20
100yr/24hr 90% Confidence Interval [in]:			5.5 - 9.6

Worthington			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.8	2.9	4
5	3.6	3.7	3
10	4.2	4.5	7
50	5.5	6.5	18
100	6.1	7.4	21
100yr/24hr 90% Confidence Interval [in]:			5.8 - 9.2

Zumbrota			
Frequency	TP 40 [in]	Atlas 14 [in]	% Change
2	2.9	2.9	0
5	3.7	3.7	0
10	4.2	4.5	7
50	5.5	6.7	22
100	6.1	7.9	30
100yr/24hr 90% Confidence Interval [in]:			5.9 - 10.7

Sources: NOAA Atlas 14, Volume 8, Version 2, Midwestern States
U.S. Weather Bureau Technical Paper No. 40, 1961

24 Hour Rainfall

Minnesota

Source: NOAA Atlas 14, Vol. 8, Ver. 2
Midwestern States
Final: April, 2013

