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TFMA FALL 2019

Can we spot a trend between Atlas 14 Rainfall and Flows in Bexar County?

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AUGUST 28, 2019

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Can you see a trend between (Atlas 14) Rainfall and Flows in Bexar County?

1. INTRODUCTION
2. DATA AND ANALYSIS
3. RESULTS
4. CONCLUSION

INTRODUCTION

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WHAT IS ATLAS 14?

- NOAA ATLAS 14 VOLUME 11 – TEXAS UPDATE
  - ✓ NOAA Draft 2018

Source NOAA

INTRODUCTION

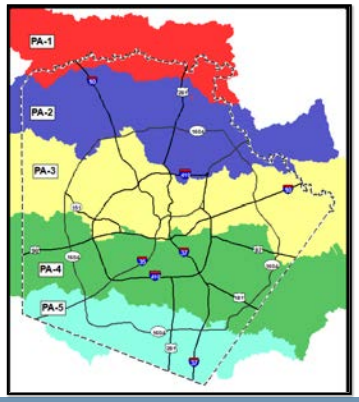
- **NOAA ATLAS 14 VOLUME 11 – TEXAS UPDATE**
  - ✓ NOAA (2018)
  - ✓ City of San Antonio Draft Guidance– Late 2018
  - ✓ City of San Antonio Amendment to UDC – April 2019

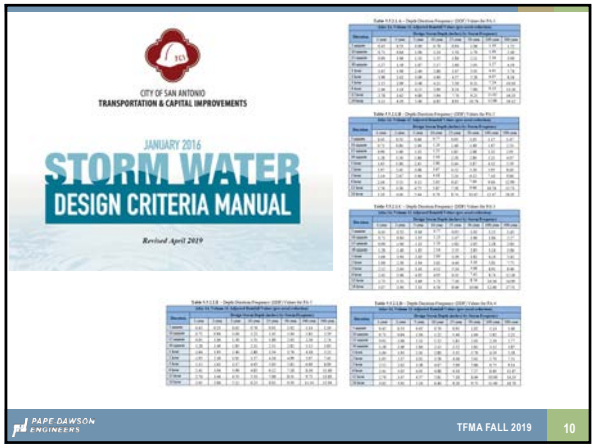
CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS

JANUARY 2016

STORM WATER DESIGN CRITERIA MANUAL

Revised April 2019




CITY OF SAN ANTONIO
TRANSPORTATION & CAPITAL IMPROVEMENTS
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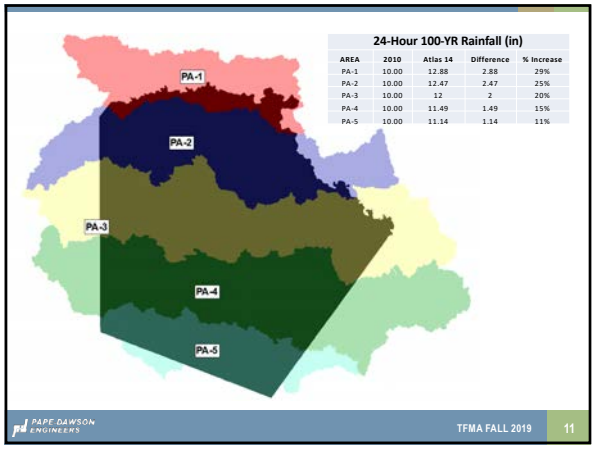
24-Hour 100-YR Rainfall (in)
AREA | 2010 | Atlas 14 | Difference | % Increase
PA-1 | 10.00 | 12.88 | 2.88 | 29%
PA-2 | 10.00 | 12.47 | 2.47 | 25%
PA-3 | 10.00 | 12 | 2 | 20%
PA-4 | 10.00 | 11.49 | 1.49 | 15%
PA-5 | 10.00 | 11.14 | 1.14 | 11%
PA-1
PA-2
PA-3
PA-4
PA-5
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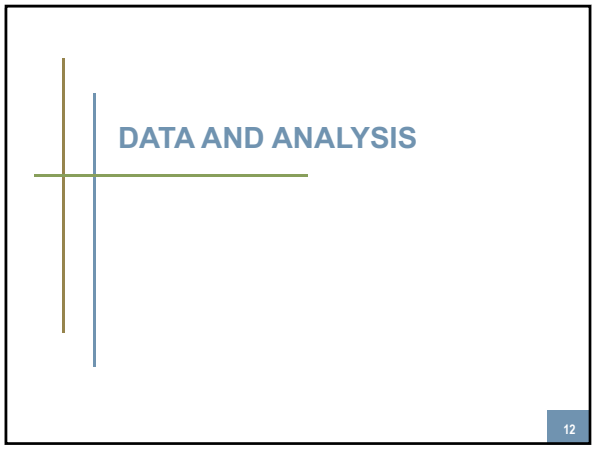
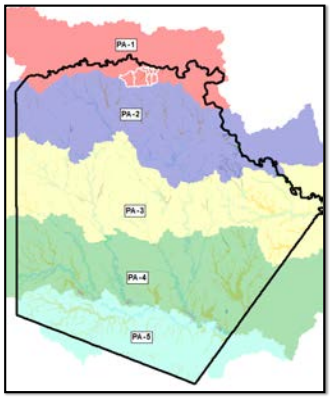

DATA AND ANALYSIS
12

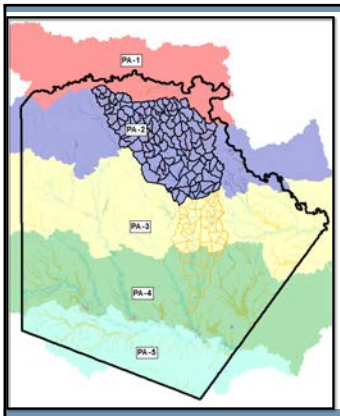
QUESTION: What am I looking for?

24-Hour 100-YR Rainfall (in)

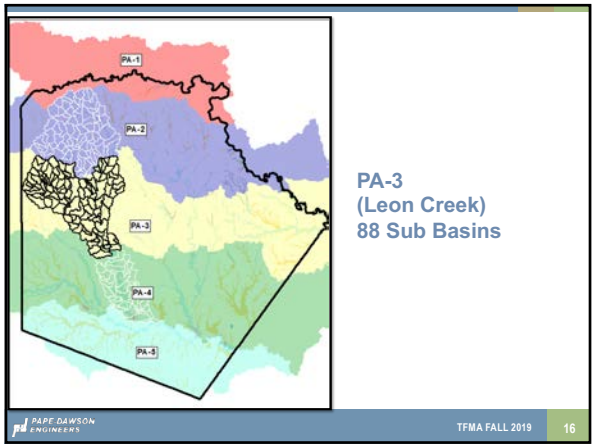
AREA	2010	Atlas 14	Difference	% Increase
PA-1	10.00	12.88	2.88	29%
PA-2	10.00	12.47	2.47	25%
PA-3	10.00	12	2	20%
PA-4	10.00	11.49	1.49	15%
PA-5	10.00	11.14	1.14	11%



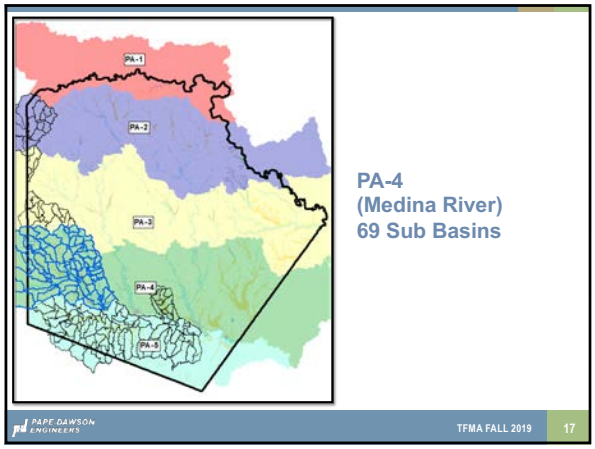
PA-1 (Muesbach Creek) 7 Sub Basins



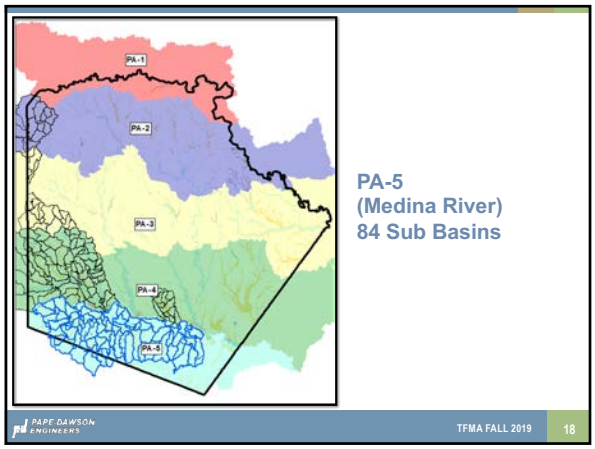
PA-2 (Salado Creek) 102 Sub Basins



PA-3
(Leon Creek)
88 Sub Basins



PA-4
(Medina River)
69 Sub Basins



PA-5
(Medina River)
84 Sub Basins

HEC-HMS MODELS FROM SARA D2MR

1. ORIGINAL PARAMETERS
2. UNDEVELOPED CONDITIONS (0% IMP)
3. DEVELOPED CONDITIONS (65% IMP)

RAINFALL DATA

1. 2010 RAINFALL (Already in the models)
2. COSA ATLAS 14 (Rainfall Hyetographs)
3. 0.5 sqmi to 2 sqmi
4. No AERIAL REDUCTION

MODEL PARAMETERS

Hydrologic Element	Type	DA (sqmi)	DA (AC)	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
10434	Subbasin	0.487	312	1382.9	1521.1	10%	145	209.8	45%
10435	Subbasin	0.569	364	1119.2	1281.6	15%	160.9	233.8	45%
10432	Subbasin	0.605	387	1774.5	1864.9	5%	227.3	313.1	38%
10431	Subbasin	0.902	577	2926.8	3032.1	4%	352.3	480.9	37%
10433	Subbasin	0.909	582	3091.7	3162.9	2%	372.7	504.3	35%
10423	Subbasin	2.607	1668	5373	5824.4	8%	1030	1396.8	36%

UNDEVELOPED CONDITIONS

Hydrologic Element	Type	DA (sqmi)	DA (AC)	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
10434	Subbasin	0.487	311.68	1769.9	1820.6	3%	185.3	255.5	38%
10435	Subbasin	0.569	364.16	1517.4	1607.1	6%	216.5	297.6	37%
10432	Subbasin	0.605	387.2	1824.7	1905.7	4%	230.2	316.9	38%
10431	Subbasin	0.902	577.28	2956.6	3066	4%	343.3	472.8	38%
10433	Subbasin	0.909	581.76	2979.6	3089.8	4%	345.9	476.5	38%
10423	Subbasin	2.607	1668.48	5258.6	5745.4	9%	992.1	1357.3	37%

DEVELOPED CONDITIONS (65% IMP)

Hydrologic Element	Type	DA (sqmi)	DA (AC)	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
10434	Subbasin	0.487	311.68	2020.2	1985.7	-2%	233.7	306.2	31%
10435	Subbasin	0.569	364.16	1742.8	1757.1	1%	273	356.7	31%
10432	Subbasin	0.605	387.2	2093.4	2084.6	0%	290.3	379.8	31%
10431	Subbasin	0.902	577.28	3366.5	3339.8	-1%	432.8	566.6	31%
10433	Subbasin	0.909	581.76	3392.6	3365.7	-1%	436.2	571	31%
10423	Subbasin	2.607	1668.48	6069.7	6311.9	4%	1251	1628	30%

RESULTS

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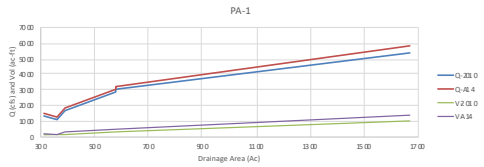
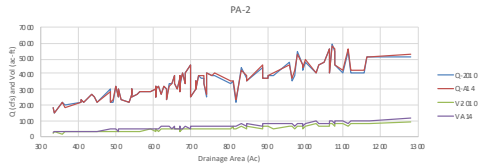
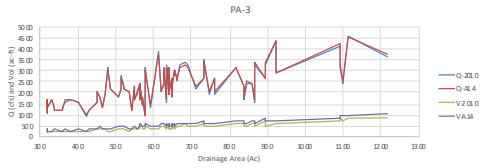
PA-1



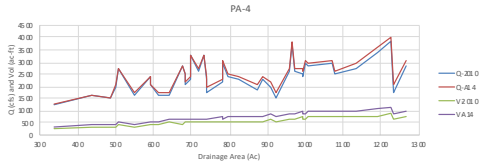
PA-2



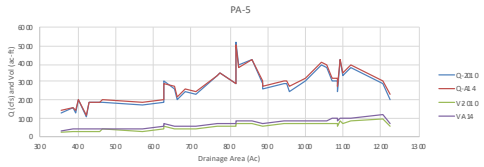
PA-3


PA-3
Drainage Area (Ac)
Q-2010
Q-Alt 4
V-2010
V-Alt 4

PA-4


PA-4
Drainage Area (Ac)
Q-2010
Q-Alt 4
V-2010
V-Alt 4

PA-5


PA-5
Drainage Area (Ac)
Q-2010
Q-Alt 4
V-2010
V-Alt 4

CONCLUSION / DISCUSSION

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PA-1

PA-1	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
Model	2611	2781	7%	381	523	37%
Undev	2718	2872	6%	386	529	37%
65% Imp	3114	3141	1%	486	635	31%

PA-2

PA-2	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
Model	3453	3482	1%	502	643	28%
Undev	3201	3308	3%	434	572	32%
65% Imp	3664	3633	-1%	547	690	26%

PA-3

PA-3	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
Model	2307	2316	1%	424	522	23%
Undev	2222	2257	2%	387	484	25%
65% Imp	2504	2470	-1%	471	571	21%

PA-4

PA-4	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
Model	2400	2526	6%	568	727	28%
Undev	2240	2405	7%	511	668	31%
65% Imp	2549	2641	4%	621	783	26%

PA-5

PA-5	Q 2010 NR	Q A14 NR	% Inc	VOL 2010 NR	VOL A14 NR	% Inc
Model	2771	2866	3%	563	719	28%
Undev	2589	2736	6%	509	664	30%
65% Imp	2936	2994	2%	617	776	26%

FINAL SUMMARY

PRECIP AREA	% RAINFALL INC	% FLOW INCREASE MODEL PARAM	UNDEV COND	65% IMP
PA-1	29%	7%	6%	1%
PA-2	25%	1%	3%	-1%
PA-3	20%	1%	2%	-1%
PA-4	15%	6%	7%	4%
PA-5	11%	3%	6%	2%

PRECIP AREA	% RAINFALL INC	% VOLUME INCREASE MODEL PARAM	UNDEV COND	65% IMP
PA-1	29%	37%	37%	31%
PA-2	25%	28%	32%	26%
PA-3	20%	23%	25%	21%
PA-4	15%	28%	31%	26%
PA-5	11%	28%	30%	26%

CONCLUSION

- DOES INCREASE IN RAINFALL MEAN INCREASE IN FLOW
- DID YOU SEE A TREND?

THANK YOU
TFMA

PAPE-DAWSON ENGINEERS

QUESTIONS?

PAPE-DAWSON ENGINEERS

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