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Flood Regulations: Impacting Emergency Management Too

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Prein&Newhof

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"YES WE MADE MISTAKES IN THE PAST, BUT
IT'S ALL WATER OVER THE BRIDGE NOW."

Will This Impact Emergency Response?









Standard Flood Events



Flood Events Defined

- 1% Frequency Rainfall/Flood (100-year flood) – Rain Event/Flood Level expected to be equaled once every 100 years on average.
- 4% Frequency Rainfall/Flood (25-year flood) - Rain Event/Flood Level expected to be equaled once every 25 years on average.
- 10% Frequency Rainfall/Flood (10-year flood) - Rain Event/Flood Level expected to be equaled once every 10 years on average.

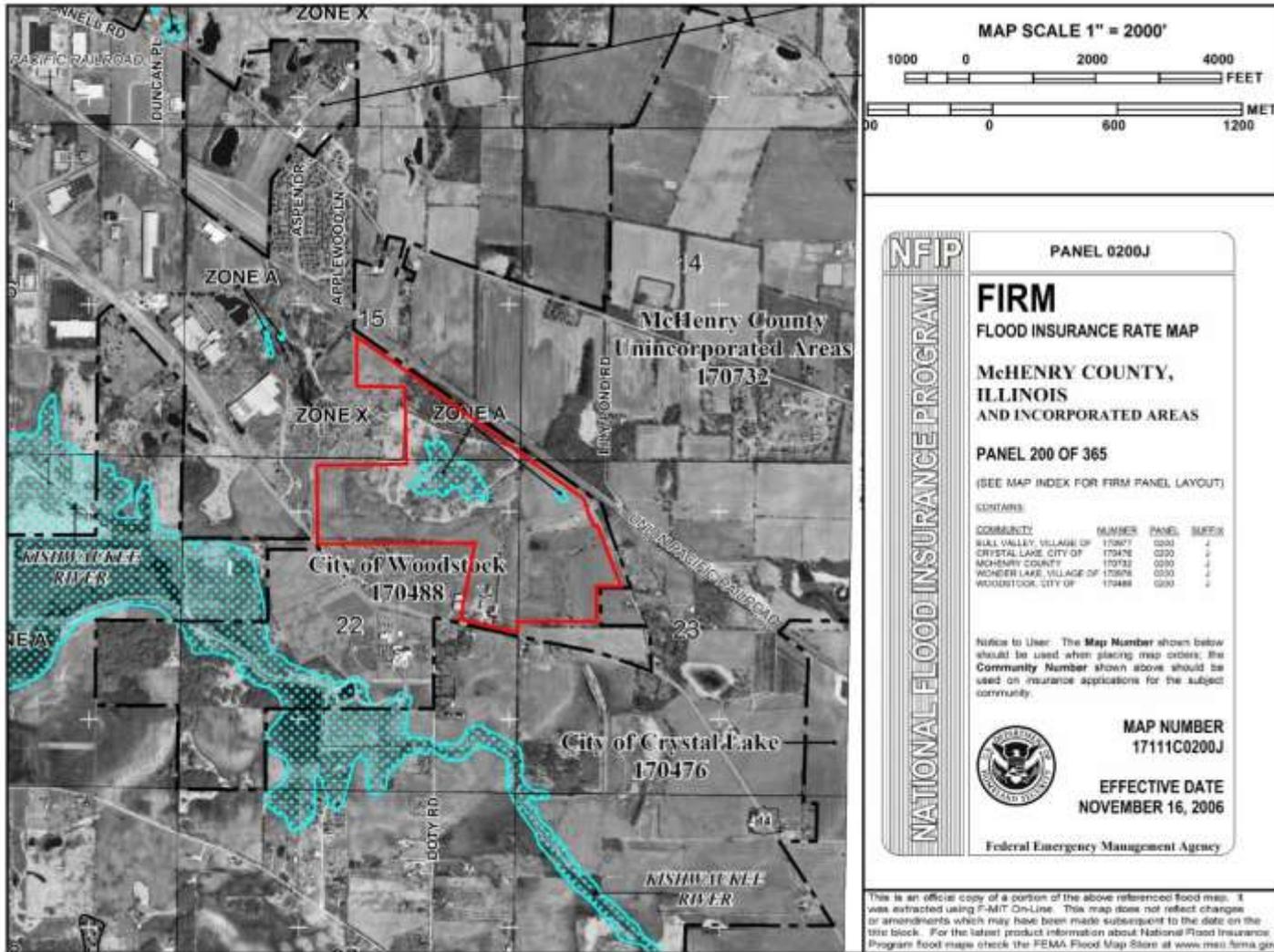


Hydrology - Hydraulics

Hydrology is the study of the movement, distribution, and quality of water on Earth

Hydraulics (free surface) deals with flow, such as occurring in rivers, canals, lakes, estuaries, and seas.

Hydrology



Hydrology

Rational Method

$$Q=C \times I \times A$$

Soil Conservation Service

(TR55, TR20, SCS92)

HEC-1/HEC-HMS

EPA Storm Water Management Model (SWMM)

Hydraulics

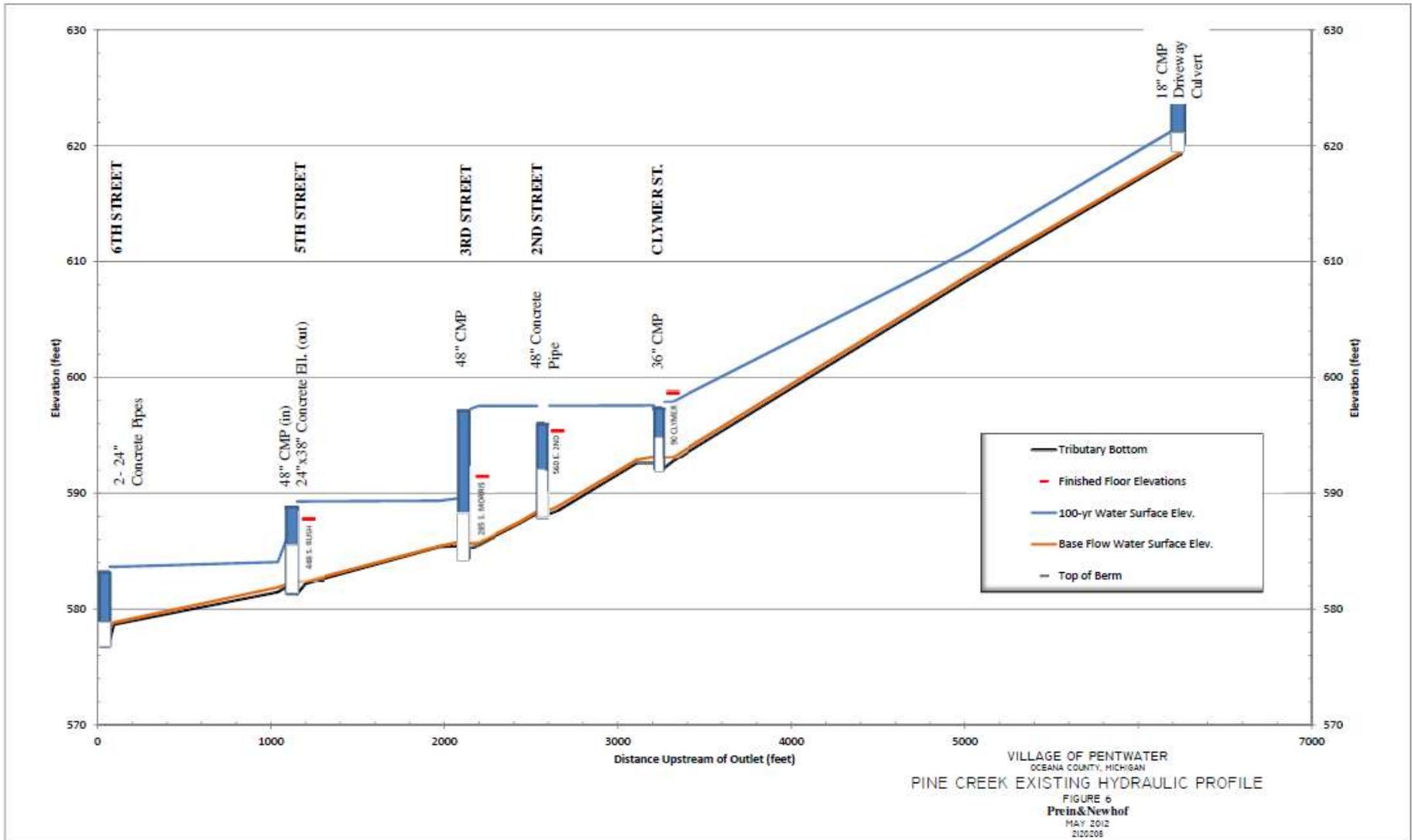
HEC-2/HEC-RAS

EPA Storm Water Management Model (SWMM)

FHWA HY-8

FHWA HYDRAIN

Hydraulic Profile

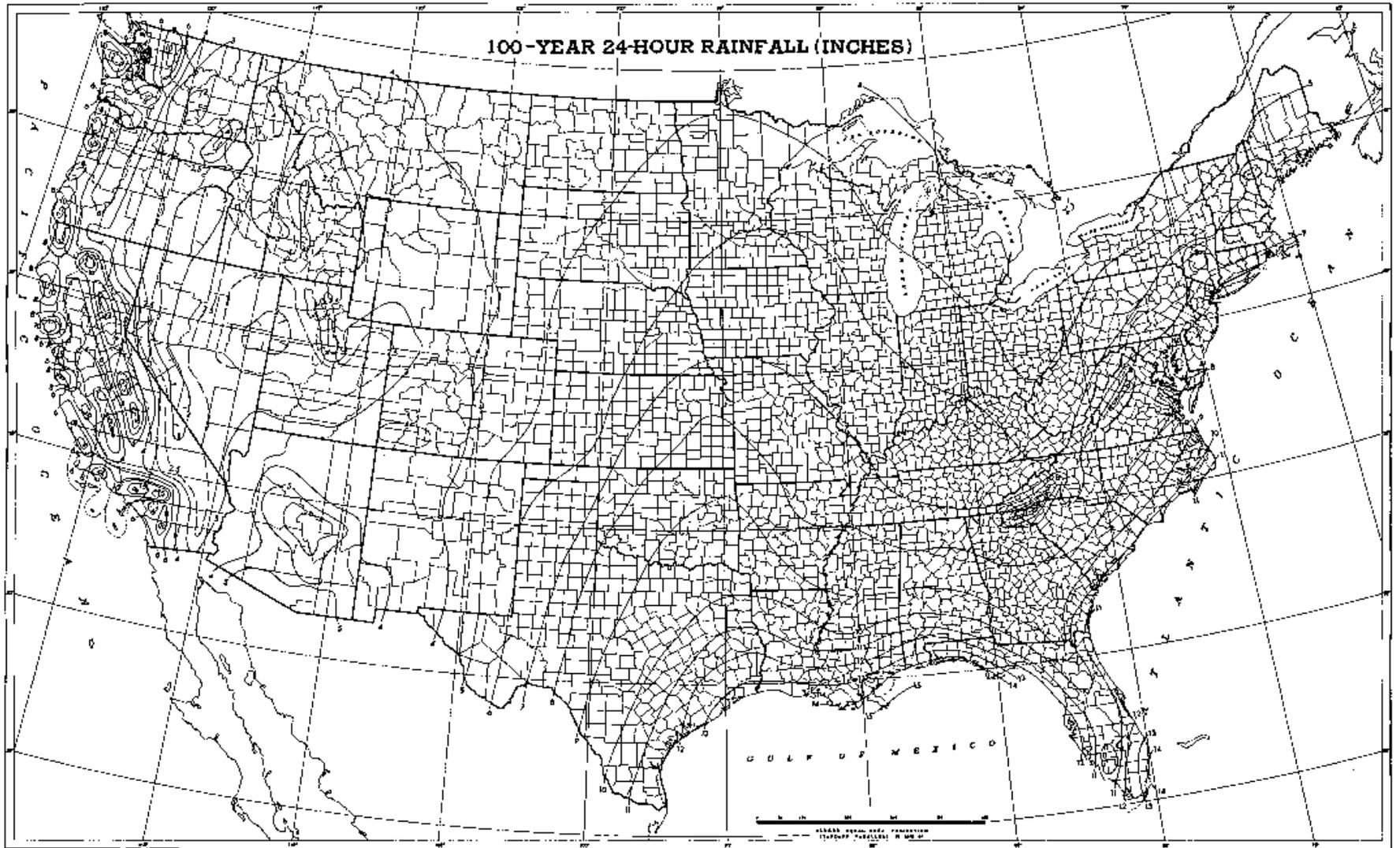




Chronological History of Rainfall Probability Evaluations

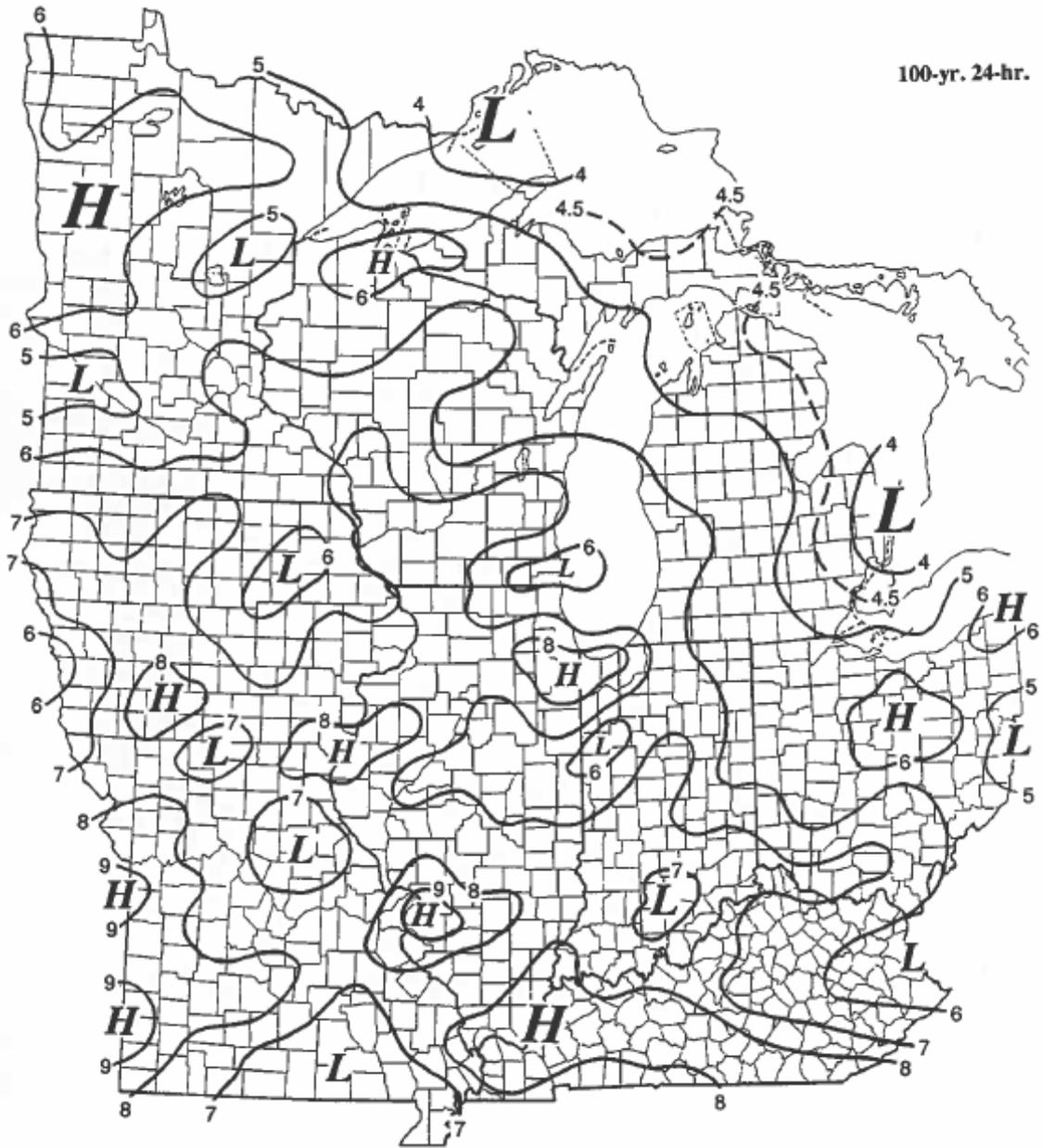
- Pre-1953-Yarnell's Paper
- 1953 – Technical Paper 24 (TP24), TP25, TP28, TP29
- 1962 – Technical Paper (TP40)

Technical Paper 40



Chronological History of Rainfall Probability Evaluations

- Pre-1953-Yarnell's Paper-see TP40 for more info
- 1953 – Technical Paper 24 (TP24), TP25, TP28, TP29
- 1962 – Technical Paper (TP40)
- 1992 - Rainfall Frequency Atlas of the Midwest (Bulletin 71)

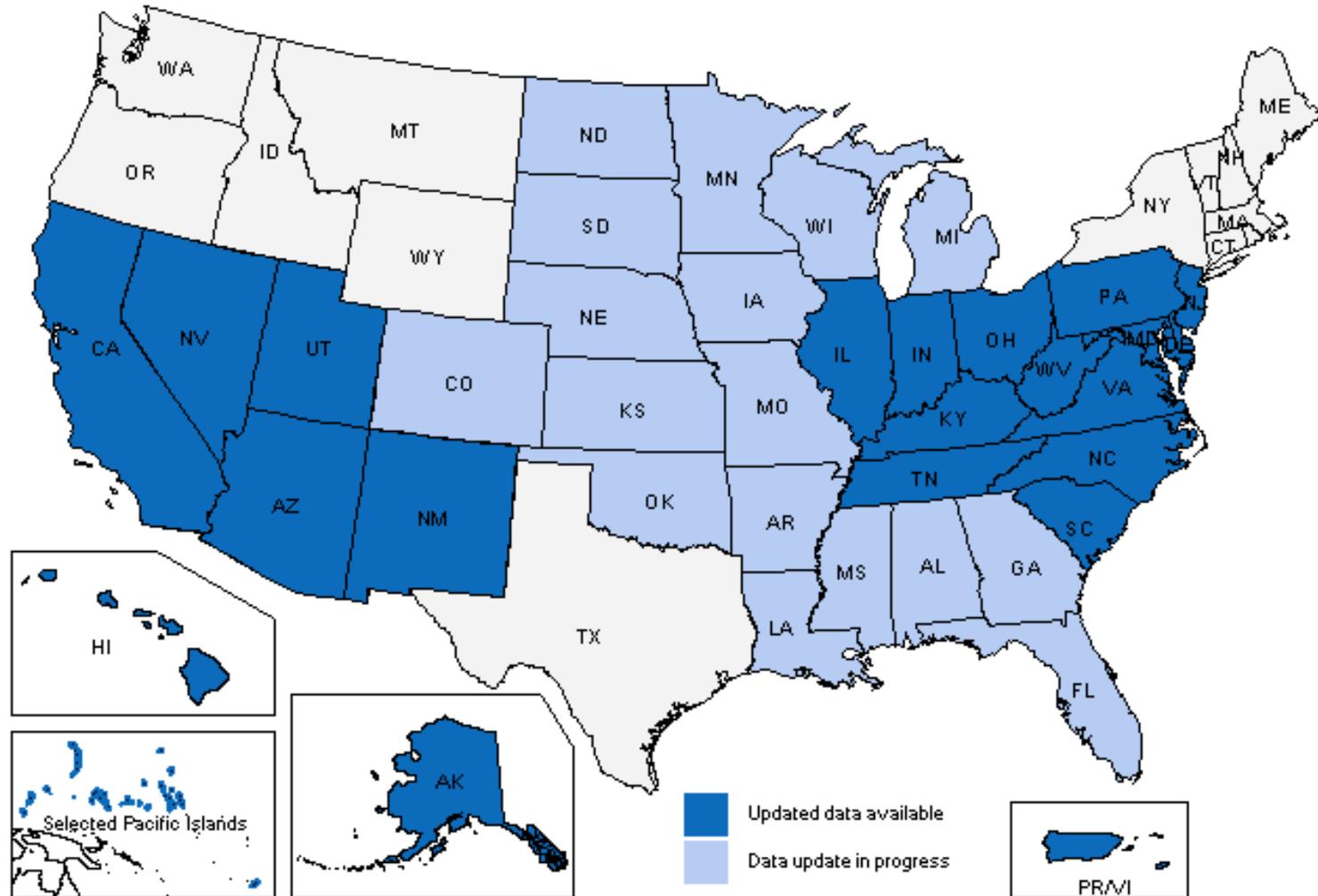


Rainfall Frequency Atlas of the Midwest (Bulletin 71)

Chronological History of Rainfall Probability Evaluations

- Pre-1953-Yarnell's Paper-see TP40 for more info
- 1953 – Technical Paper 24 (TP24), TP25, TP28, TP29
- 1962 – Technical Paper (TP40)
- 1992 - Rainfall Frequency Atlas of the Midwest (Bulletin 71)
- 2013 - Precipitation-Frequency Atlas for Michigan(Atlas 14)

Atlas 14



Atlas 14

- Volume 1: Semiarid Southwest (2004)
- Volume 2: Ohio River Basin and Surrounding States (2004)
- Volume 3: Puerto Rico and the U.S. Virgin Islands (2006)
- Volume 4: Hawaiian Islands (2011)
- Volume 5: Selected Pacific Islands (2011)
- Volume 6: California (2011)
- Volume 7: Alaska (2012)
- **Volume 8: Midwest**
- Volume 9: Southeast
- <http://www.nws.noaa.gov/oh/hdsc/currentpf.htm>

Atlas 14

Volume 2: Ohio River Basin and Surrounding States (DE, IN, IL, KY, MD, NC, NJ, OH, PA, SC, TN, VA, WV)

1% Frequency
(100yr) Event

24-hour

TP40=5.0 in

Bulletin 71=6.0 in

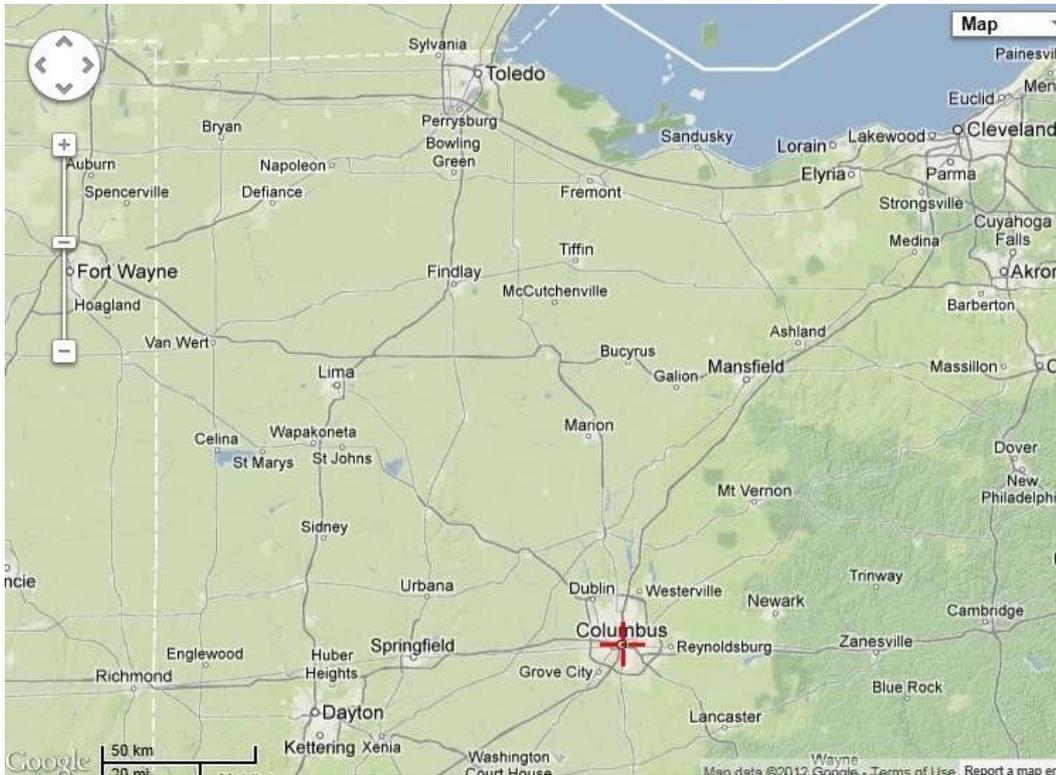
Atlas 14=5.2-6.1 in

1-hour

TP40=2.6 in

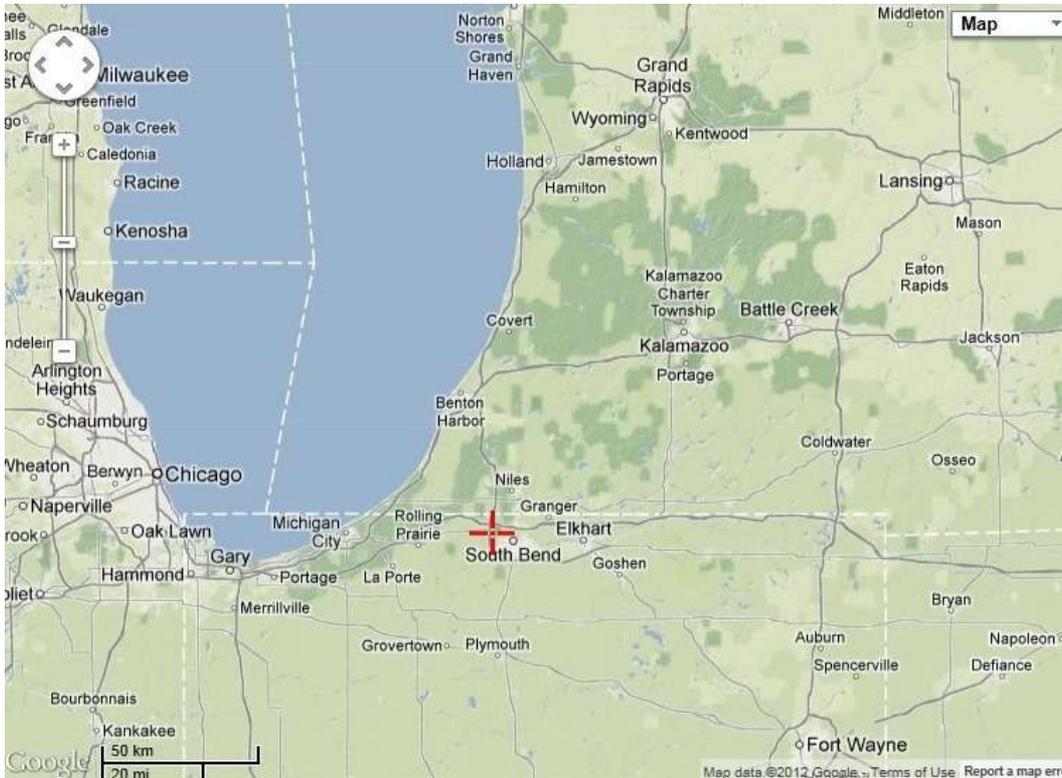
Bulletin 71=2.8 in

Atlas 14=2.5-3.1 in



Atlas 14

Volume 2: Ohio River Basin and Surrounding States (DE, IN, IL, KY, MD, NC, NJ, OH, PA, SC, TN, VA, WV)



1% Frequency
(100yr) Event

24-hour

TP40=5.3 in

Bulletin 71=6.3 in

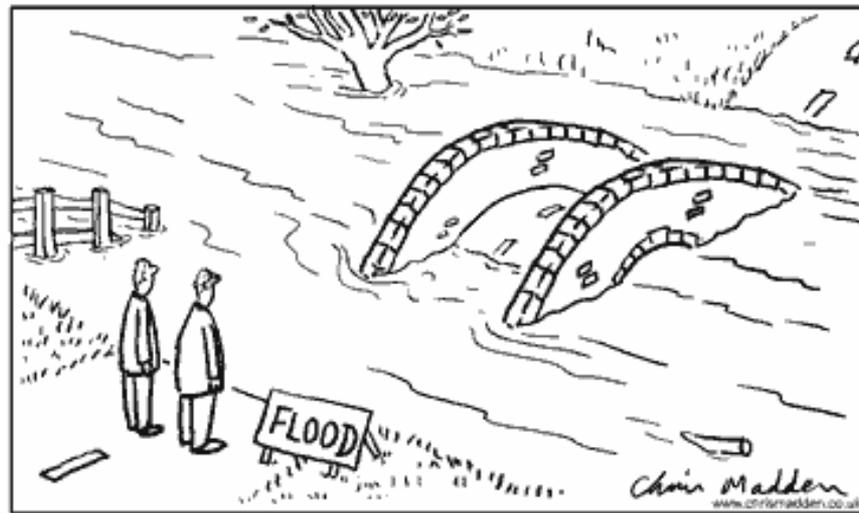
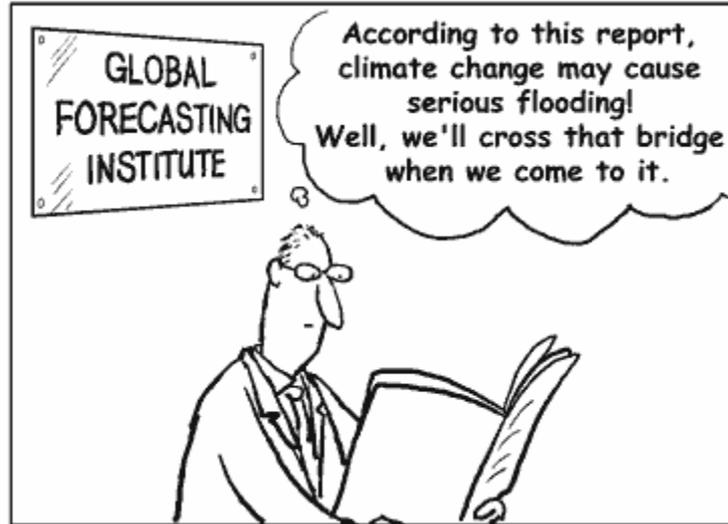
Atlas 14=5.8-6.8 in

1-hour

TP40=2.7 in

Bulletin 71=3.0 in

Atlas 14=2.7-3.2 in



FEMA Flood Maps

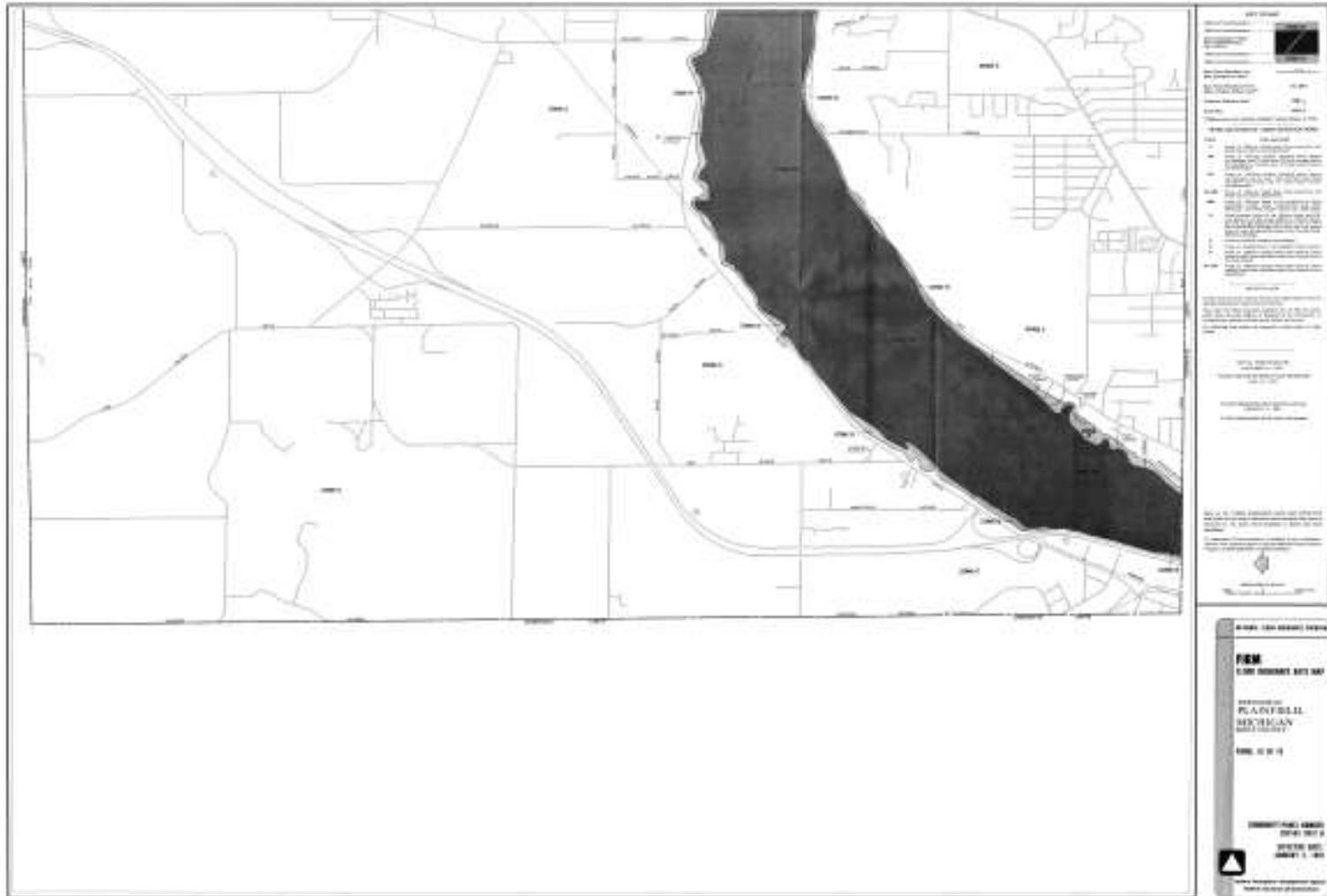


www.clangnuts.com

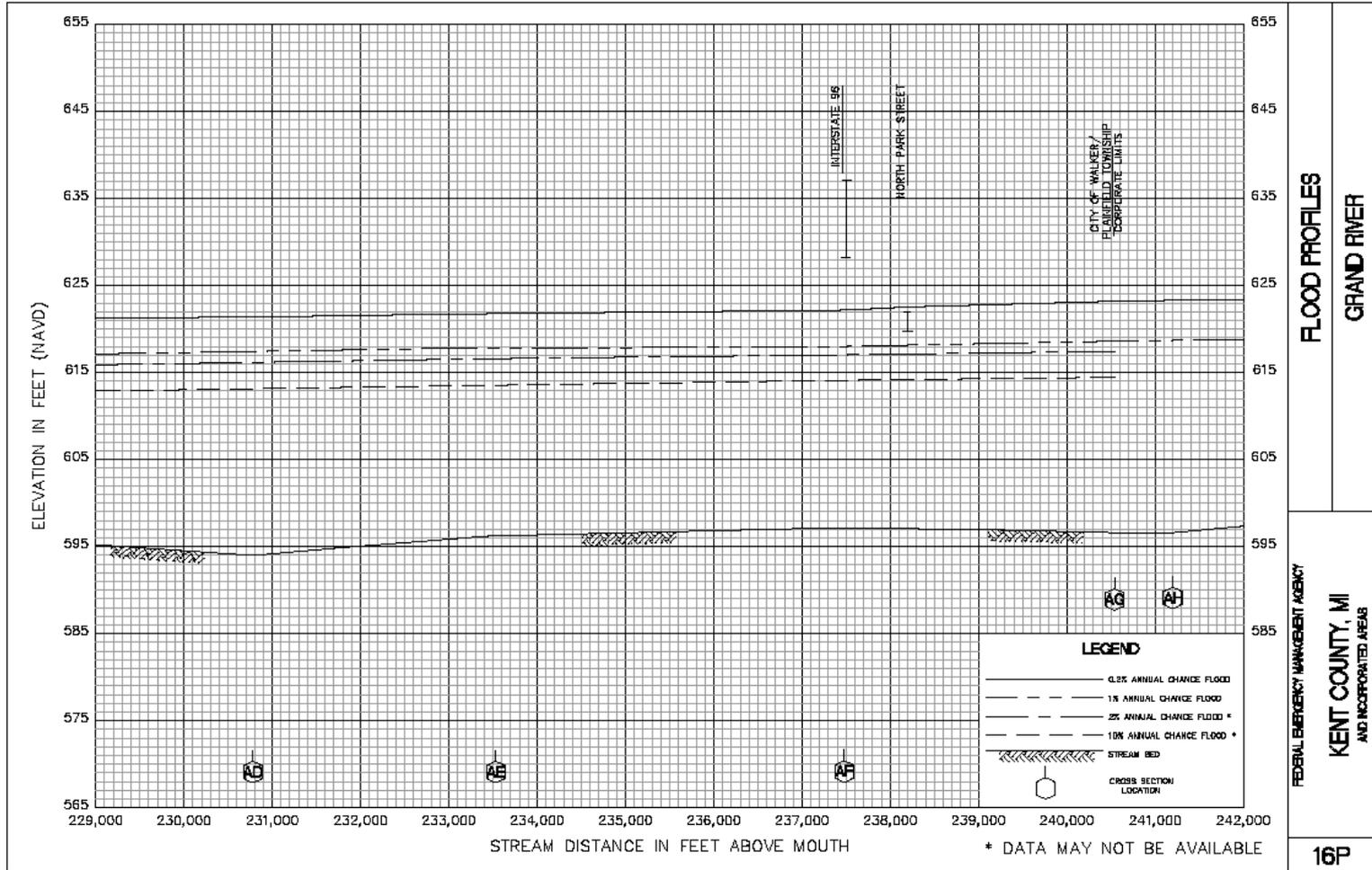


"Yes, there is a slight damp problem, but let me show you the upstairs, I think you'll be impressed by the river views from the master bedroom!"

Flood Insurance Rate Map



Flood Insurance Study Profile



Typical Design Standards



Design Storms

Storm Sewer System – 10% Frequency

Detention Pond – 4% Frequency Event w/
1% Emergency Outlet

Culverts – 4% Frequency Event or 1%
Frequency Event

Retention Ponds – Back-to-Back 1%
Frequency Events

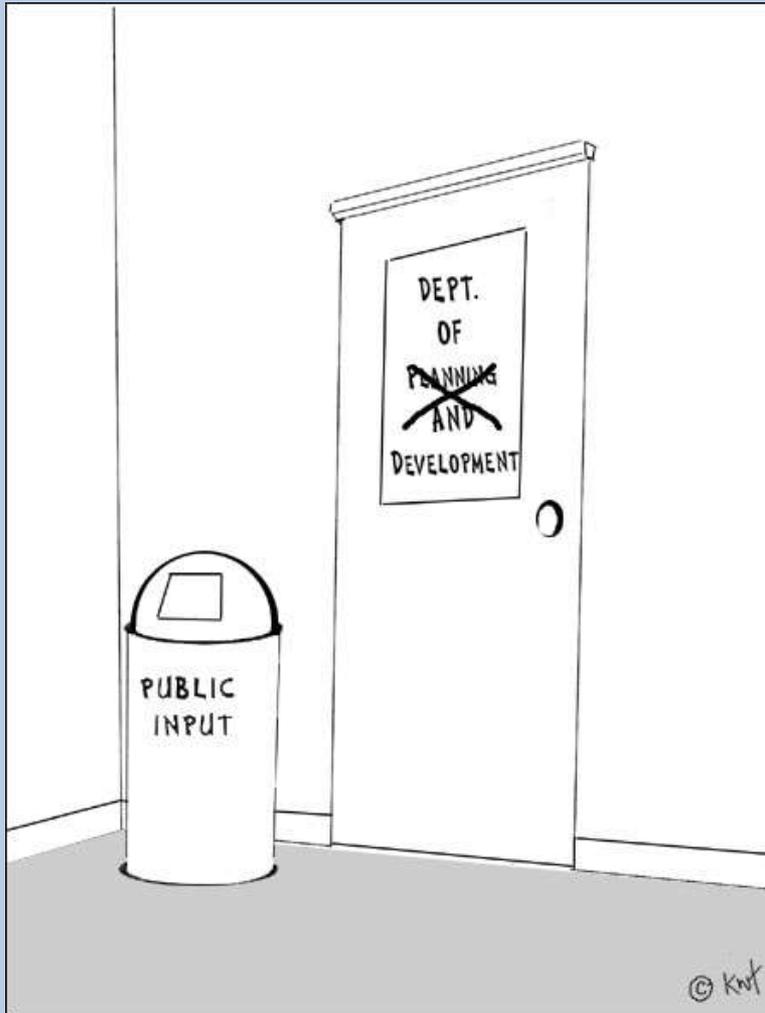
Each Community Determines Standards

Conundrum

Should Communities Exceed Typical Design
Criteria for Facilities to Reduce the
Frequency of Flooding???

Consider It Emergency Response Planning?

Emergency Planning



Be Sure To
Plan Ahead,
And Gather
Public Input

Emergency Planning



Don't Get
Caught in
the Rain
Without A
Plan!

Questions

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"Try not to fret dear, things always look much worse than they really are at 3 o'clock in the morning."

Plainfield Township

