May 25, 2015 Event Analysis

Presented to the Board of Directors

June 4, 2015

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

- Call for Data Collection
- Assessment of May 25, 2015 Event
  - Magnitude of Event
  - Flooding extents
- Observations
  - W140-01-00
  - W151-00-00
  - W153-00-00

Call for Data Collection

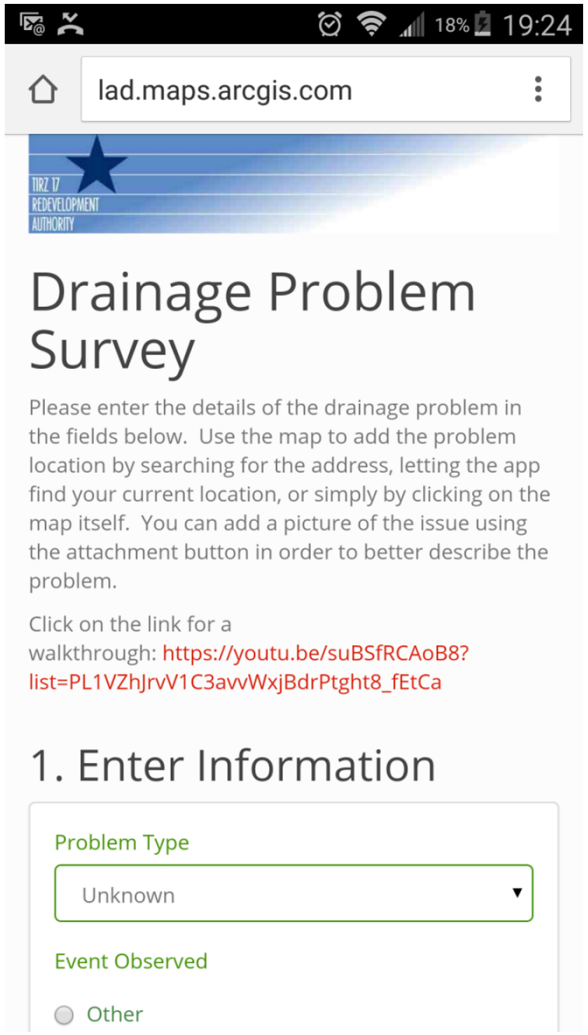
May 2015 Event

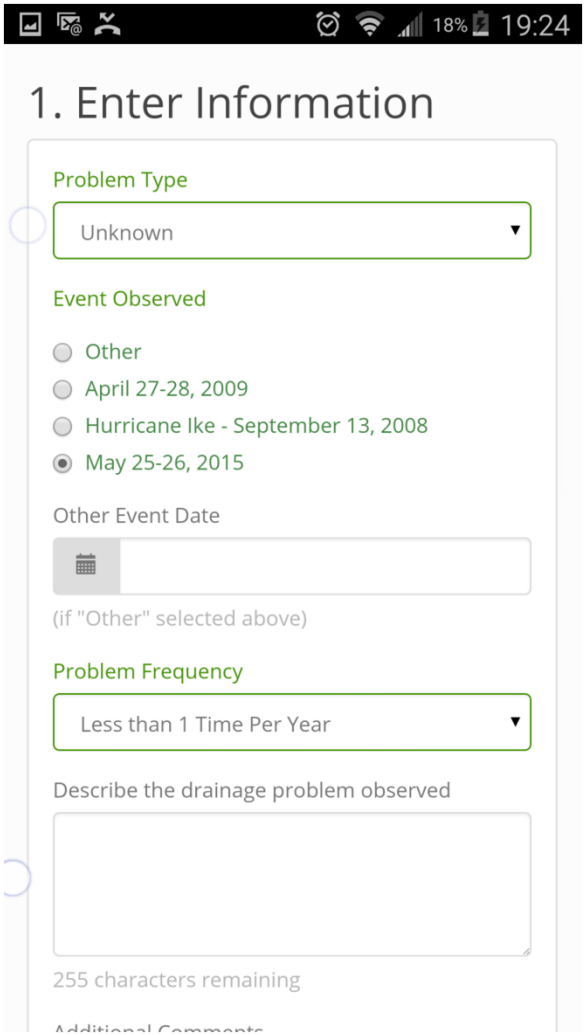
- Hard Copy Survey
- Online Survey
  - Link on TIRZ Website WWW.HoustonTIRZ17.org
  - URL: http://q-r.to/1AzO
  - QR Code:

Call for Data Collection

May 2015 Event

- Online Survey Demonstration





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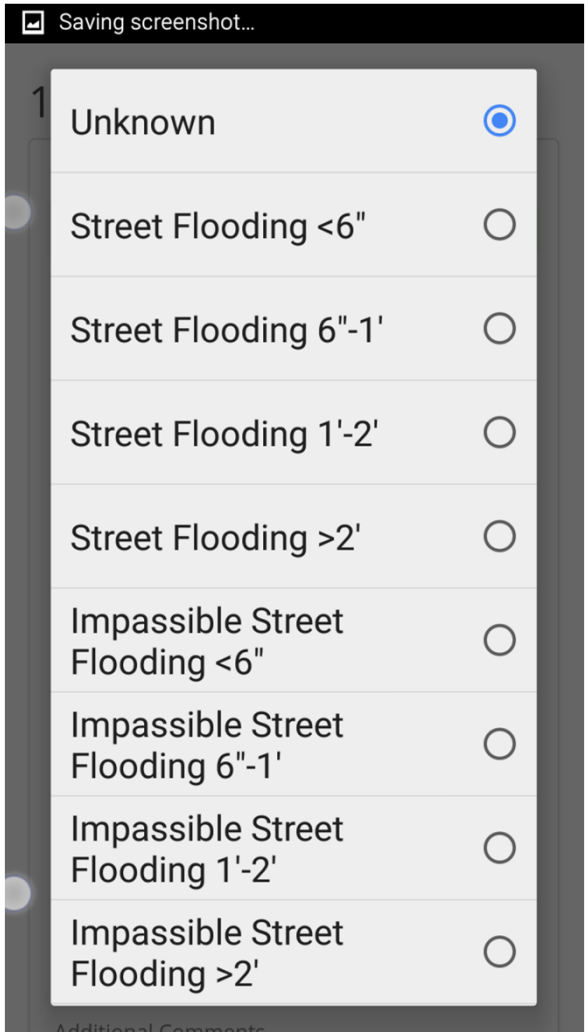

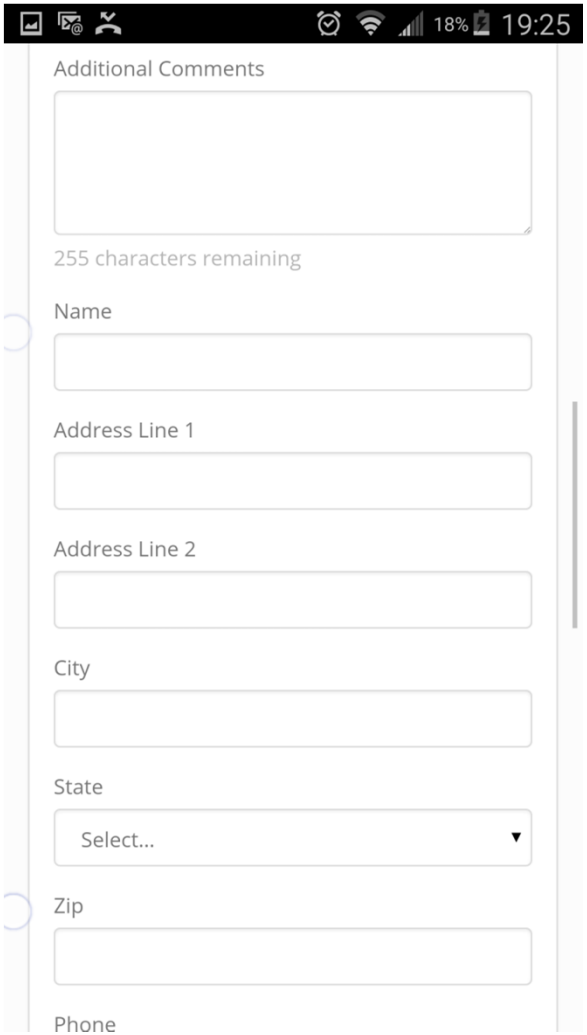

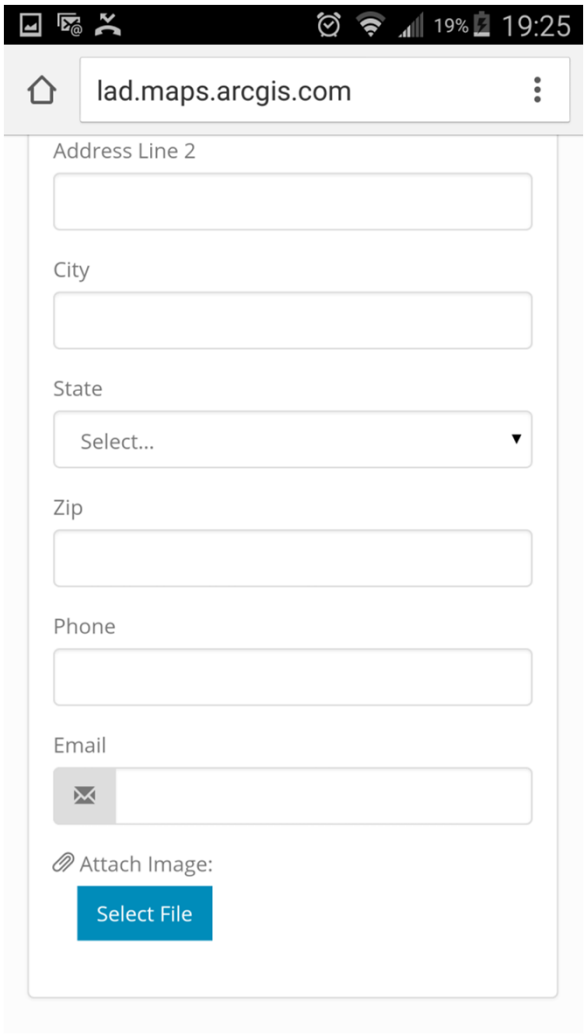

Call for Data Collection

May 2015 Event

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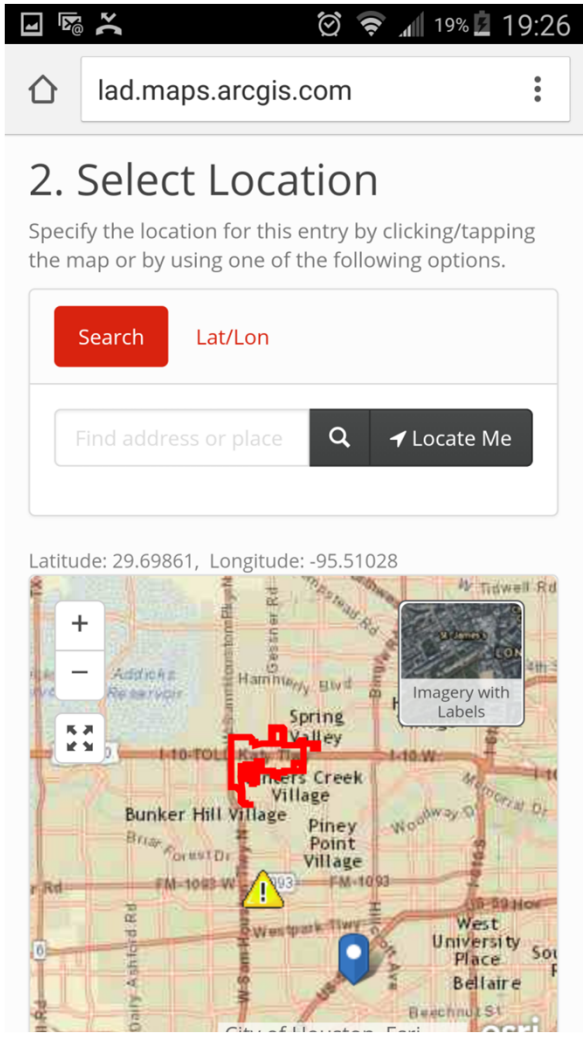
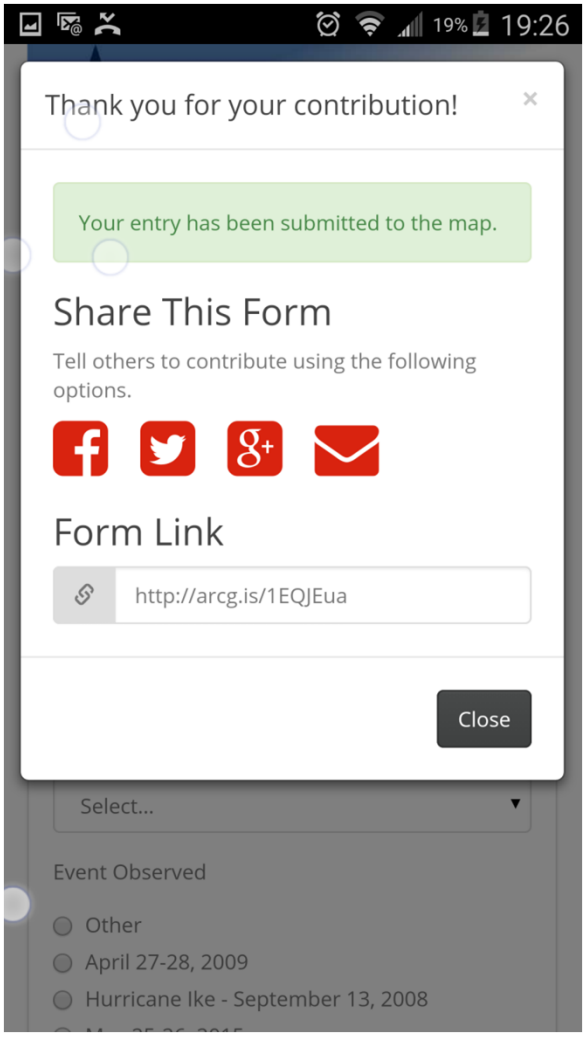
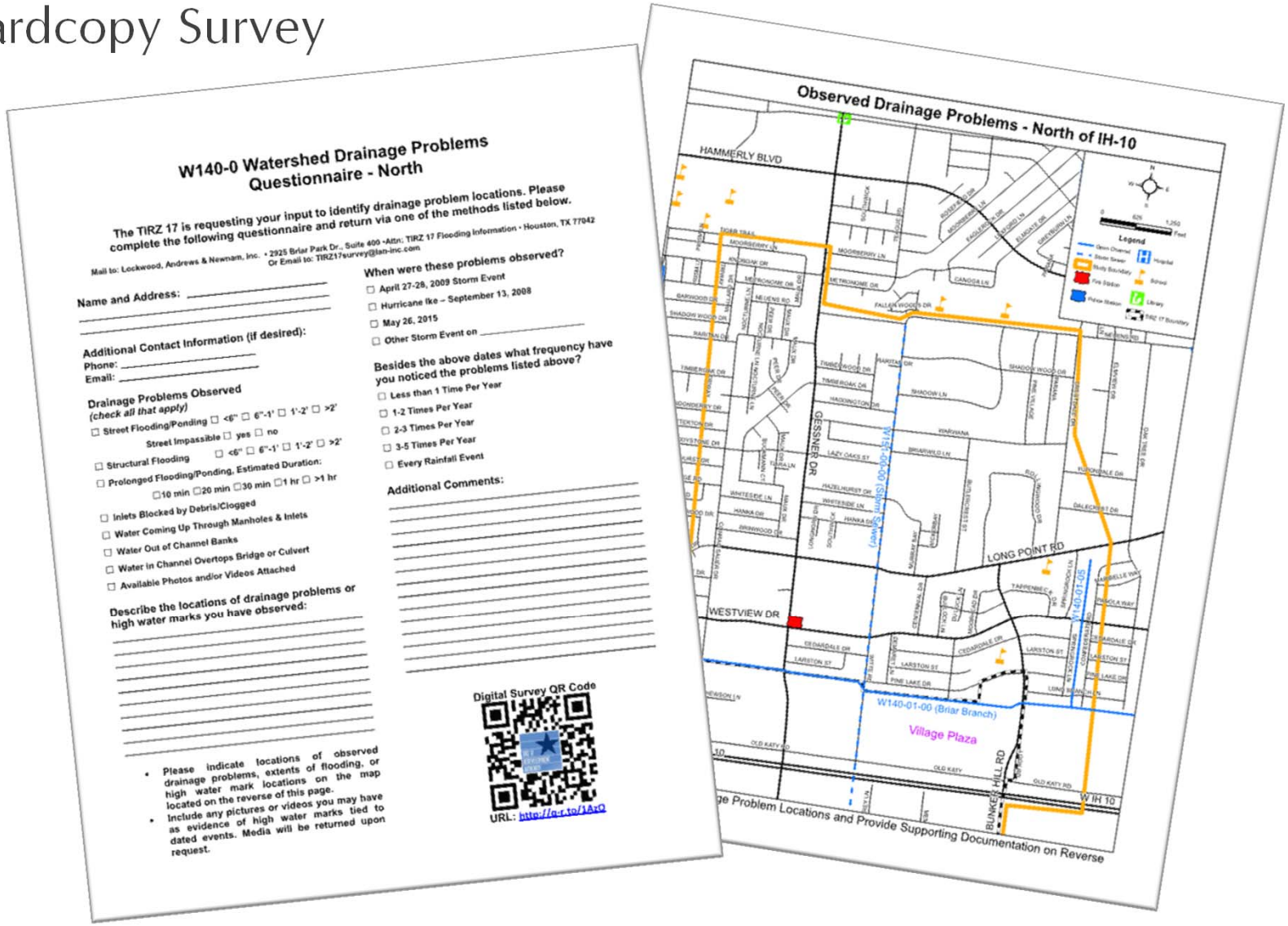




Call for Data Collection

May 2015 Event

- Hardcopy Survey



W140-0 Watershed Drainage Problems Questionnaire - North

The TIRZ 17 is requesting your input to identify drainage problem locations. Please complete the following questionnaire and return via one of the methods listed below.

Mail to: Lockwood, Andrews & Newnam, Inc. • 2925 Briar Park Dr., Suite 400 •Attn: TIRZ 17 Flooding Information • Houston, TX 77042
Or Email to: TIRZ17survey@lan-inc.com

Name and Address: _____

Additional Contact Information (if desired):
Phone: _____
Email: _____

Drainage Problems Observed
(check all that apply)

- ☐ Street Flooding/Ponding ☐ <6" ☐ 6"-1' ☐ 1'-2' ☐ >2'
  - Street Impassible ☐ yes ☐ no
- ☐ Structural Flooding ☐ <6" ☐ 6"-1' ☐ 1'-2' ☐ >2'
- ☐ Prolonged Flooding/Ponding, Estimated Duration:
  ☐10 min ☐20 min ☐30 min ☐1 hr ☐ >1 hr
- ☐ Inlets Blocked by Debris/Clogged
- ☐ Water Coming Up Through Manholes & Inlets
- ☐ Water Out of Channel Banks
- ☐ Water in Channel Overtops Bridge or Culvert
- ☐ Available Photos and/or Videos Attached

Describe the locations of drainage problems or high water marks you have observed:

When were these problems observed?

- ☐ April 27-28, 2009 Storm Event
- ☐ Hurricane Ike – September 13, 2008
- ☐ May 26, 2015
- ☐ Other Storm Event on _____

Besides the above dates what frequency have you noticed the problems listed above?

- ☐ Less than 1 Time Per Year
- ☐ 1-2 Times Per Year
- ☐ 2-3 Times Per Year
- ☐ 3-5 Times Per Year
- ☐ Every Rainfall Event

Additional Comments:

Digital Survey QR Code

URL: http://a-r.to/1AzQ

- Please indicate locations of observed drainage problems, extents of flooding, or high water mark locations on the map located on the reverse of this page.
- Include any pictures or videos you may have as evidence of high water marks tied to dated events. Media will be returned upon request.

Observed Drainage Problems - North of IH-10

HAMMERLY BLVD
GESSNER DR
LONG POINT RD
WESTVIEW DR
W140-00-00 (Clear Creek)
W140-01-05
W140-01-00 (Briar Branch)
Village Plaza
BUNKER HILL RD
W IH 10
OLD KATY RD

Legend

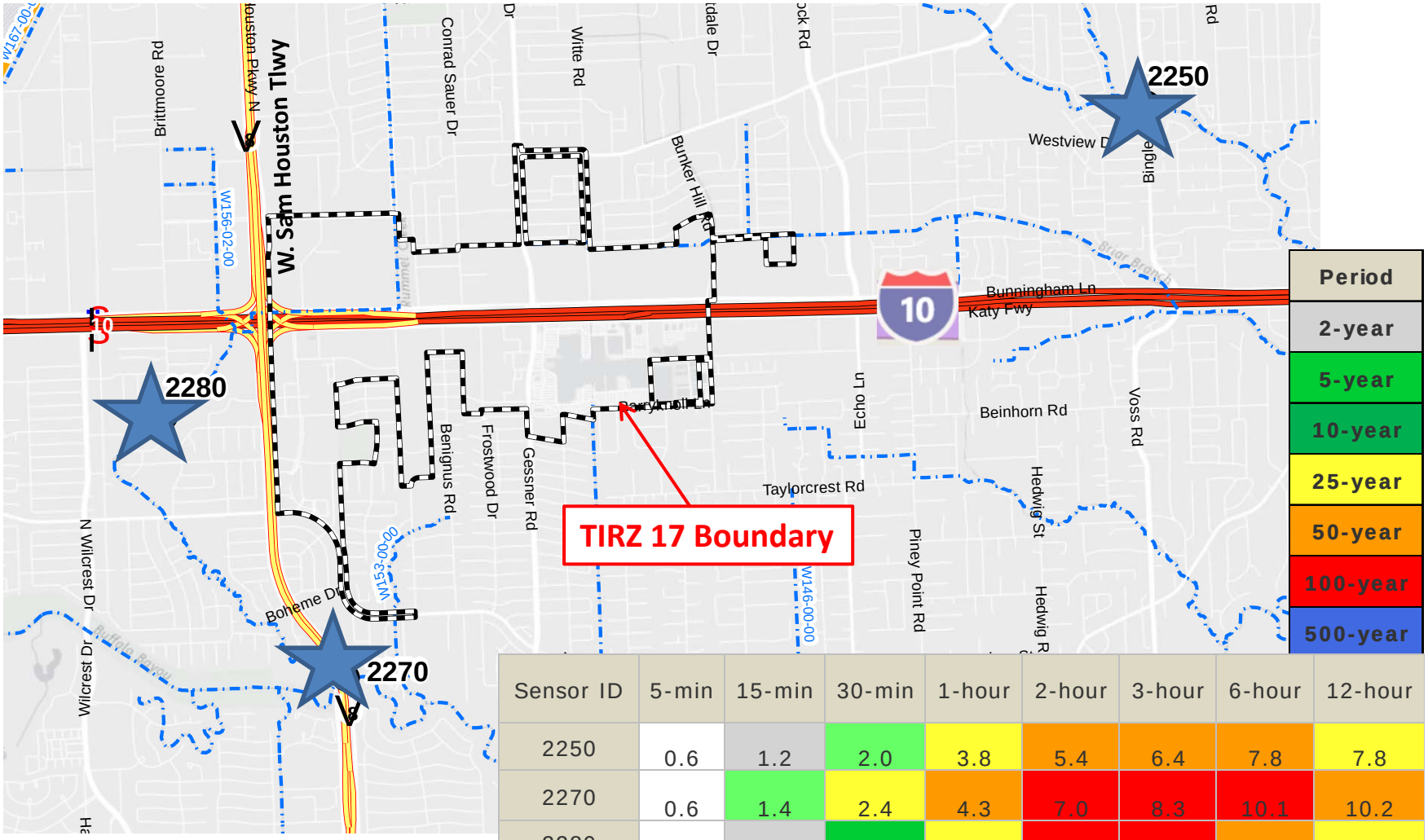
...ge Problem Locations and Provide Supporting Documentation on Reverse

- Return Period and Probability

Region 2--Brays, Buffalo, Greens, Hunting, Luce, West Fork San Jacinto, and White Oak											
Period	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	1-day	2-day	4-day
2-year	0.7	1.1	1.5	2.0	2.3	2.6	3.1	3.7	4.4	5.0	5.8
5-year	0.8	1.4	1.8	2.5	3.1	3.5	4.3	5.1	6.2	7.1	8.1
10-year	0.9	1.5	2.1	2.9	3.6	4.1	5.1	6.2	7.6	8.6	9.8
25-year	1.0	1.7	2.4	3.4	4.3	5.0	6.4	7.8	9.6	10.8	12.1
50-year	1.1	1.9	2.7	3.8	5.0	5.8	7.6	9.2	11.3	12.5	14.0
100-year	1.2	2.1	3.0	4.3	5.7	6.7	8.9	10.8	13.2	14.5	15.9
500-year	1.4	2.6	3.8	5.5	7.6	9.2	12.8	15.5	18.9	20.0	21.1

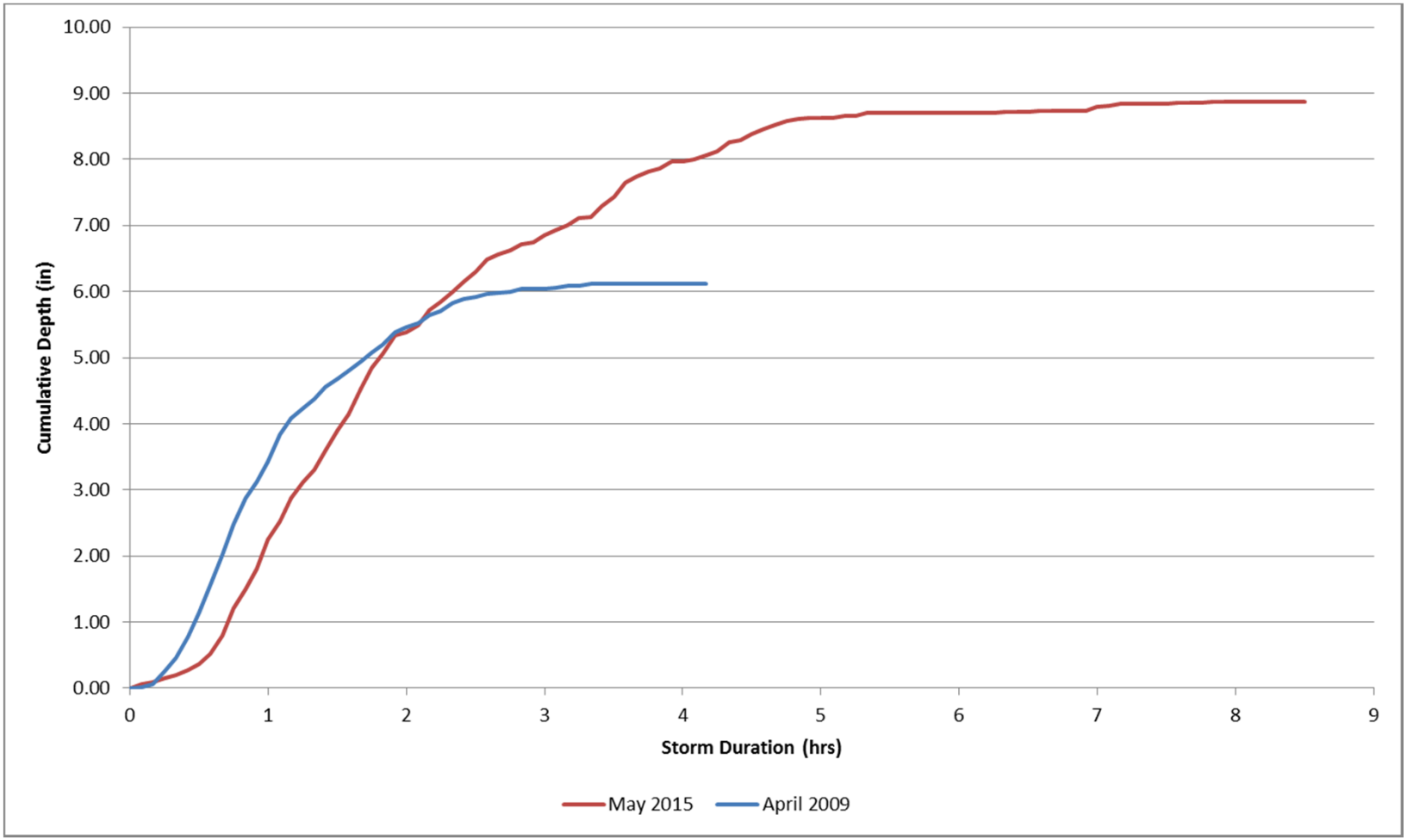
Magnitude of the Event

- Gauge Locations



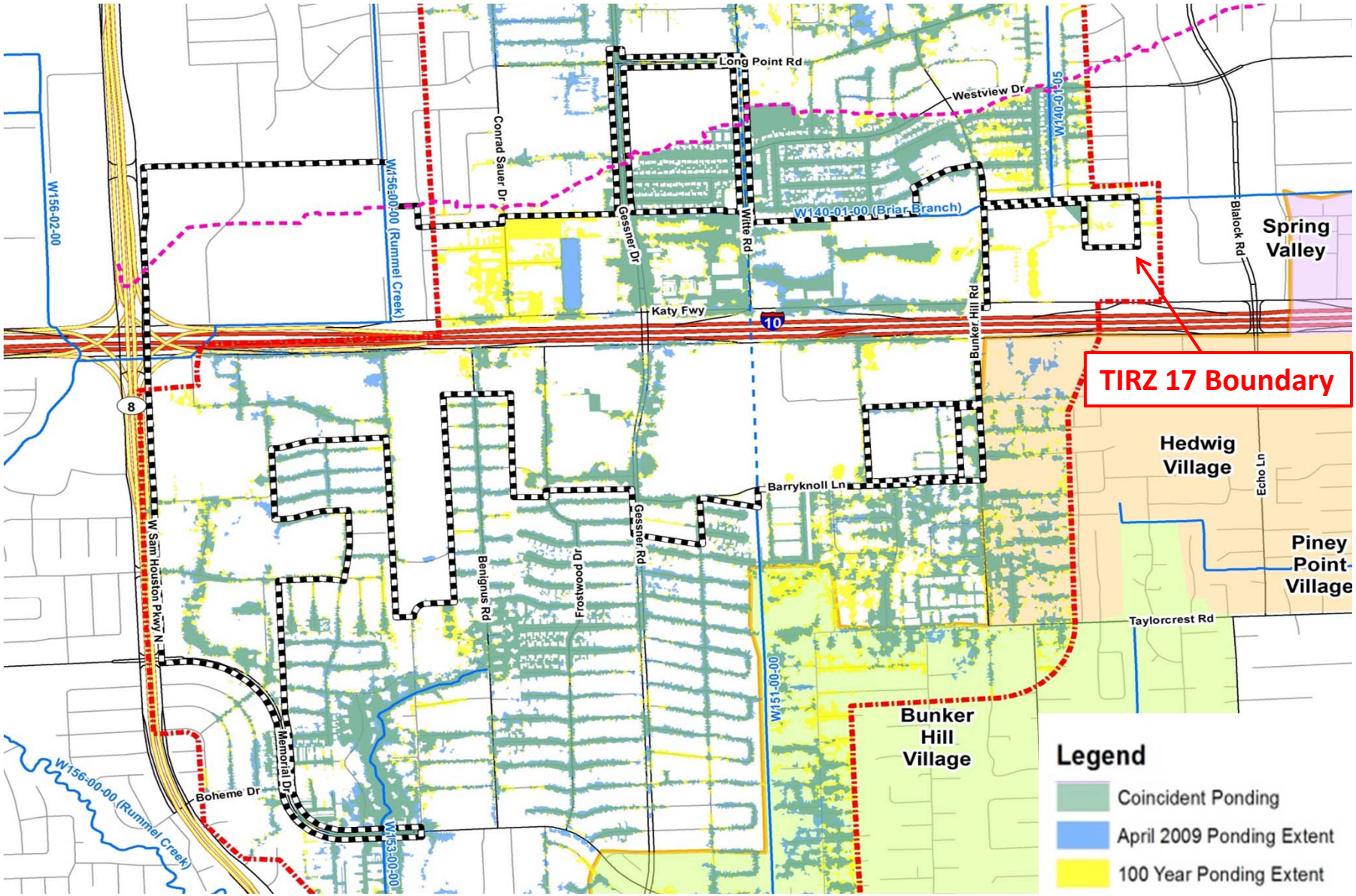
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour
2250	0.6	1.2	2.0	3.8	5.4	6.4	7.8	7.8
2270	0.6	1.4	2.4	4.3	7.0	8.3	10.1	10.2
2280	0.5	1.3	2.2	3.6	5.7	6.9	8.2	8.3

- Cumulative Rainfall Totals
  - April 2009 vs May 2015 (Average of recording gauges)



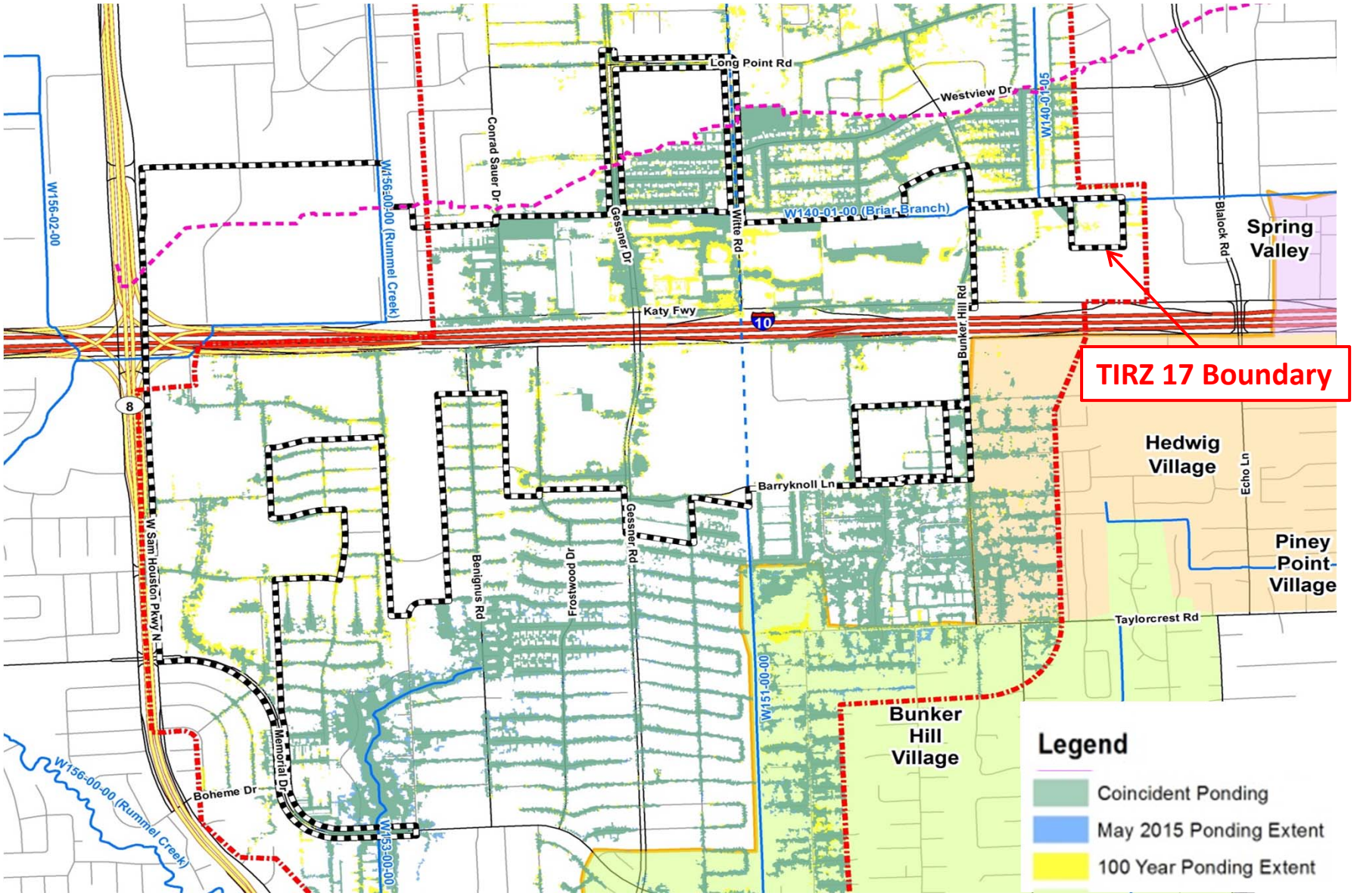
Flooding Extents – April '09 vs 100yr

May 2015 Event



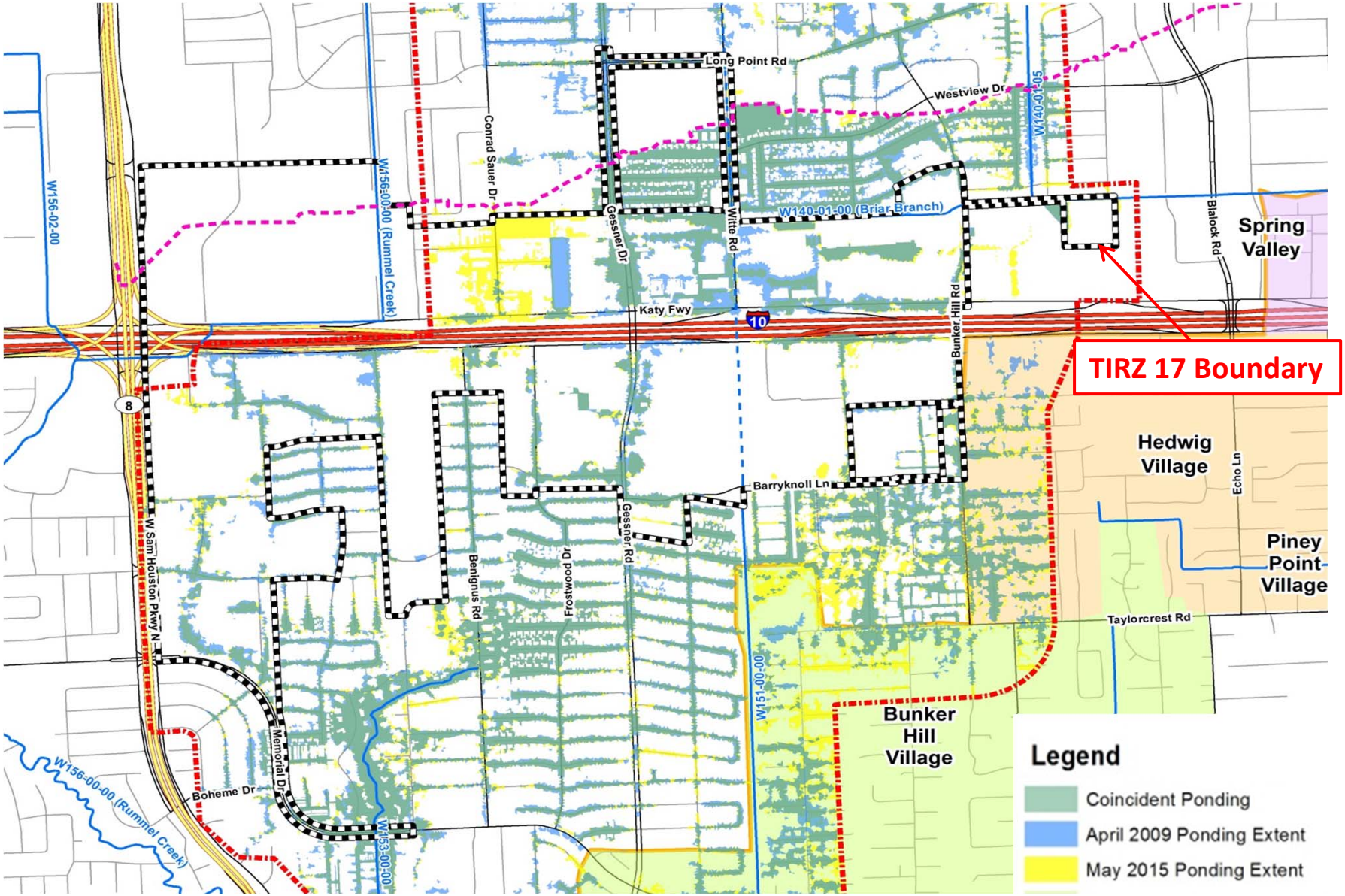
Flooding Extents – May ‘15 vs 100yr

May 2015 Event



Flooding Extents – April '09 vs May '15

May 2015 Event



Observations – W140-01

May 2015 Event

- Basin Summary
  - Tract Area: 8.2 acres
  - Basin Volume: 44 ac-ft
  - 89% of detention is dedicated for community flood damage reduction
  - 1st phase of planned improvements for the Briar Branch Watershed

- Basin Performance

Observations – W140-01

May 2015 Event

- Basin Performance

Observations – W140-01

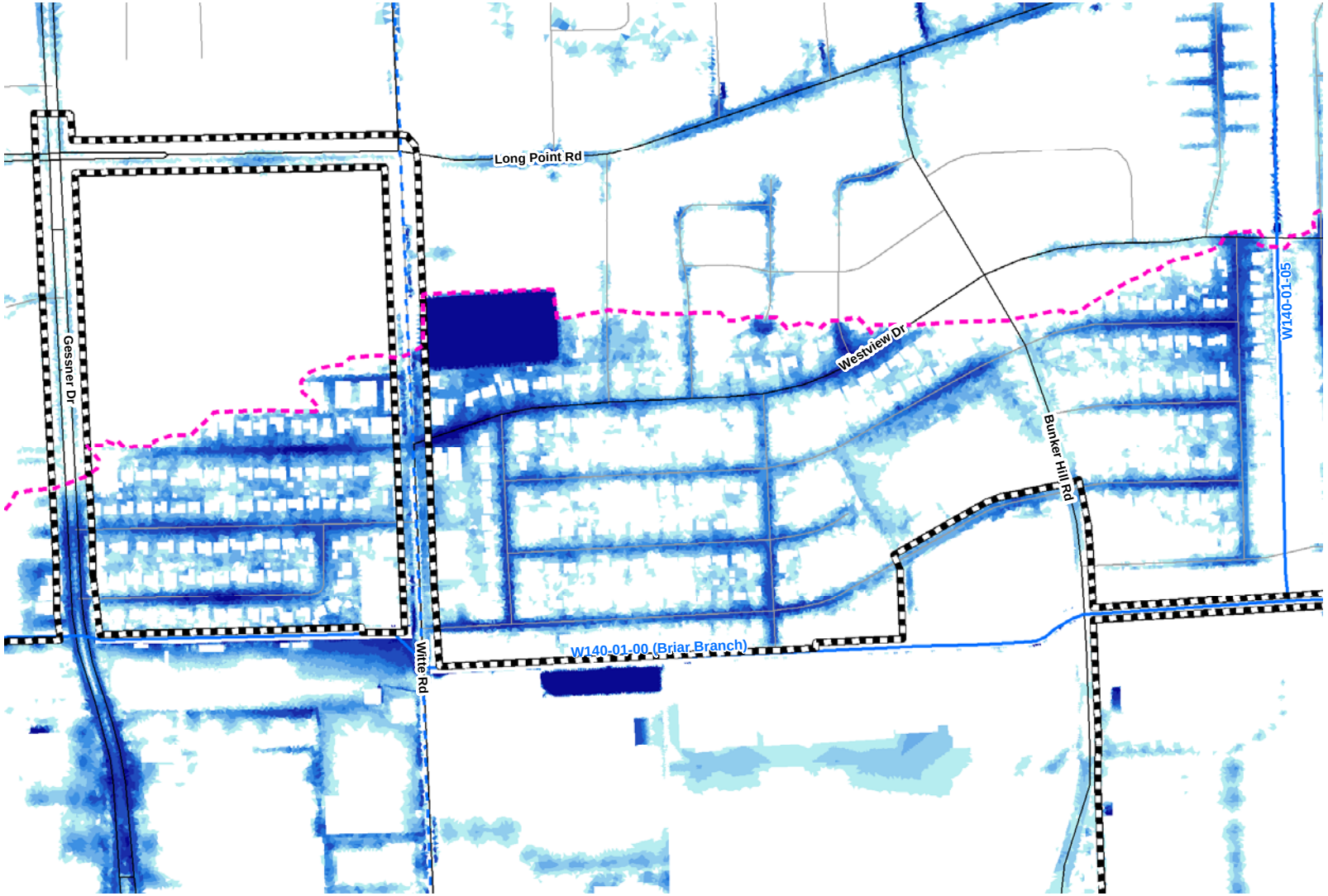
May 2015 Event

- Basin Performance

Observations – W140-01

May 2015 Event

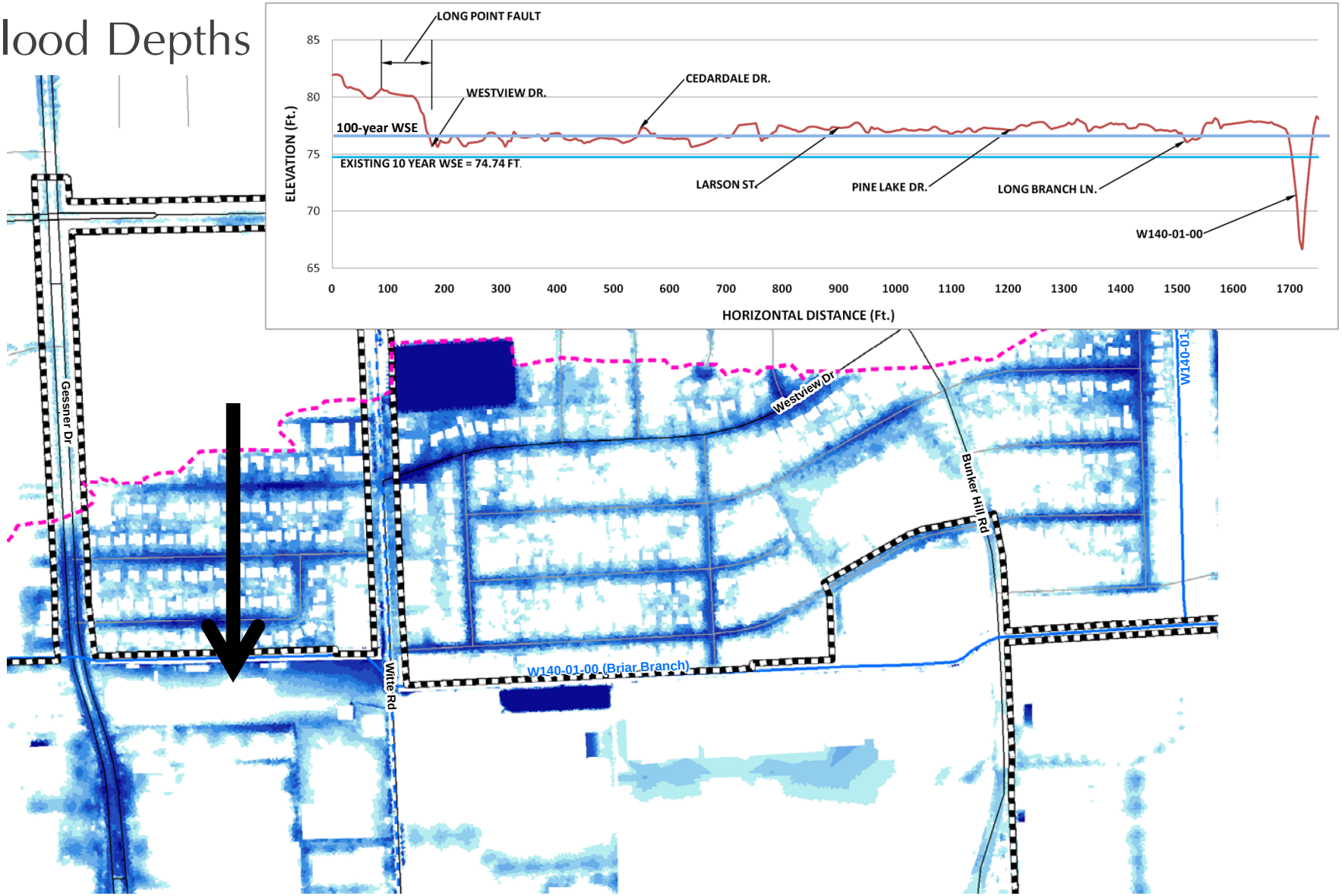
- Flood Depths



Observations – W140-01

May 2015 Event

- Flood Depths



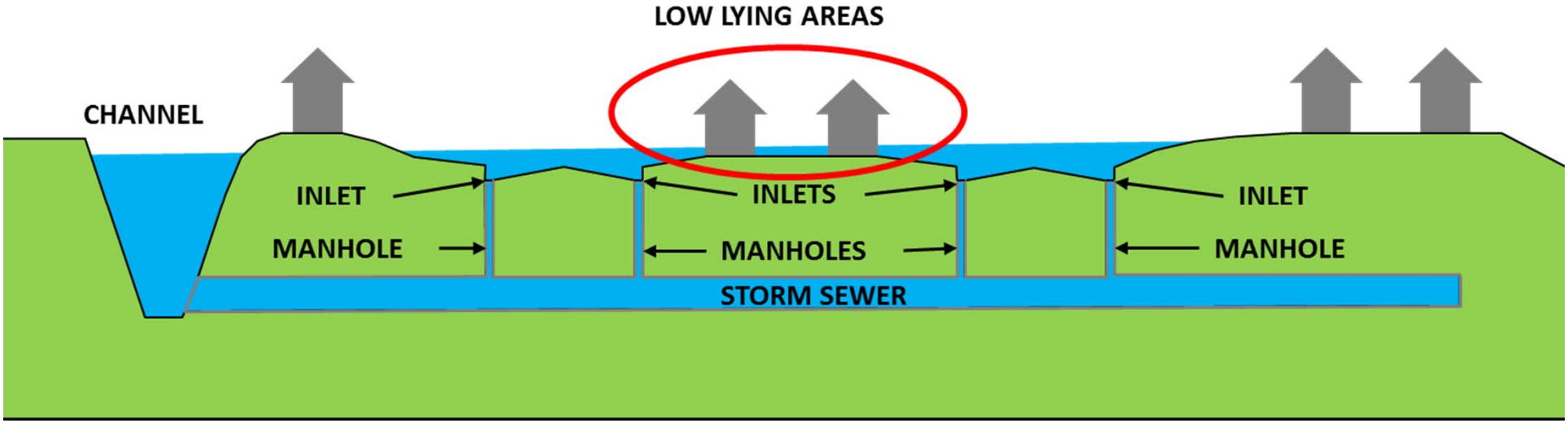
- Model Video

Observations – W151

May 2015 Event

- High Water Mark – Near top of bank

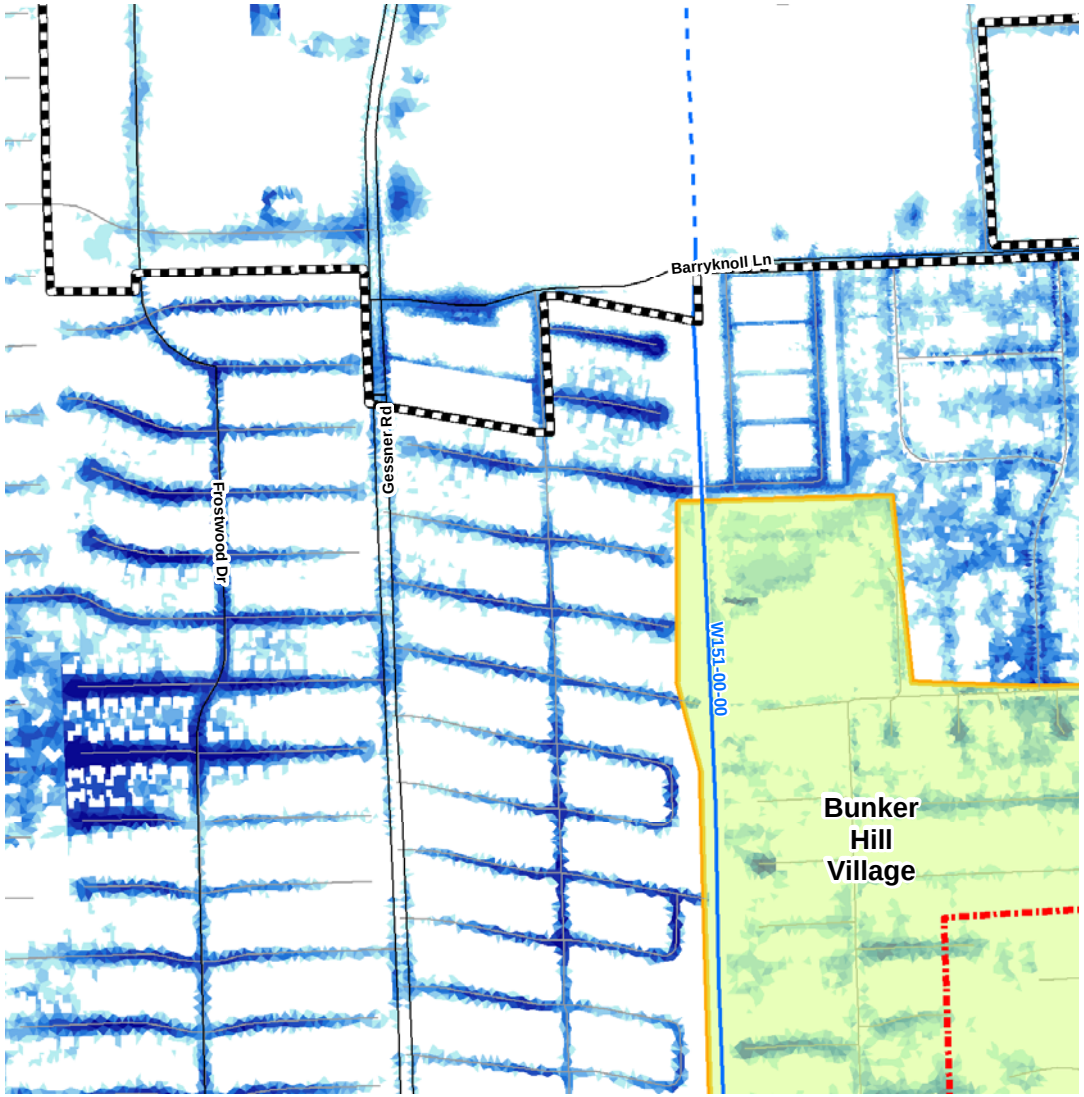
- Perched Channel



Observations – W151

May 2015 Event

- Flood Depths



- Model Video

Observations – W153

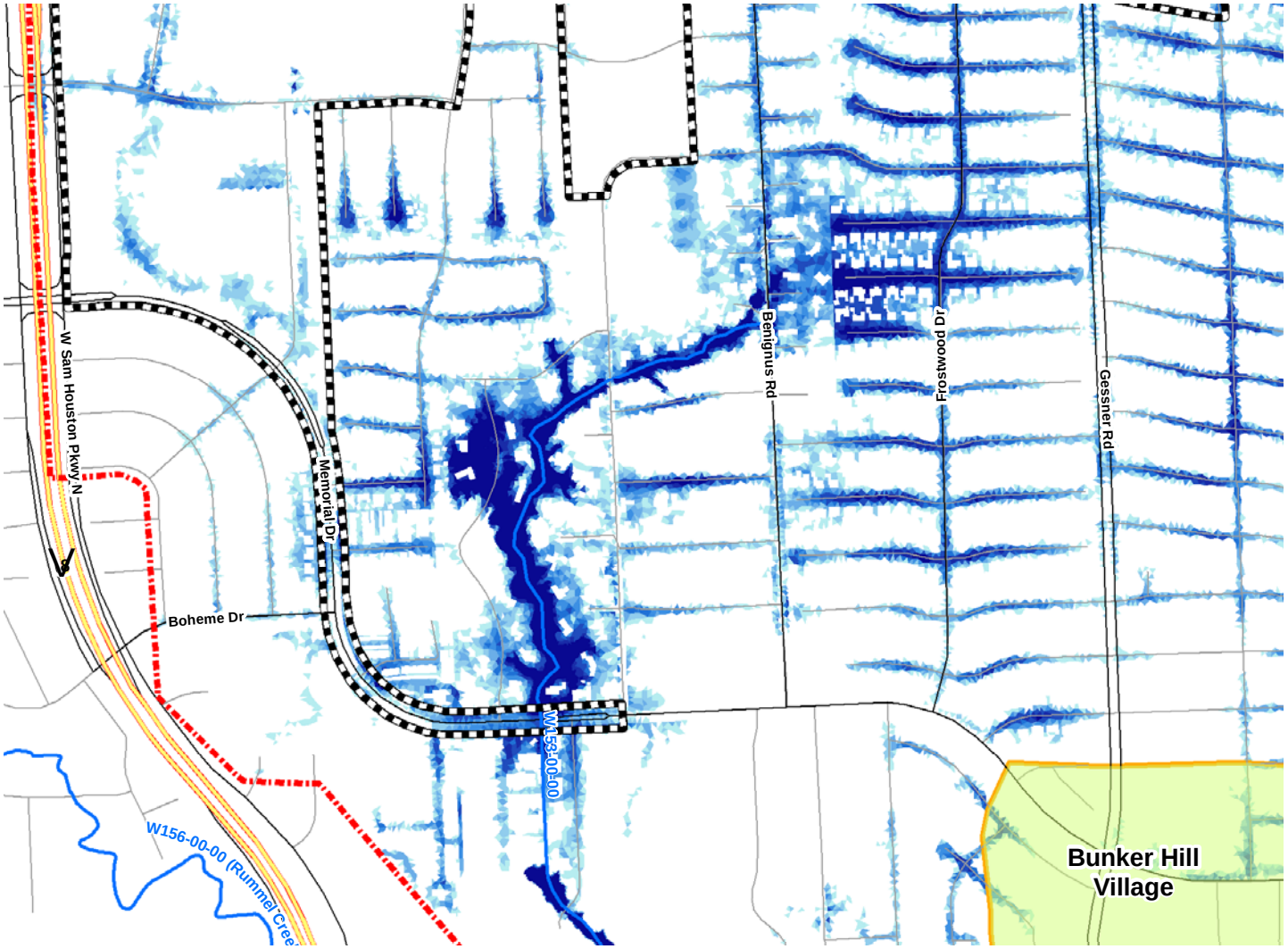
- Upstream of Memorial on W153

- Upstream of Memorial on W153

Observations – W153

May 2015 Event

- Flood Depths

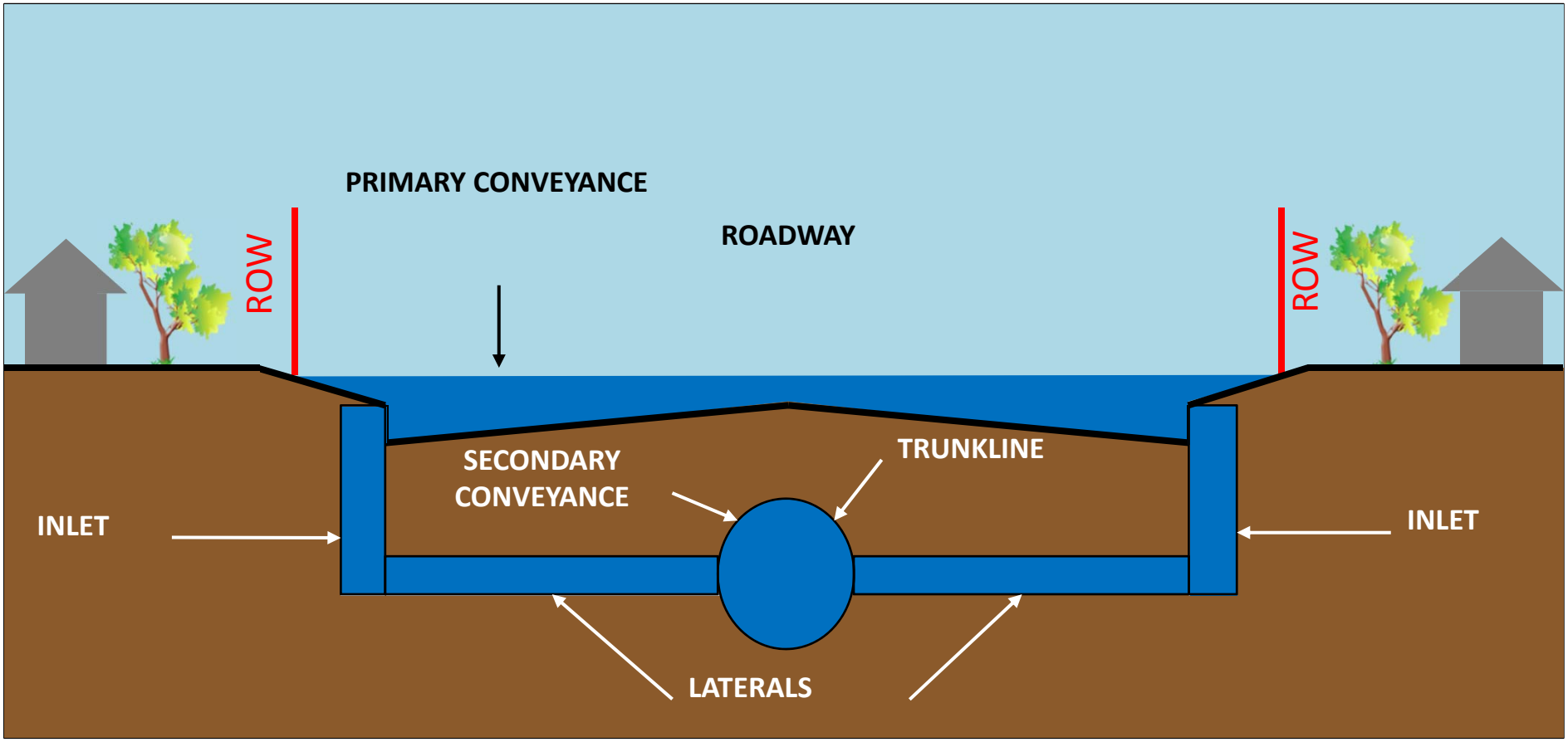


Observations – W153

May 2015 Event

- Model Video

Drainage Criteria – 100-Year



Flooding Causes

	Development Criteria (1950's-1970's)	Resulting Issues	Current Criteria
Low Lying Community Relative to Chan. Banks	N/A	No Overland Flow Outfalls	N/A
Slab Elevation	No Standard	Frequent Home Flooding	12-18 inches Above Curb
Storm Sewer or Roadside Ditch Size	Smaller	Frequent Street Flooding	Larger
Overland Flow	No Requirement	Excessive Ponding in Low Lying Developed Areas	Defined Path Maintained Within ROW

- May 2015 Event Summary
  - Extreme event – 100 year Intensities
  - Similar in Magnitude and Impact to April 2009 Event
  - Widespread Structural Flooding
  - Confirmed Identified Problem Areas
  - W140-01-00 Basin Performed as Designed

Questions