# West Branch DuPage River Watershed Plan



IAFSM 2011 Conference March 10, 2011



# DuPage County Overview





# DuPage County Stormwater Management Plan

September 1989

## Establish objectives

## **DuPage County**

Liste

Dewners Gir

Countywide Stormwater And Flood Plain Ordinance

Original: 1991



## Regulatory Mechanism

## Stormwater Management Plan

The 1989 Plan identifies 6 objectives:

- 1. Reduce the existing potential for stormwater damage to public health, safety, life, and property.
- 2. Control future increases in stormwater damage within DuPage County and in areas of adjacent counties affected by DuPage County drainage.
- 3. Protect and enhance the quality, quantity and availability of surface and groundwater resources.



## Stormwater Management Plan

The 1989 Plan identifies 6 objectives (cont'd):

- 4. Preserve and enhance existing aquatic and riparian environments and encourage restoration of degraded areas.
- 5. Control sediment and erosion in and from drainageways, developments and construction sites.
- 6. Promote equitable, acceptable and legal measures for stormwater management.



# DuPage County Methodology for Watershed Plan Development

Continuous simulation and dynamic routing models.

## Why?

- Account for non-uniform precipitation distribution over the watershed.
- Capture the effects of antecedent moisture on runoff volumes and peaks.
- Difficult to do the above using the design storm approach.
- Model the effects of backwater, flood plain storage and complex urban stream systems.



# DuPage County Methodology for Watershed Plan Development

## HSPF

- hydrologic analysis
- output is a continuous time series file of runoff for each land cover type and each rain gage.
- 157 events (1949-2008)

**USGS** Gages

calibration

FEQ

- hydraulic analysis
  DEC-2
  - calculate flood damages







## West Branch Watershed Location





# West Branch Watershed Characteristics



- Total Watershed Area To Fawell Dam is Approximately 100 Square Miles.
- Total Reach Length To Fawell Dam is Approximately 24 Miles
- 10 Tributaries Contribute Flow To The Study Area:
  - Klein Creek
  - Winfield Creek
  - Kress Creek
  - Ferry Creek
  - Spring Brook #1
  - Tributaries #1-5
- 14 Communities & Unincorporated DuPage Contribute Runoff To The Study Area.



# **Study Limits**



- Study Limit: Roosevelt Road to Upstream of Fawell Dam
- Total Reach Length: 7.0 Miles
- 8 Major Bridge Crossings:
  - Gary Mills Road
  - Mack Road
  - Williams Road
  - Butterfield Road
- Warrenville Road
- Ferry Road
- I-88 Tollway
- Diehl Road
- Base Flow Rate: Approximately 75 CFS
- Flow Rates At Roosevelt Road
  - 10-Yr 2,400 CFS
  - 50-Yr 2,700 CFS
  - 100-Yr 3,550 CFS
- Flow Rates Upstream Of Fawell Dam
  - 10-Yr 2,900 CFS
  - 50-Yr
  - 100-Yr
- 4,100 CFS 4,600 CFS



## **Reach 1** Fawell Dam to Ferry Road



### Flood Damage Areas

1A – Ferry Road Near River Road

### **Flood Impacts**

1A – Ferry Road Closure





## **Reach 2** Ferry Road to Warrenville Road



#### **Flood Damage Areas**

- 2A Bower Elementary
- 2B Forest View Drive
- 2C Rogers Avenue
- 2D Immediately Downstream of Warrenville Road

#### **Flood Impacts**

- 2A Berm Overtopping/Flap Gate Failures
  - 4 Properties With Structural Flooding
  - Impact to the Public School System
- 2B Sandbagging To Prevent Overtopping
  - 35 Flood Risk Properties
- 2C Sandbagging To Prevent Overtopping
  - 3 Properties With Structural Flooding
  - 35 Flood Risk Properties
- 2D Structural Flooding Area
- 3 Properties With Structural Flooding General Reach Flooding
  - River Road Closure
  - Approximately 10 Properties Cutoff from Emergency Access
  - Flood Damages Caused by Groundwater



## **Reach 3** Warrenville Road to Butterfield Road



#### Flood Damage Areas

- 3A Warrenville Road Area
- 3B 2<sup>nd</sup> Street Corridor
- 3C Main Street & Batavia Road
- 3D Riverview Drive

#### **Flood Impacts**

- 3A Restrictive Bridge Crossing
  - 3 Properties with Structural Flooding
  - Warrenville Road Closure
  - Approximately 1.0' increase in Water Surface Elevations
- 3B Structural Flooding Area
  - 7 Properties with Structural Flooding
- 3C Structural Flooding Area
  - 5 Properties with Structural Flooding
- 3D Structural Flooding Area
  - 5 Properties with Structural Flooding
  - Riverview Drive Closure
  - Approximately 5 Properties Cutoff from Emergency Access



# Reach 3 September 2008 Pictures



## **Reach 4** Butterfield Road to Mack Road



#### **Flood Damage Areas**

- 4A Butterfield Road Bridge
- 4B Williams Road Bridge
- 4C Emerald Green Area
- 4D Iroquois Court
- 4E Forestview Drive

#### Flood Impacts

- 4A Butterfield Road Closure
- 4B Restrictive Bridge Crossing
  - 2 Properties with Structural Flooding
  - Williams Road Closure
  - Approximately 0.3' increase in Water Surface Elevations for Extreme Events & 0.7' for More Frequent Flood Events
- 4C High Flood Risk Area
  - Water Surface Elevations Within 2.0"
    of First Floor Entry
  - 10 Multifamily Structures at Risk of Flooding
- 4D Structural Flooding Area
  - 15 Properties with Structural Flooding
  - Approximately 20 Properties Cutoff from Emergency Access
- 4E Structural Flooding Area
  - 9 Properties with Structural Flooding
  - Approximately 17 Properties Cutoff from Emergency Access



## Reach 4 September 2008 Pictures



## **Reach 5** Roosevelt Road to Mack Road



#### Flood Damage Areas

5A - Mack Road

#### **Flood Impacts**

5A – Mack Road Overtopping • Mack Road Closure

• 1 Property with Structural Flooding





# Reach 5

## **September 2008 Pictures**





# **Summary of Flood Damages**

### Roadway Closings

- Five bridges closed during the 2008 storm event
- Three mile stretch between open bridges
- Two local roads closed

### • Structural Flood Damages

- 47 Residential Structures
- 6 Commercial Structures



# **Alternatives**

### Alternative 1: No Action

## Alternative 2:

### Buyouts/Flood Proofing

- Purchase Flood Prone Properties
- Acquire Drainage Easements
- Flood Proof Existing Structures

### Alternative 3:

### Storage

Upstream Storage Reservoir

## Alternative 4:

### Conveyance/Flood Protection

- Warrenville Road Bridge Reconstruction
- Williams Road Bridge Reconstruction
- River Road Improvements
- Bower Elementary Berm Modifications
- Miscellaneous Berm Protection Projects
- Residual Buyouts/Flood Proofing

## Alternative 5:

Conveyance/Flood Protection with Water Quality & River Restoration

- Alternative 4 Options
- Channel & Overbank Geometry Improvements
- Streambank Stabilization Improvements
- Riparian Enhancement
  - Wildlife Habitat Enhancement
  - Educational Opportunities
  - Passive Recreation Opportunities of the second second
- Residual Buyouts/Flood Proofing



# Alternative 5

### (Conveyance/Flood Protection With Water Quality and River Restoration)





# **Recommendation of Alternative 5**

Benefits of Alternative 5 - *Economic Model Results* 

- 93% Reduction in Residential Structural Flood Damages
- 88% Reduction in Buyout Eligible Residential Structures
- 94% Reduction in Residential Associated Flood Damages
- 100% Reduction in Commercial Structural Flood Damage
- Provides Unique Opportunity For Funding Alternatives
  - Total Cost: **\$18,335,175**
  - Cost Share:
    - DuPage County Stormwater Share \$6,490,000 (35%)
    - City of Warrenville (Williams Road Bridge) \$2,500,000 (14%)
    - DuPage DOT (Warrenville Road Bridge) \$4,000,000 (22%)
    - Public and Private Partnership (Water Quality) \$5,400,000 (29%)



# **Moving Forward**

### • Funding:

- End of 2010 Board passed bond issue that allocated 5.5M towards implementation improvements.
- Cost Sharing Agreements between local agencies
- Seeking other sources of funding for water quality improvements
- Final Design Contracts Awarded

### Construction Schedule:

- Final Design by end of 2011
- Permits by Summer 2012
- Begin construction on compensatory storage/overbank cuts by Fall 2012



# **Questions & Comments**

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