

Illinois Floodplain and Stormwater Managers Association  
2009

## Improving Illinois Dams: Alpine Dam Rehabilitation Project



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## DAMS ARE...

"all obstructions, walls, embankments, or barriers, together with their abutments and appurtenant works, if any, constructed for the purpose of storing or diverting water or creating a pool. Not included are underground or elevated tanks to store water."\*

# ILLINOIS DAMS: CURRENT CONDITION

## STATE REGULATED DAMS

### Illinois - 1480

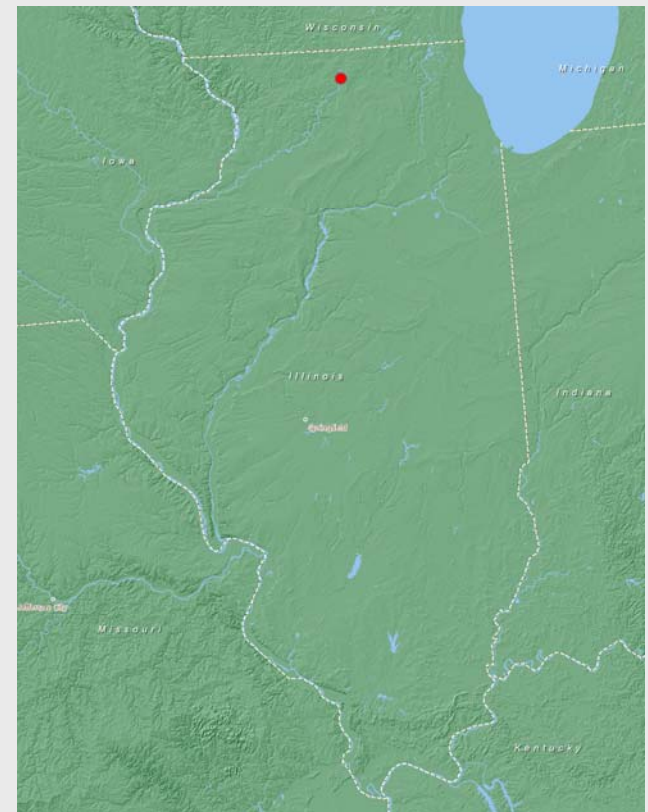
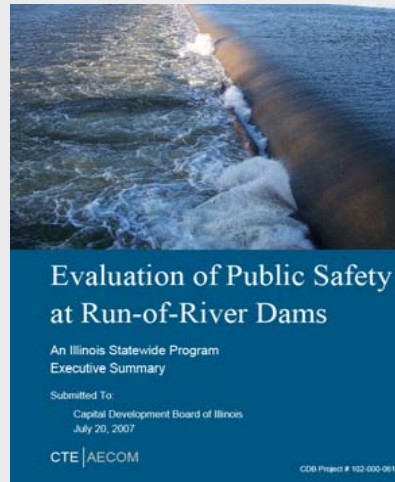
ILLINOIS  
2007 – 10 Deaths

ASCE '09 Report Card  
Dams "D"

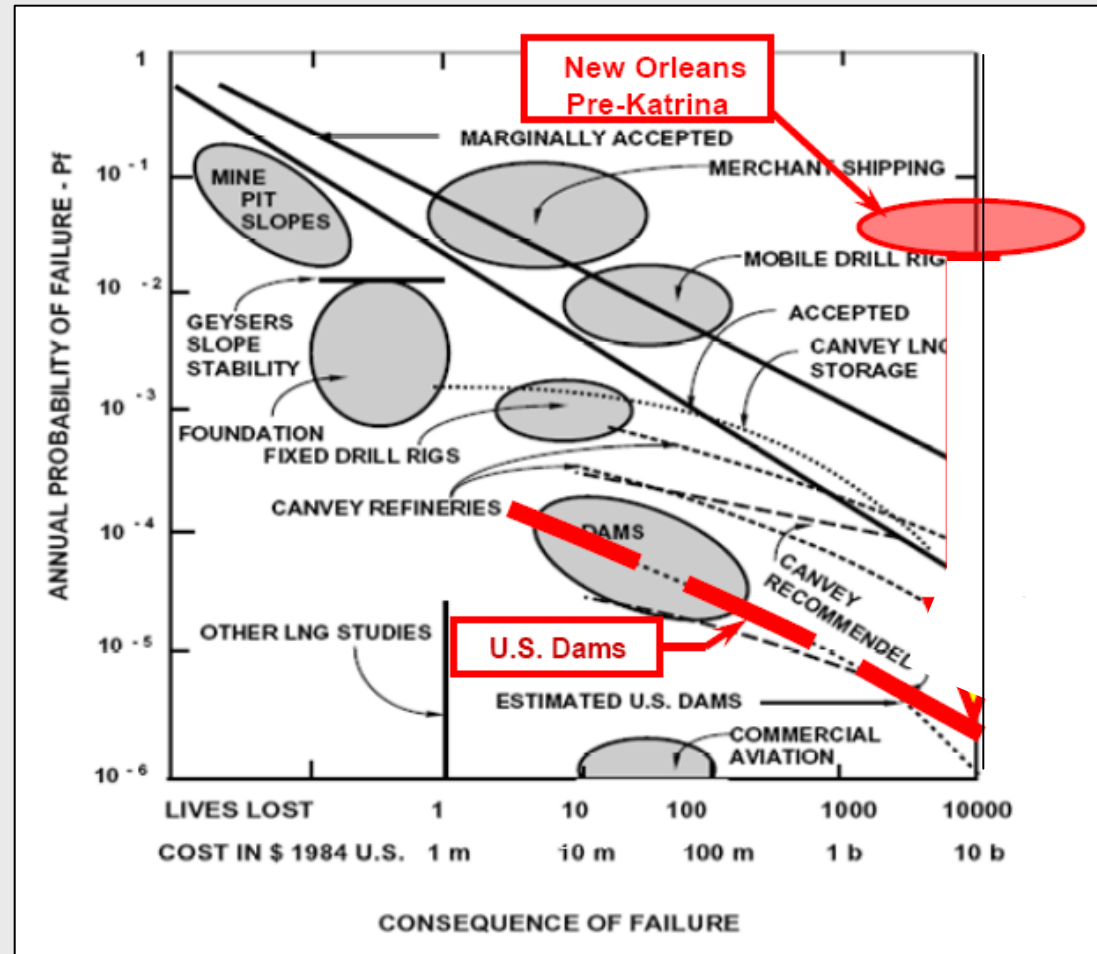
Dam Age  
National Average  
51 years

2007 Illinois Pop.  
12.85 Million

1950 Illinois Pop.  
8.17 Million



# ILLINOIS DAMS: APPROPRIATE RISK



# ILLINOIS DEPARTMENT OF NATURAL RESOURCES: DAM REGULATION

## ILLINOIS CODE 17 CHAPTER I SECTION 3702 Construction and Maintenance of Dams

### CLASS I

### CLASS II

### CLASS III

### Reference Report

"Procedural Guidelines for the Preparation of Technical Data to be Included in the Application of Permits for the Construction and Maintenance of Dams"

<http://dnr.state.il.us/owr/resman/3702RULE.htm>

#### CLASS I

#### Principal Capacity

Pre 1980 - 100-Yr  
New/Major Mod - PMF

#### Total Capacity

Pre 1980 – 0.6 PMF  
New/Major Mod - PMF

# OVERVIEW: Alpine Dam Rehabilitation Project

1. Location
2. Background
3. Appropriate Risk
4. Assessment Process
5. Summary





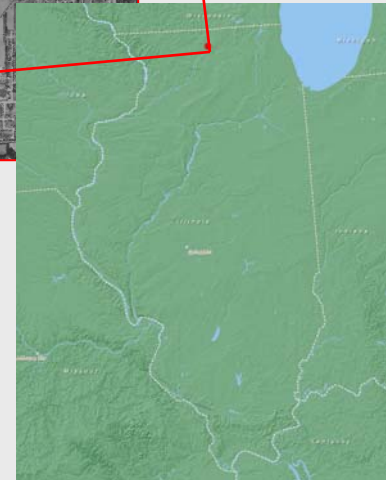
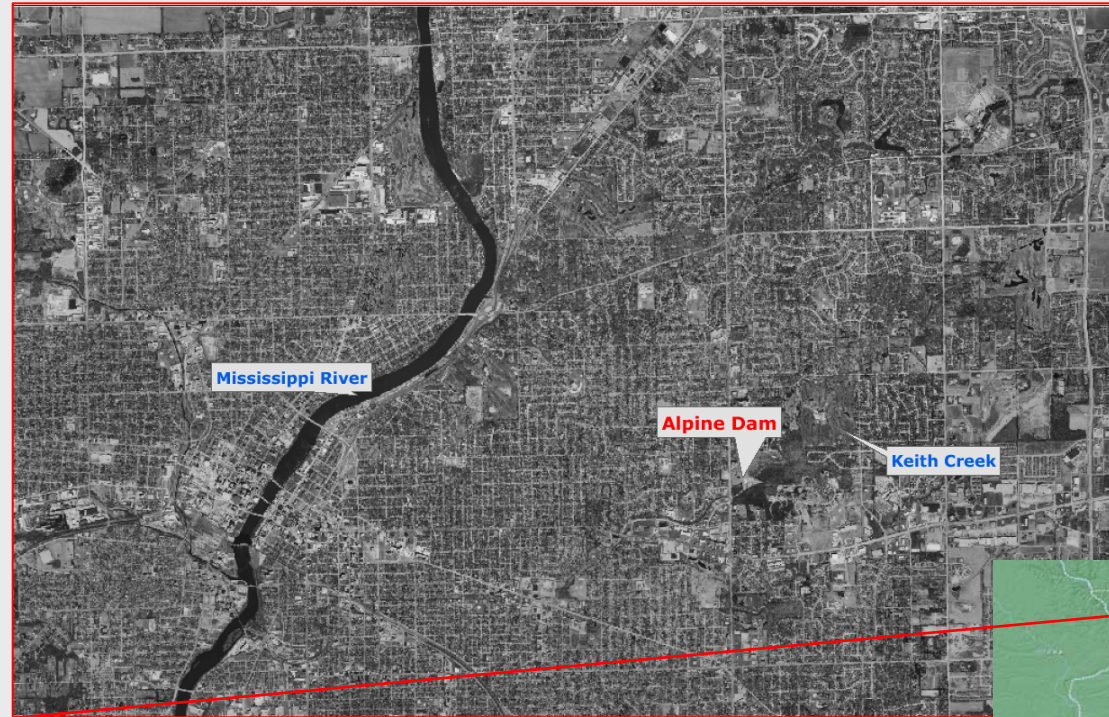
# ALPINE DAM: LOCATION

Owned & Operated  
City of Rockford

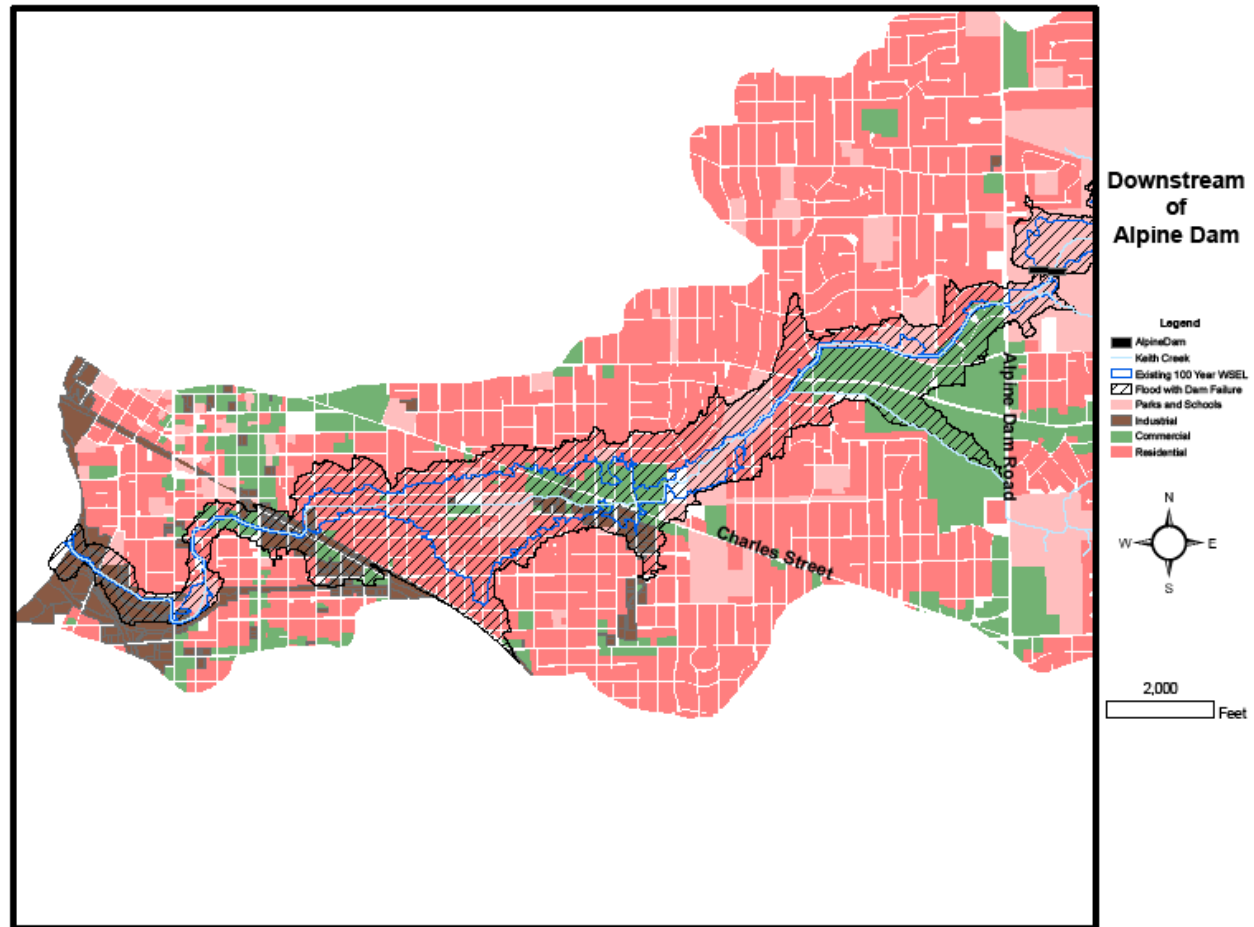
Keith Creek

Drainage Area  
6.6 sq miles

Periodic Inspections  
USACE

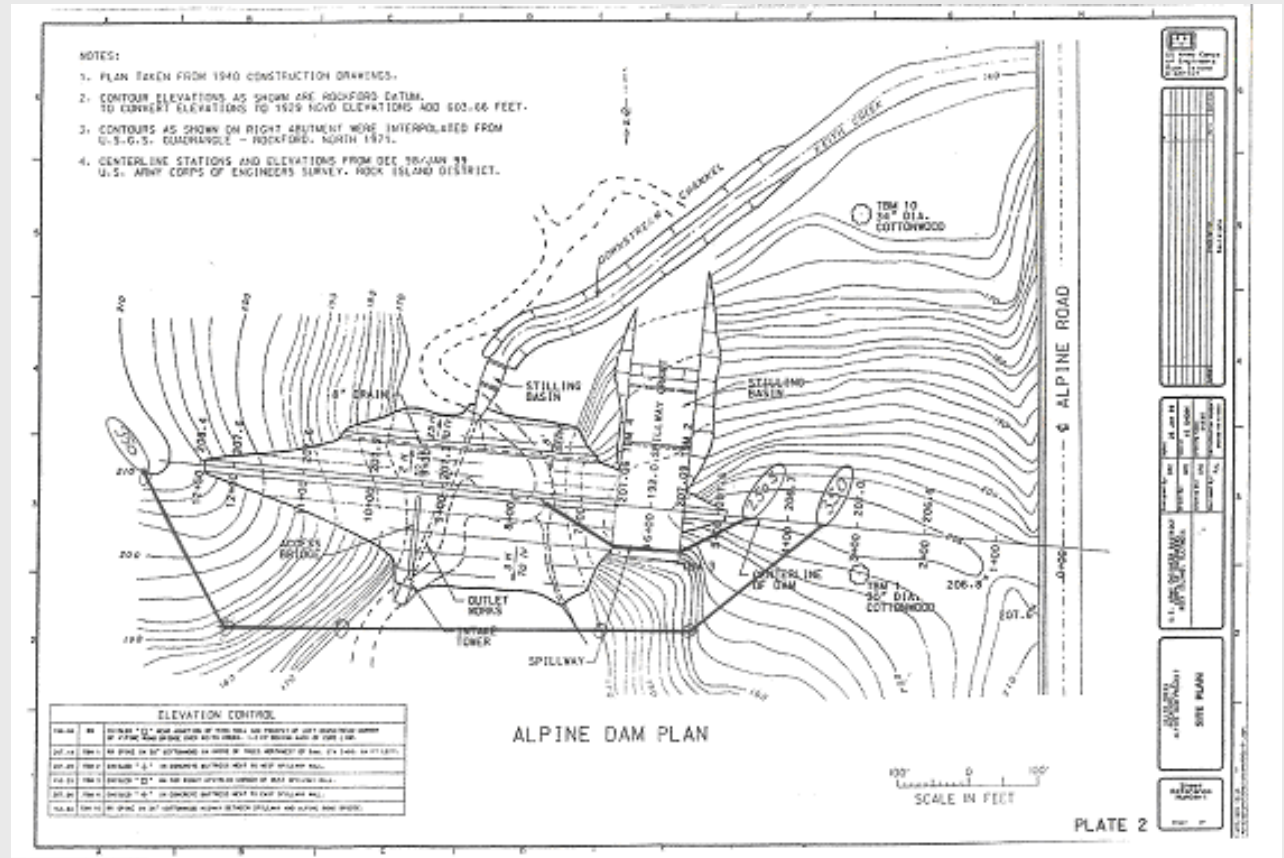


# ALPINE DAM: BACKGROUND





## ALPINE DAM: BACKGROUND



## Built in 1942

**Length - 600 ft**  
**Width -48 ft**

**Owned by City of Rockford**

**Storage Capacity**  
**2100 acre-ft**

# ALPINE DAM: ASSESSMENT PROCESS

## I. Dam Safety Evaluation

Prior  
Inspections

Field  
Investigation

Specific  
Evaluation

## II. Design and Permitting and Bidding Assistance

Phase I  
Spillway  
and  
Stilling  
Basin

Phase II  
Embankment  
and  
Outlet Works

## III. Services During Construction



# ALPINE DAM: ASSESSMENT PROCESS

## I. Dam Safety Evaluation

### Prior Inspections

### Field Investigation

### Specific Evaluation

1. Settlement
2. Movement
3. Erosion
4. Seepage
5. Leakage
6. Cracking
7. Deterioration
8. Seismicity
9. Internal Stress
10. Foundation Drainage
11. Stability of Adjacent Slopes
12. Site Geologic Conditions

1. Adequacy of Spillway
2. Effect of Overtopping and Non-Overflow
3. Structural Adequacy
4. Hydraulic Data
5. Analysis of Monitoring Data
6. Evaluation of Maintenance and Operation

## II. Design and Permitting and Bidding Assistance

## III. Services During Construction





# ALPINE DAM: APPROPRIATE RISK

## NRCS Requirements CLASS I Dam

### Principal Capacity

- Pre 1980 - 100-Yr
- New/Major Modifications - PMF

### Total Capacity

- Pre 1980 – 0.6 PMF
- New/Major Modification - PMF

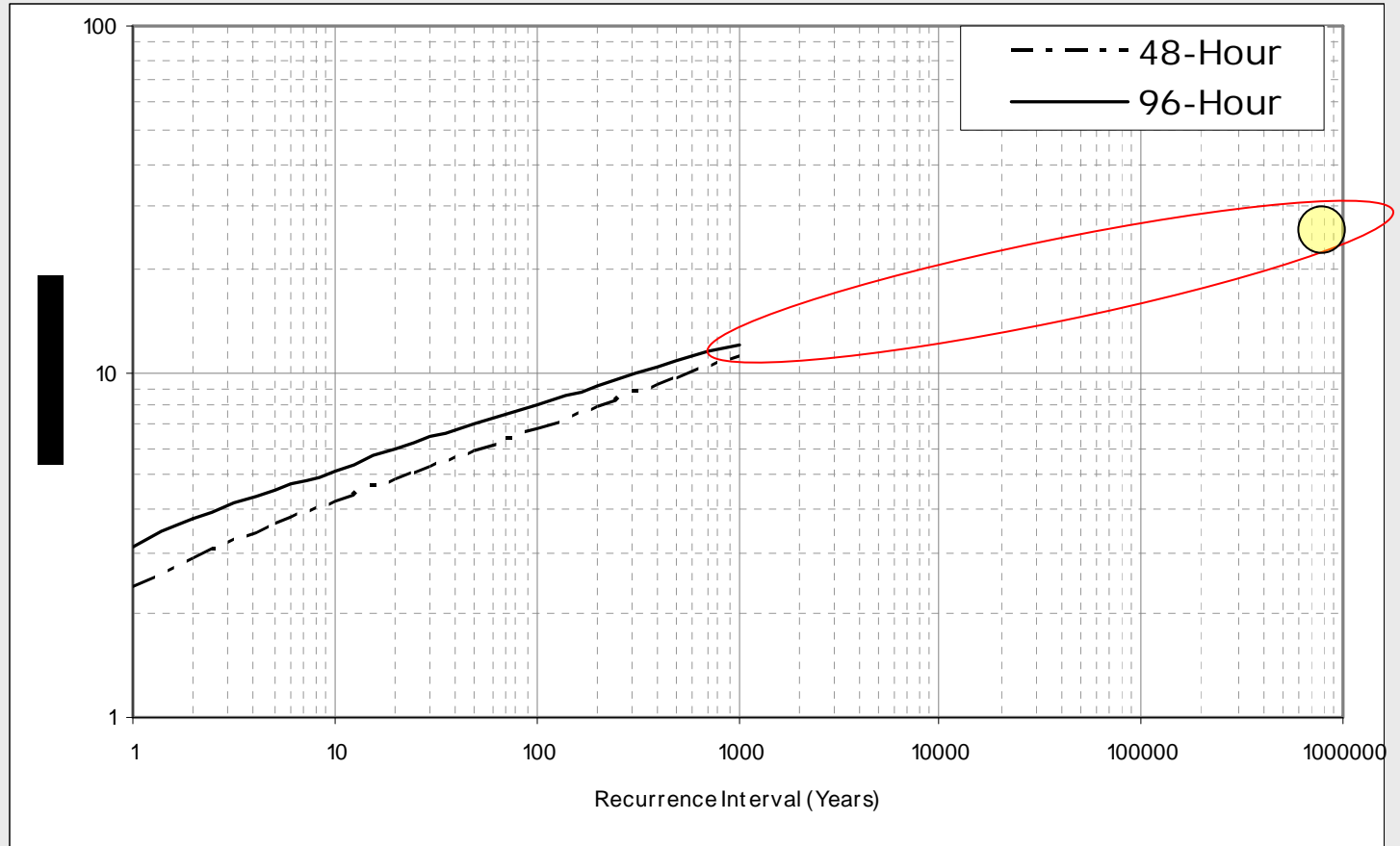
# ALPINE DAM: APPROPRIATE RISK

## Rainfall Depth

100-Year 12-Hour  
6.5 inches

0.6 PMP 72-Hours  
21.48

PMP 72-Hour  
35.8 inches



# ALPINE DAM: PMF DETERMINATION

## Method of Analysis

### 1. Probable Maximum Storm

- i. Hydrometeorologic Report 51 (NOAA 1975)
- ii. HEC HMR 52

### 2. Probable Maximum Flood

- i. HEC HMS

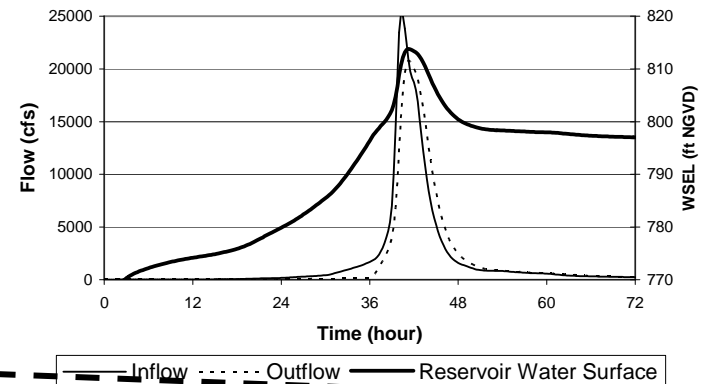
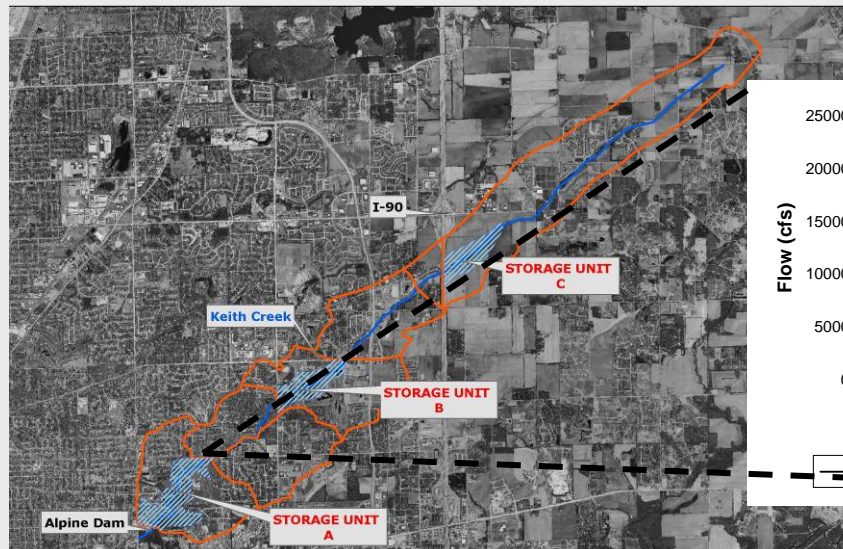
100-Year 12-Hour  
6.5 inches

PMP 72-Hour  
35.8 inches

100-Year  
2,200 cfs

0.6 PMF  
13,100 cfs

PMF  
25,300 cfs





# ALPINE DAM: INSPECTION REPORT

**Current Capacity**  
0.8 PMF

**Spillway**  
Unacceptable

**Low Flow Intake**  
Minimally Acceptable

**Monitoring Capability**  
None



Inspection Report  
Alpine Dam, Rockford IL

Submitted to the City of Rockford, IL  
By HNTB Corporation

July 24, 2008

**HNTB**

# ALPINE DAM: ASSESSMENT PROCESS

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## II. Design and Permitting and Bidding Assistance

Phase I  
Spillway  
and  
Stilling  
Basin

Phase II  
Embankment  
and  
Outlet Works

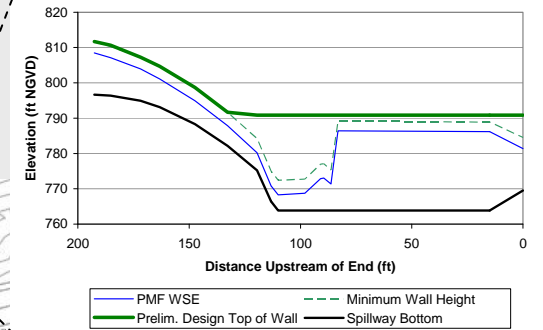
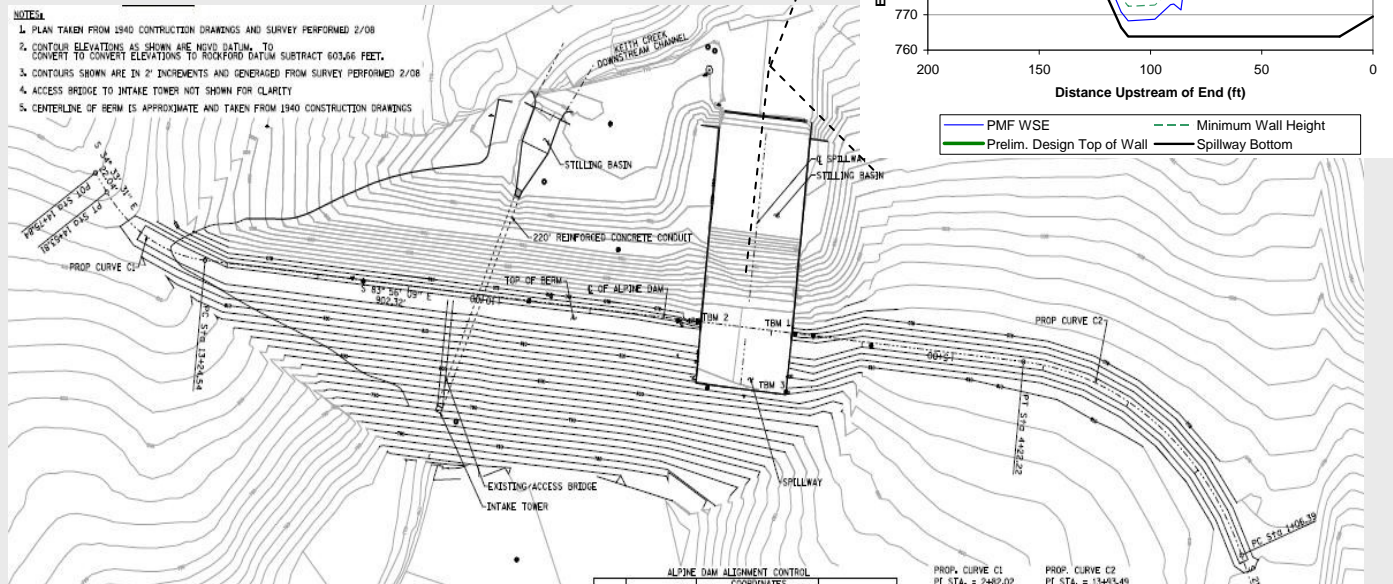
## III. Services During Construction



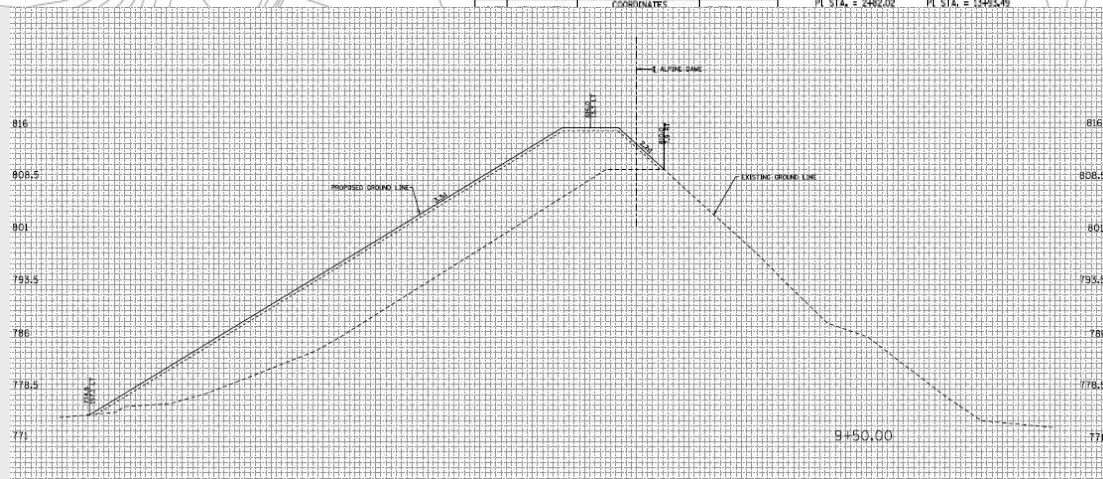
# ALPINE DAM: DESIGN

## NOTES

1. PLAN TAKEN FROM 1940 CONSTRUCTION DRAWINGS AND SURVEY PERFORMED 2/08
2. CONTOUR ELEVATIONS AS SHOWN ARE NGVD DATUM. TO CONVERT TO CONVERT ELEVATIONS TO ROCKFORD DATUM SUBTRACT 603.66 FEET.
3. CONTOURS SHOWN ARE IN 2' INCREMENTS AND GENERATED FROM SURVEY PERFORMED 2/08
4. ACCESS BRIDGE TO INTAKE TOWER NOT SHOWN FOR CLARITY
5. CENTERLINE OF BEAM IS APPROXIMATE AND TAKEN FROM 1940 CONSTRUCTION DRAWINGS

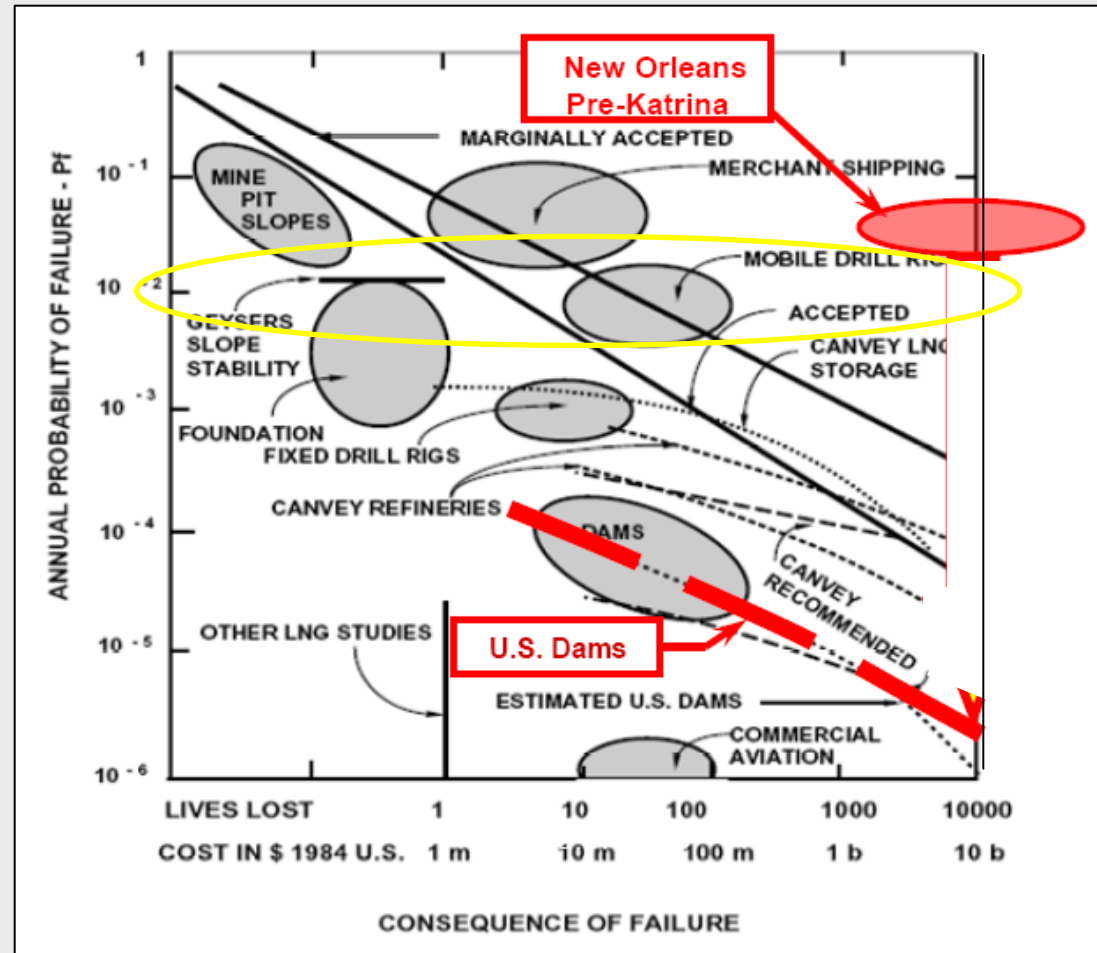


## Phase I Spillway and Stilling Basin



# ILLINOIS DAMS: SUMMARY

For Every  
1 Repaired Dam  
There are  
2 Deficient Dams



# ILLINOIS DAMS: SUMMARY

## I. Dam Safety Evaluation

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## II. Design and Permitting and Bidding Assistance

## III. Services During Construction



# Improving Illinois Dams: Alpine Dam Rehabilitation Project

## QUESTIONS



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