Heritage Park Flood Control Facility Compensatory Storage for Levee 37

Joseph Kratzer, P.E., CFM

Presentation Agenda

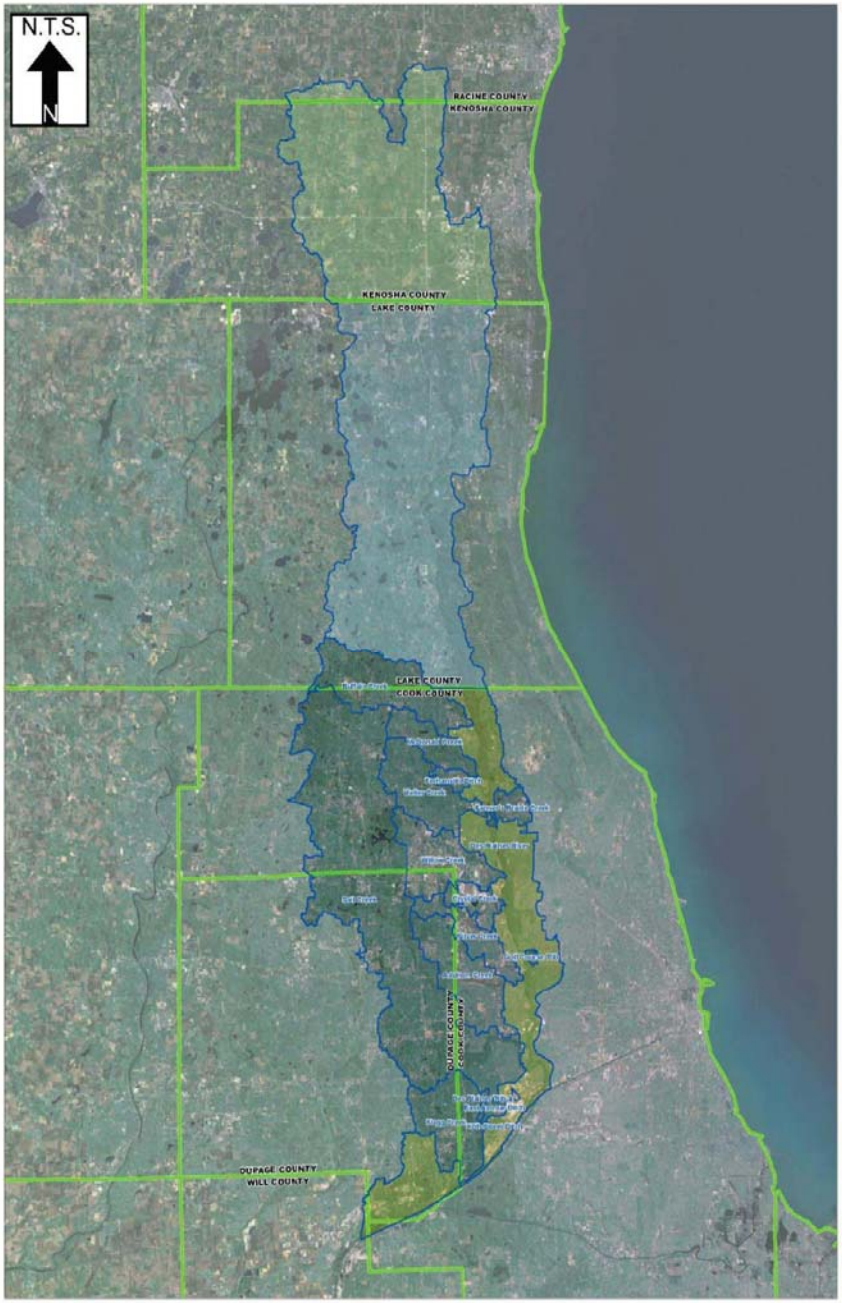
- Background
  - Des Plaines River Flooding
  - U.S. Army Corps of Engineer's Levee 37
- Heritage Park Flood Control Facility
  - Site Plan
  - Challenges/Solutions
- Keys to Successful Collaboration

Des Plaines River Watershed

Wisconsin/Illinois: 120 mi^2

Lake/Cook County: 320 mi^2

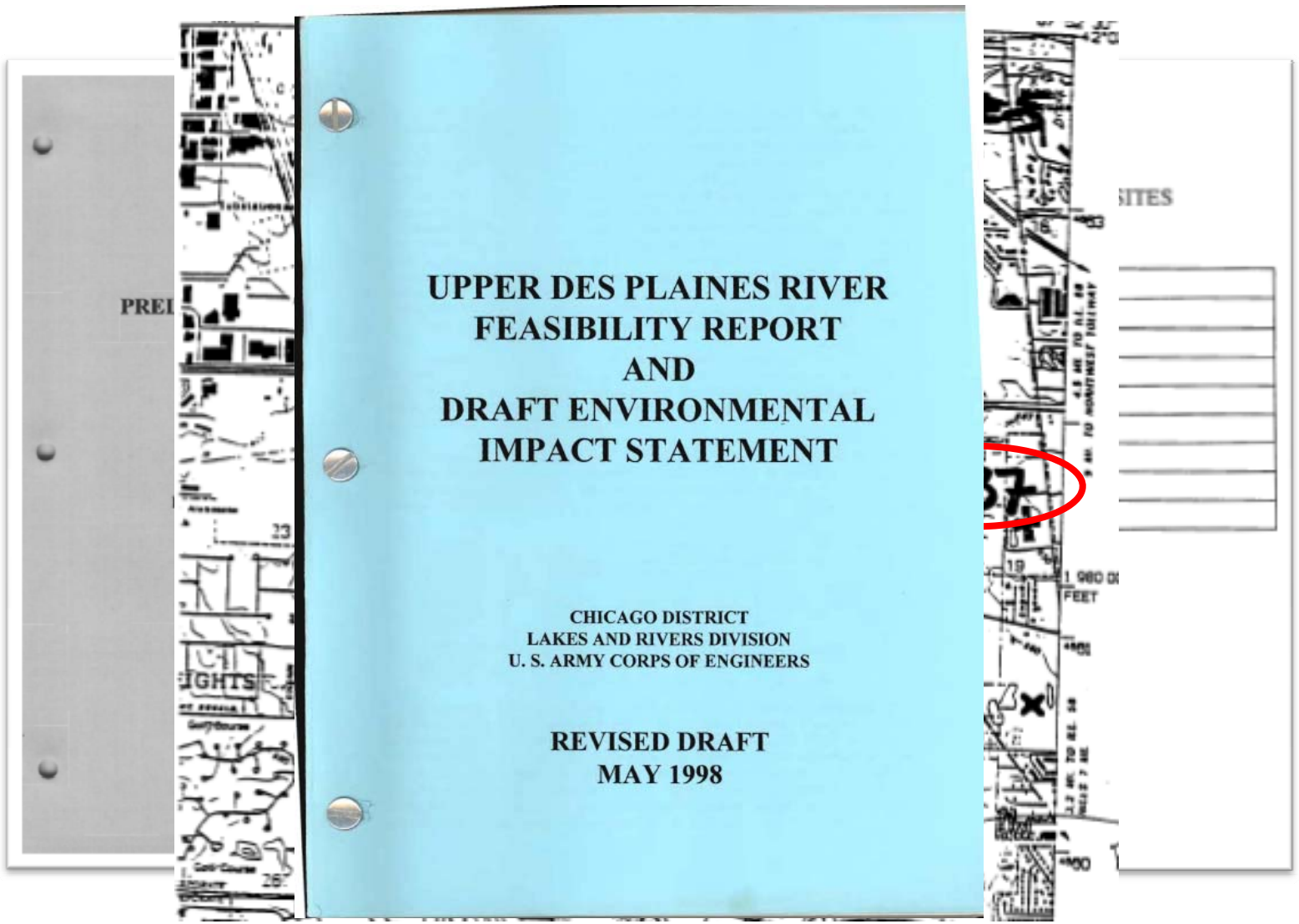
Will/Cook County: 680 mi^2



Des Plaines River Flooding

- 1986 Flood
  - $35 Million Estimated Damages
  - 10,000 Homes Flooded
  - 263 Businesses Flooded
- 1987 Flood
  - $78 Million Estimated Damages
  - O'Hare Airport Closure

Des Plaines River Flooding



Levee 37 Benefits

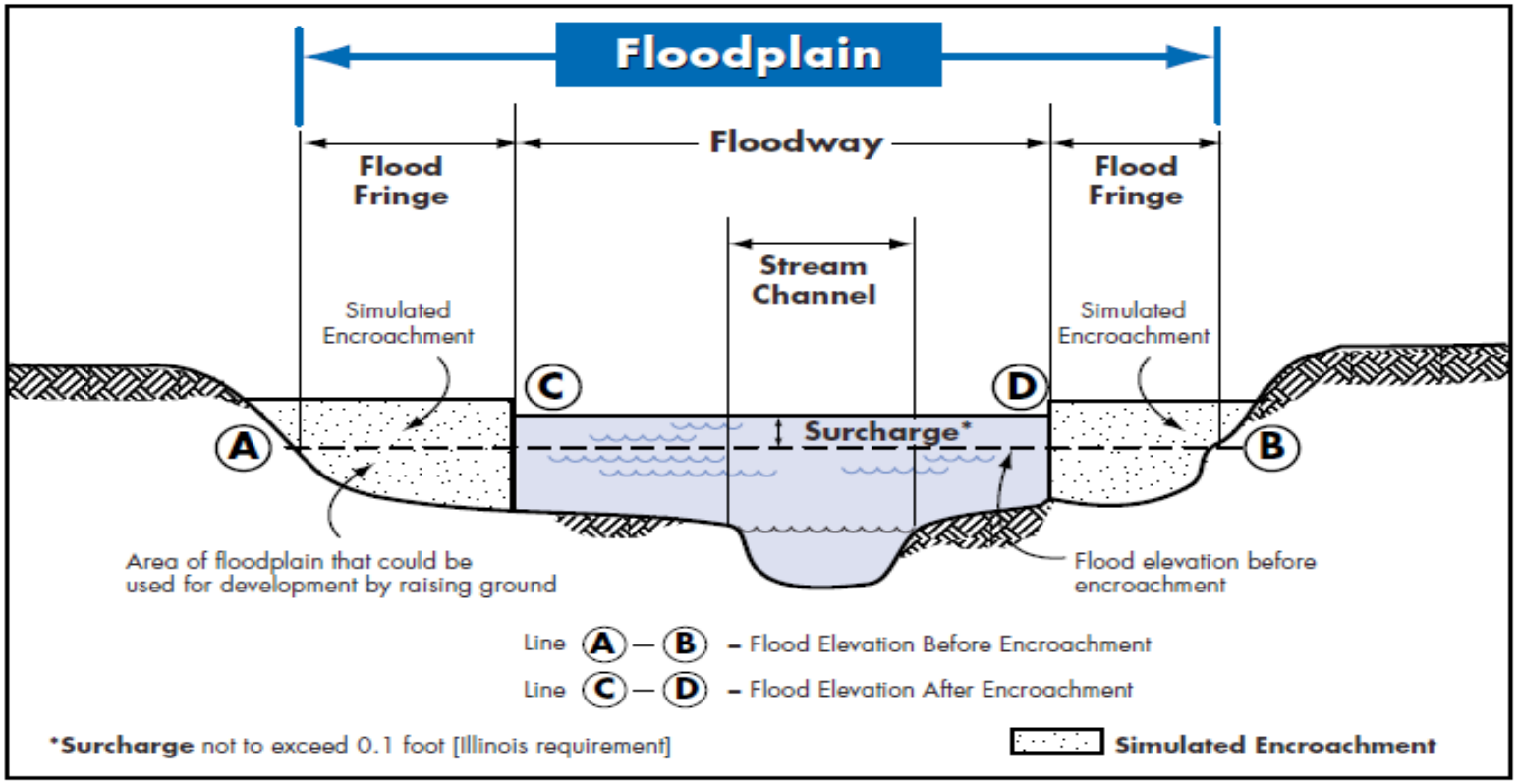
Without Levee 37

With Levee 37

Levee 37 Permitting

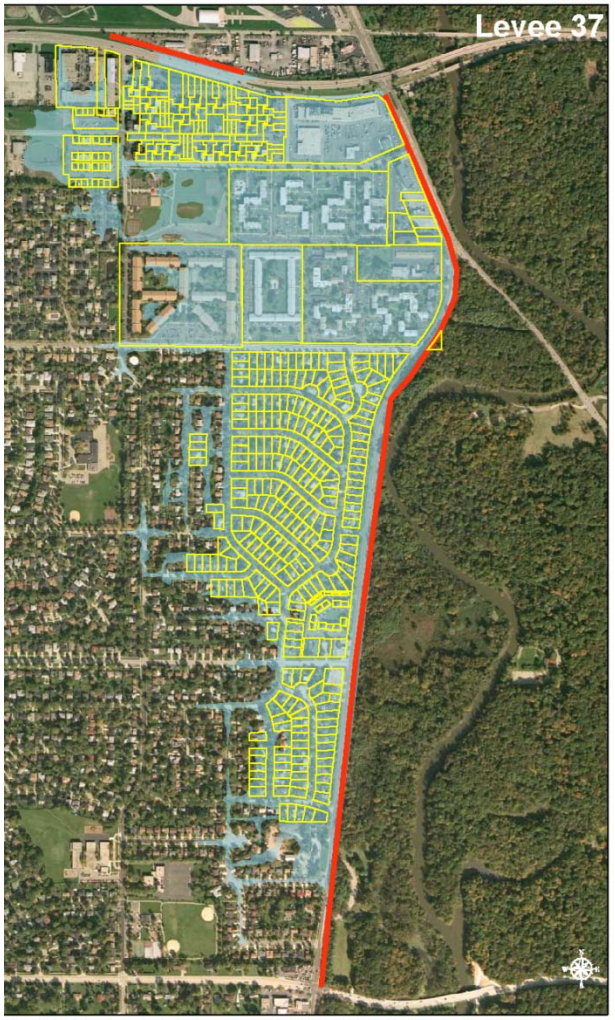
State of Illinois Floodway Construction Permitting Authority

"Regulatory Floodway" The channel and that portion of the floodplain adjacent to a stream or watercourse as designated by the Department, which is needed to store and convey the anticipated future 100-year frequency flood discharge with no more than a 0.1 foot increase in stage due to the loss of flood conveyance or storage.



Levee 37 Permitting

- Analysis of the **Des Plaines River system** indicated that the induced flood stage increase for the 100-year flood caused by Levee 37 is **greater than the State's permitting guidelines allow**.
- Permit for levee construction will not be issued without other **upstream flood storage measures** in place to reduce this increase.



The 100-Year Flood

- The 100 year flood has a one percent (or 1/100) chance of being equaled or exceeded during any given year.

- When FEMA was setting its standards for mapping flood hazard areas and for issuing regulations ,the 100 year flood standard was established as a compromise. It fell between what the Corps of Engineers had used as the protection level when they built dams and levees and what most communities used when they designed their stormwater systems. It was thought to be a fair balance between protecting the public and overly stringent regulation.

Chances of Being Flooded

Period of Time	Flood Level			
	10-yr Flood	25-yr Flood	50-yr Flood	100-yr Flood
1 year	10%	4%	2%	1%
10 years	65%	34%	18%	10%
20 years	88%	56%	33%	18%
30 years	96%	71%	45%	26%
50 years	99%	87%	64%	39%

- 1% **A**nnual **E**xceedance **P**robability flood

- The 1% AEP flood has a 1% chance of occurring in any given year; however, **during the span of a 30-year mortgage, a home in the 1% AEP (100-year) floodplain has a 26% chance of being flooded at least once** during those 30 years, based on probability theory that accounts for each of the 30 years having a 1% chance of flooding.

Levee 37 Permitting

- Levee 37 Floodway Construction Permit

PERMIT NO. NE2008013
DATE: April 11, 2008

State of Illinois
Department of Natural Resources, Office of Water Resources

THIS PERMIT IS SUBJECT TO THE FOLLOWING SPECIAL CONDITION:

a) Prior to completion of construction of the levee herein authorized, flood stage increases on the Des Plaines River due to the levee must be effectively mitigated by the construction of additional floodwater storage at Buffalo Creek Reservoir or an alternate site. Otherwise, flood easements must be acquired on all properties affected by the stage increases.

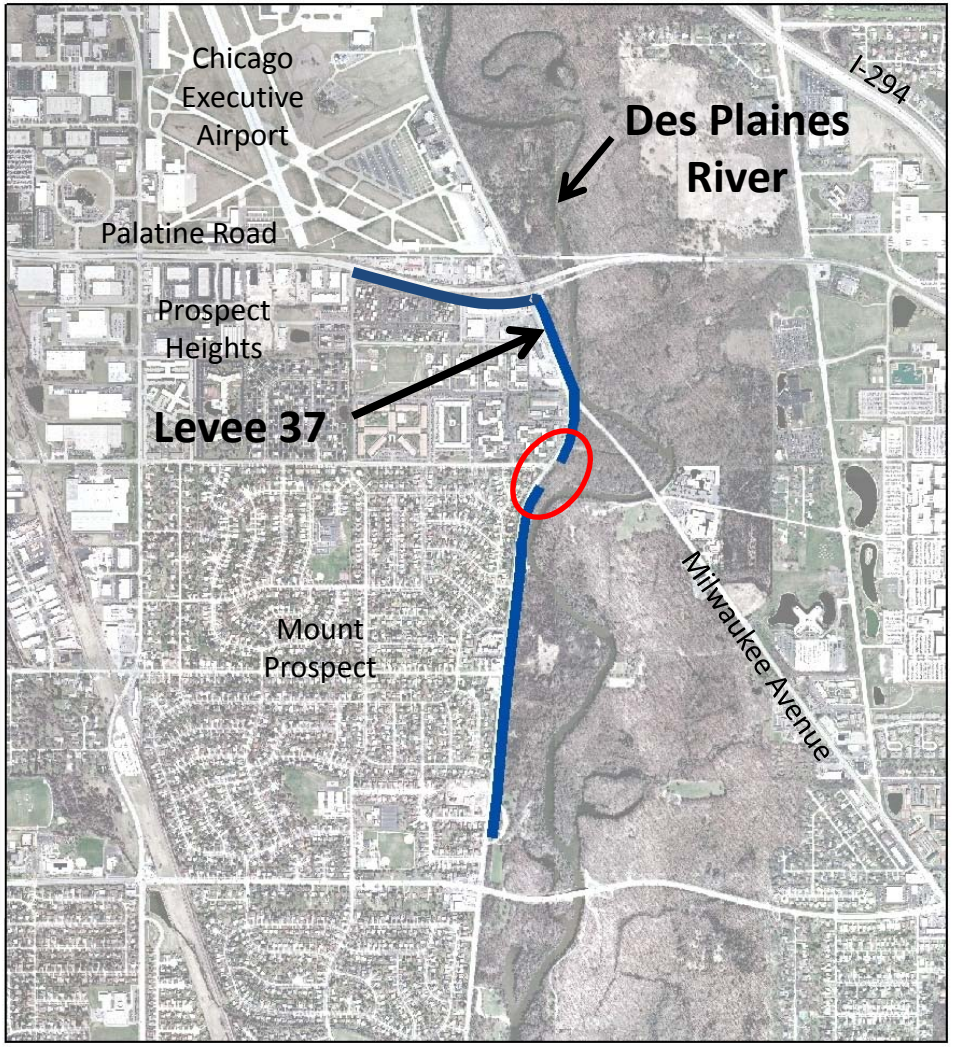
Alternate Sites for Levee 37 Compensatory Storage

- 30 sites analyzed by USACE on mainstem Des Plaines River and upstream tributaries
- Buffalo Creek Reservoir Expansion
  - USACE recommended expansion of the Buffalo Creek Reservoir as part of Upper Des Plaines River Phase I report.
  - Project would provide Comp storage for Levee 37 and reduce flooding along Buffalo Creek
  - Unable to negotiate with landowner for expanding Buffalo Creek Reservoir.

Levee 37

- Combination Levee / Floodwall
- Approx. 8,500 Feet Long
- Construction started in 2009
- Essentially Complete in 2011

- 600 Foot Long Gap in Place until Compensatory Storage is Provided

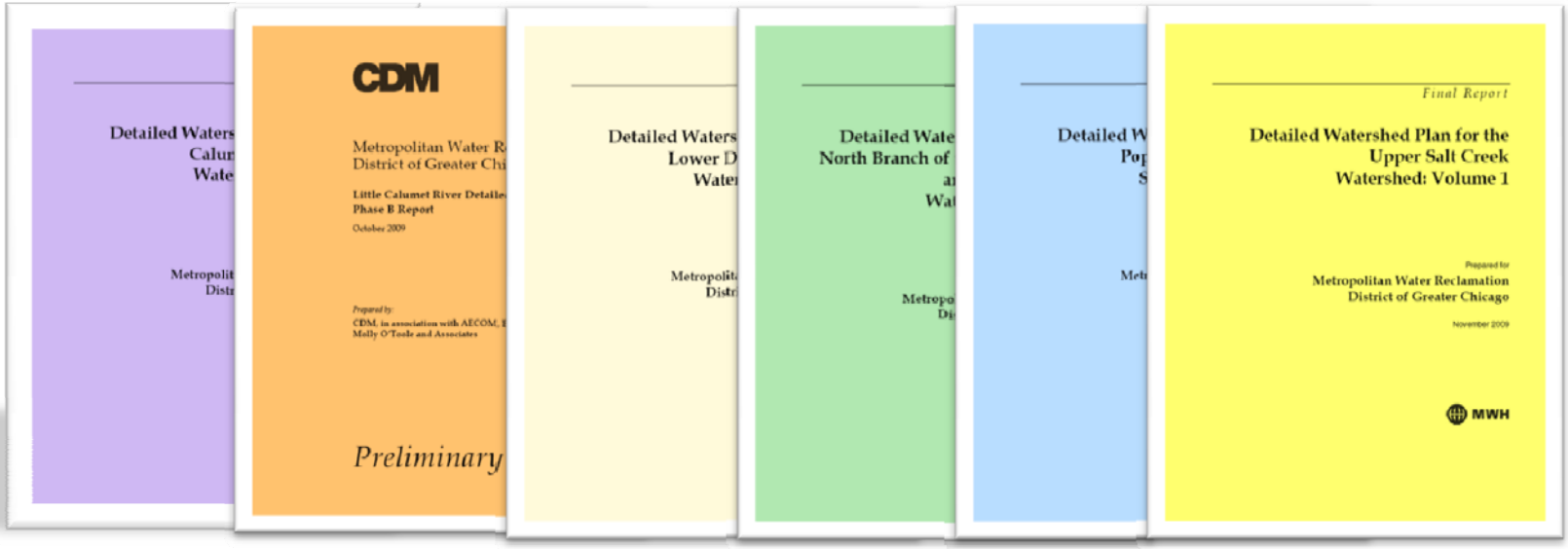


MWRDGC | Stormwater Management

- District conveyed authority in November 2004 to plan, manage, implement, and finance activities relating to stormwater management in Cook County
- Engineering Department's primary activities:
  - Capital Improvement Program to address existing stormwater problems
  - Comprehensive stormwater regulations to ensure future development and redevelopment does not exacerbate flooding

MWRDGC | Stormwater Management

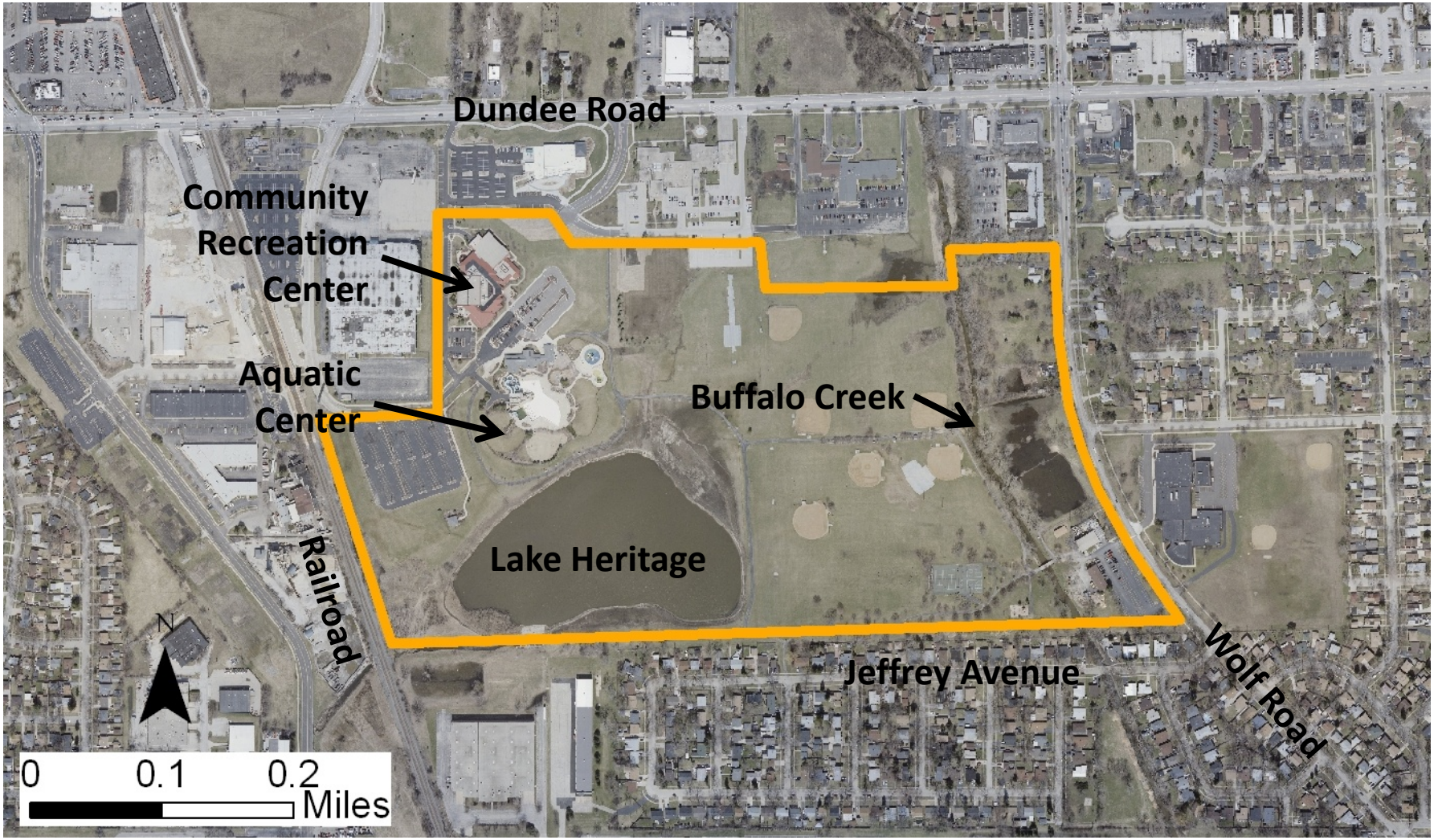
- Regional Flooding or Streambank Stabilization Projects recommended in Detailed Watershed Plans



- Projects previously approved by Federal or State Agencies

Levee 37 and Heritage Park

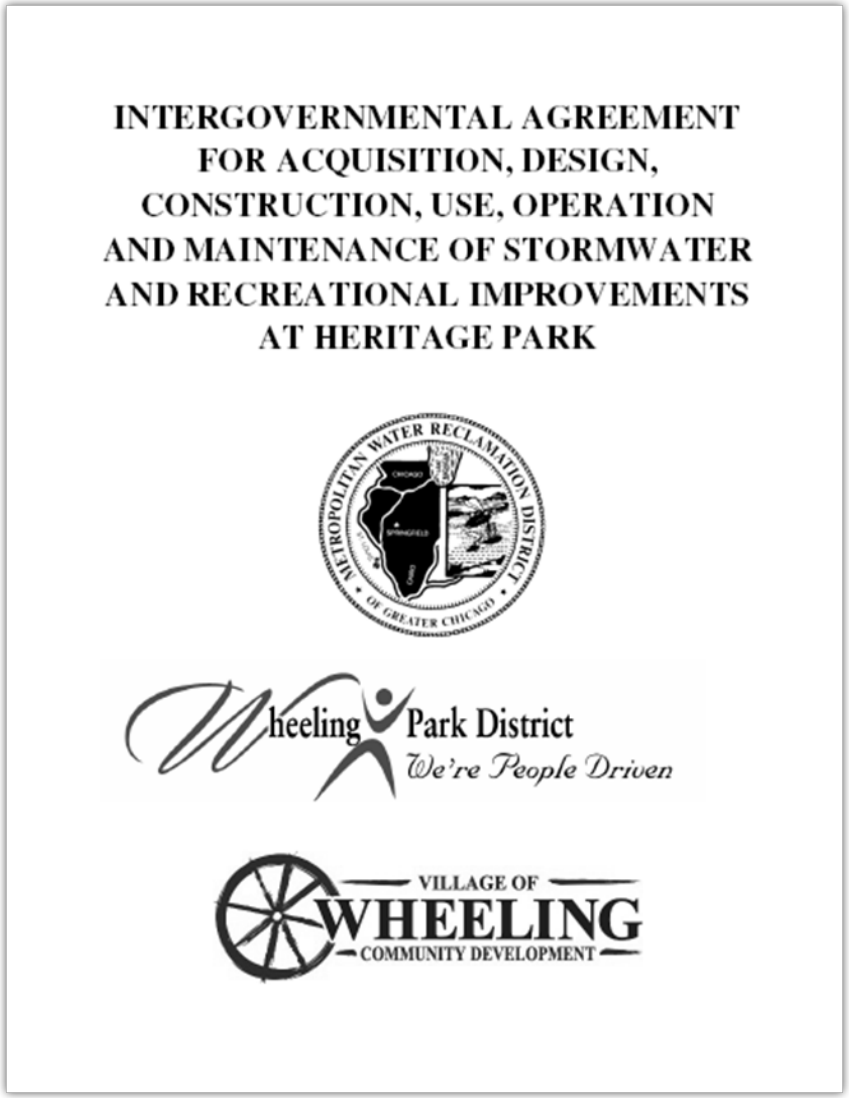
Heritage Park



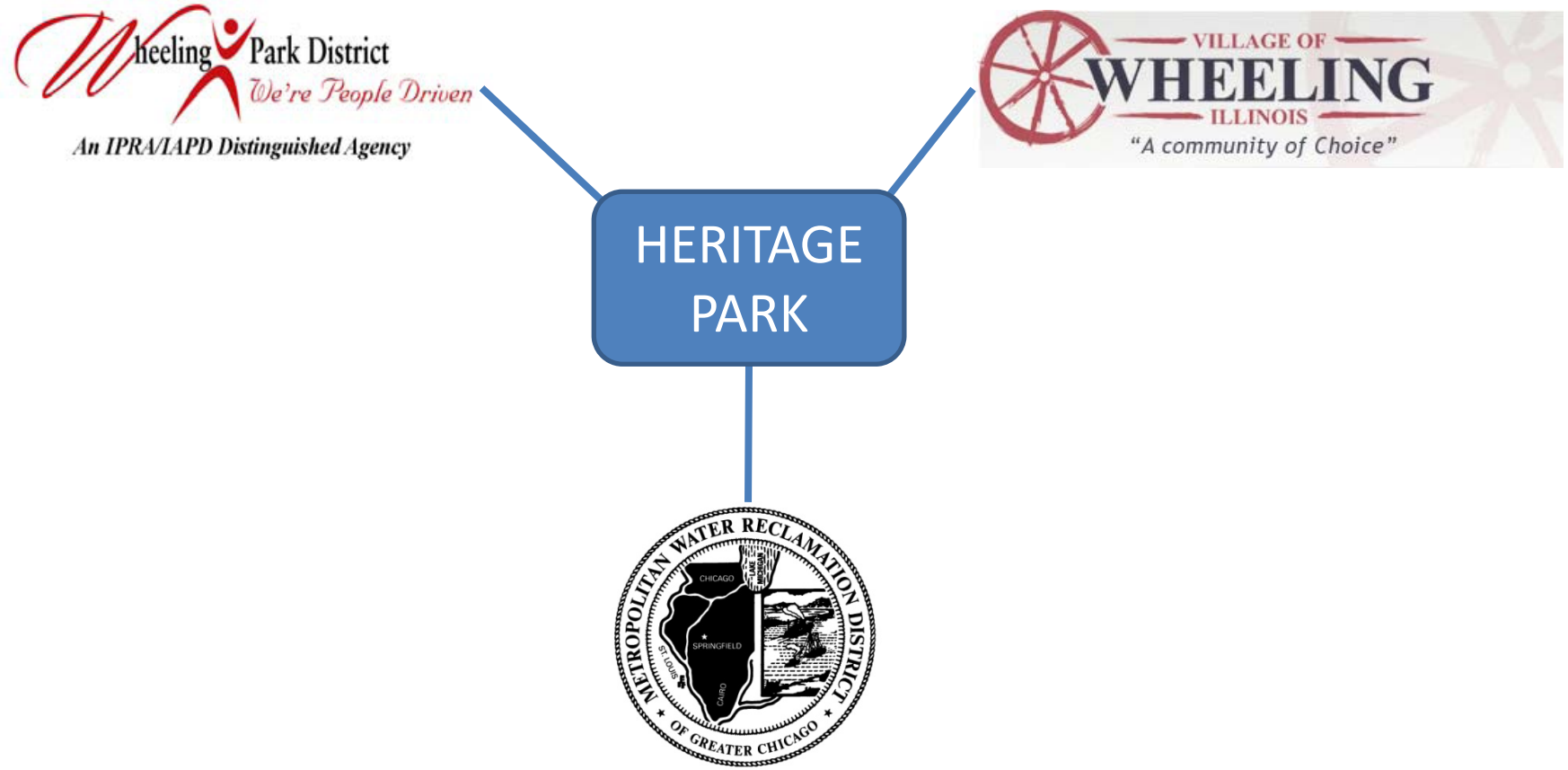
Wheeling Park District Master Plan for Heritage Park

Negotiations

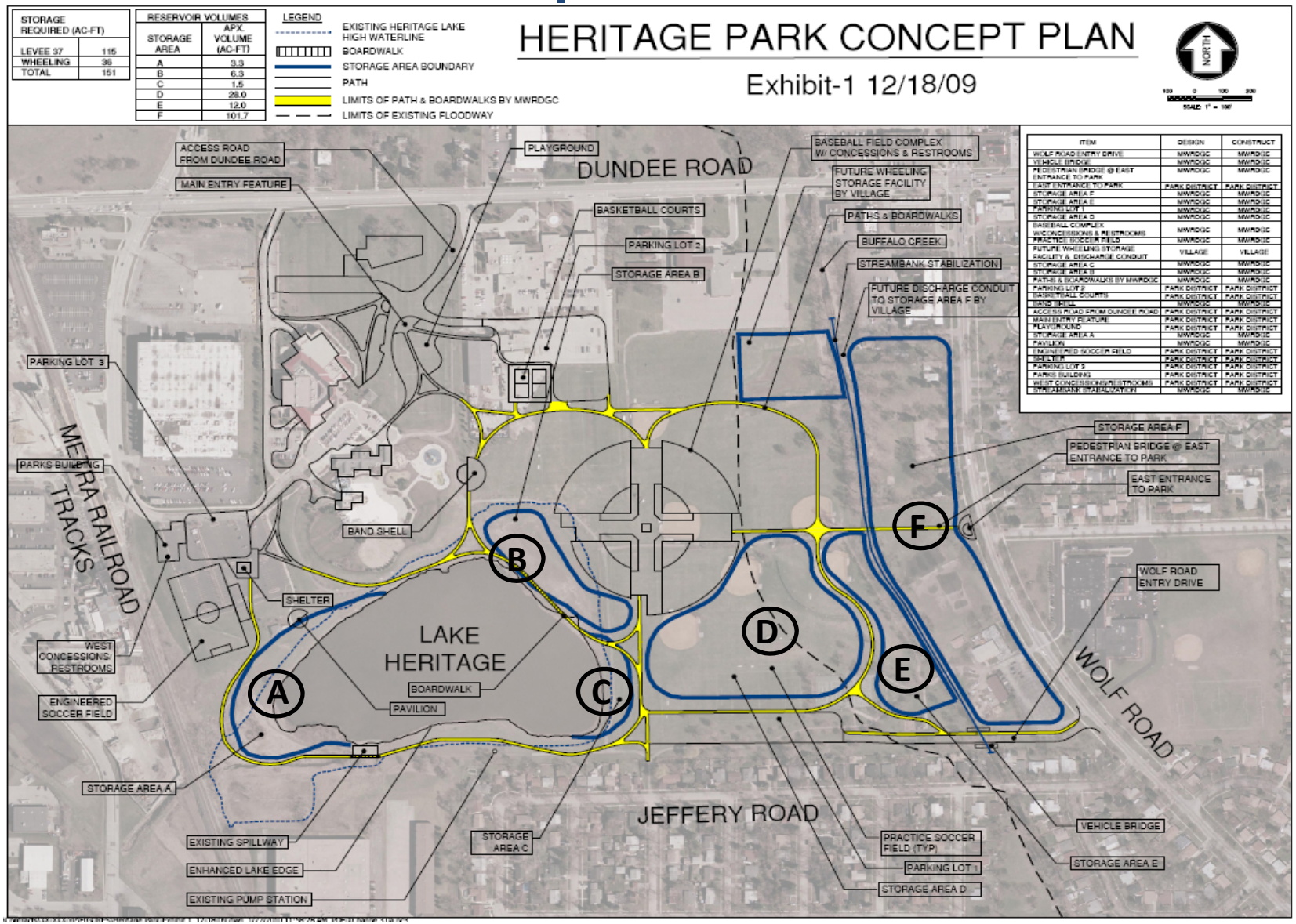
- Conceptual plans and negotiations began late 2008
- Defined terms for design/construction
- Responsibility for maintenance to Park District
- IGA signed April 2010



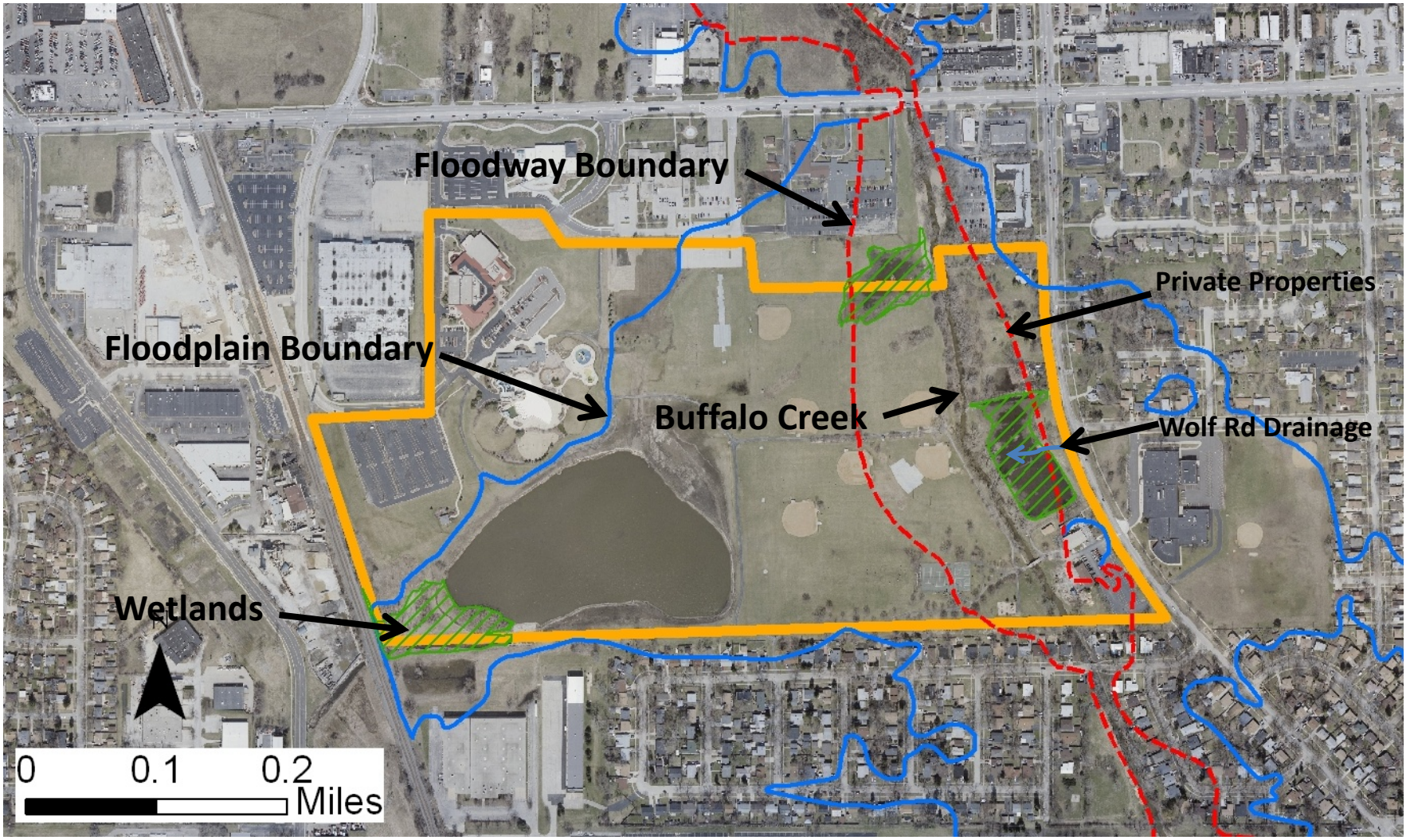
Heritage Park Partners



Concept Site Plan



Site Constraints

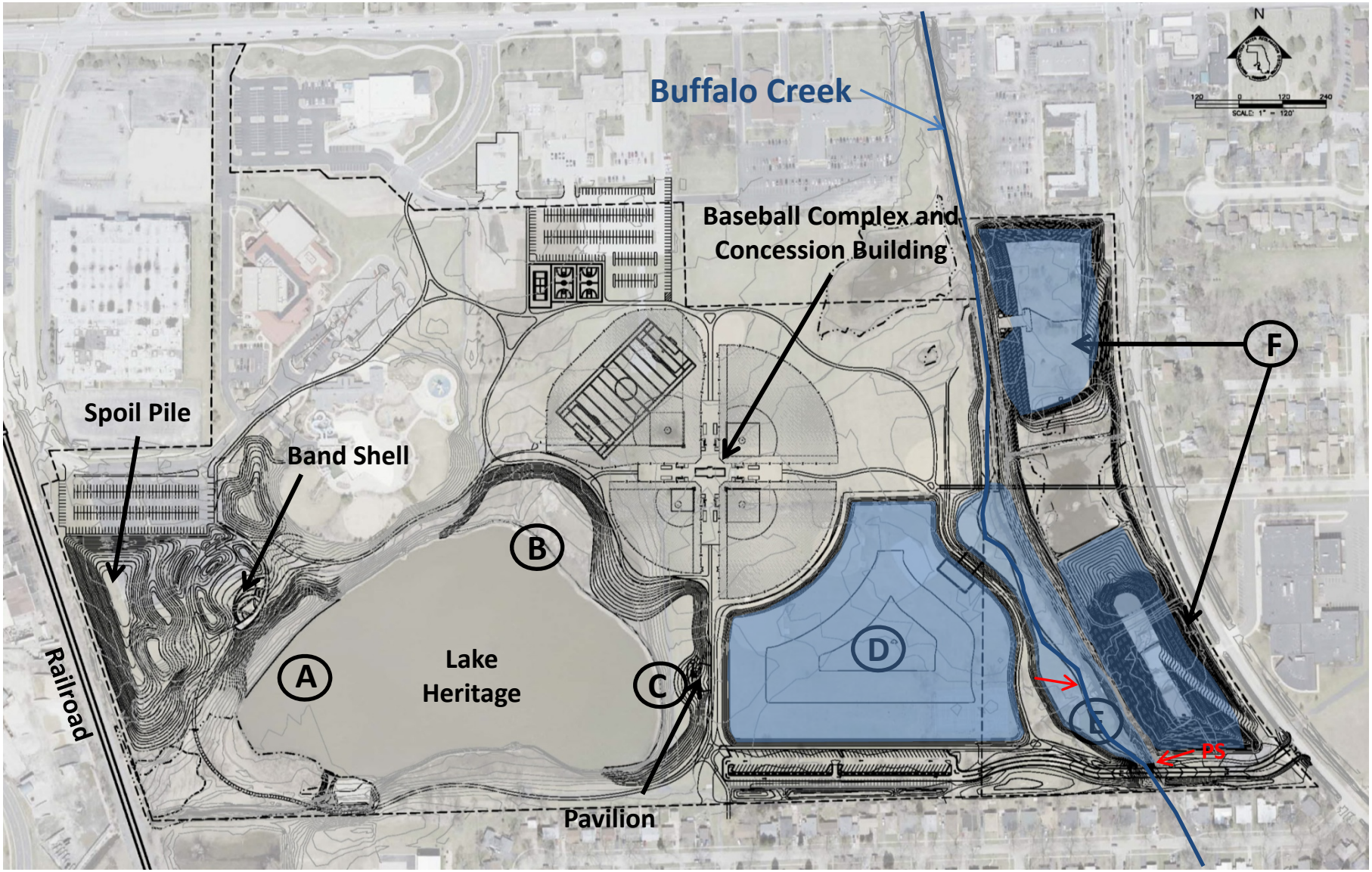


H&H Modeling

- Des Plaines River
  - 630 Square Miles
  - 10 Day Critical Duration
  - HEC-1 / HEC-2
- Buffalo Creek
  - 27.2 Square Miles
  - 24 Hour Critical Duration
  - HEC-HMS / HEC-RAS
- Basin Volume / Spillway Elevation Optimization

Preliminary Site Planning

Site Plan


Buffalo Creek
Baseball Complex and Concession Building
Spoil Pile
Band Shell
Railroad
A
B
C
D
E
F
Lake Heritage
Pavilion
PS
N

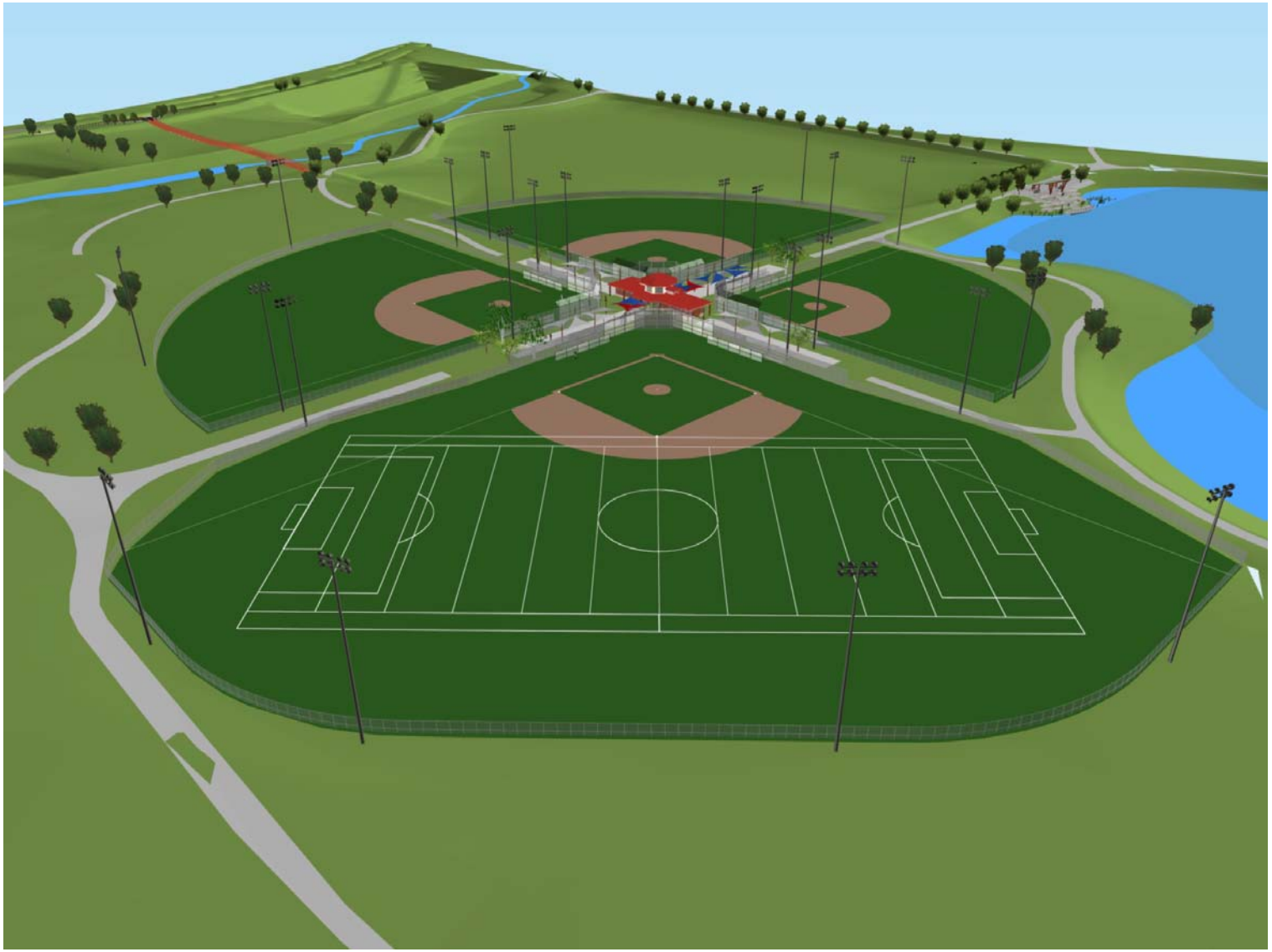
Flood Control Operations

- Basin F spillway crest elev. 640.15
- Basin D spillway crest elev. 641.20
- Basin F will be served by (3) main 75 HP submersible pumps for heavy rainfall events, as well as (2) 7 HP submersible sump pumps to handle final wet well dewatering and light rainfall events.
- Pump out when Buffalo Creek below elev. 638

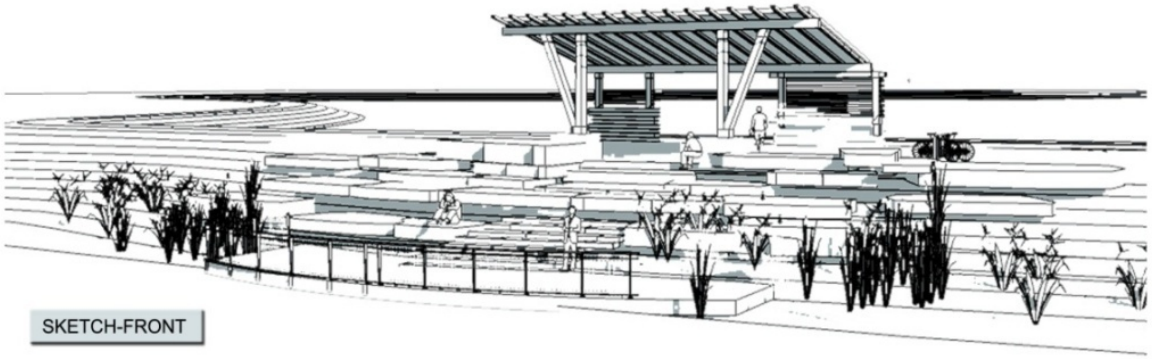
Stakeholders

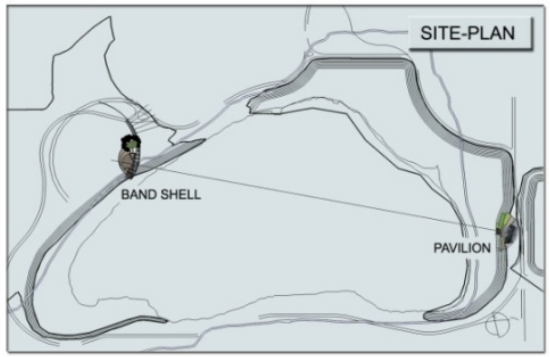
Recreational Features

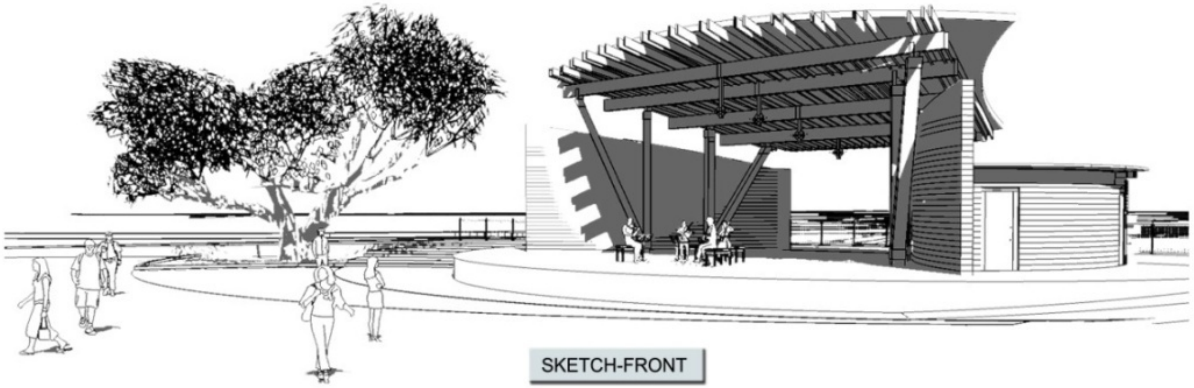
Ballfields w/ Concession Bldg

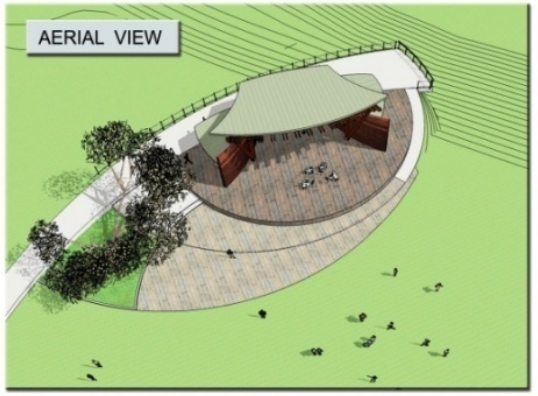


Pavilion & Bandshell

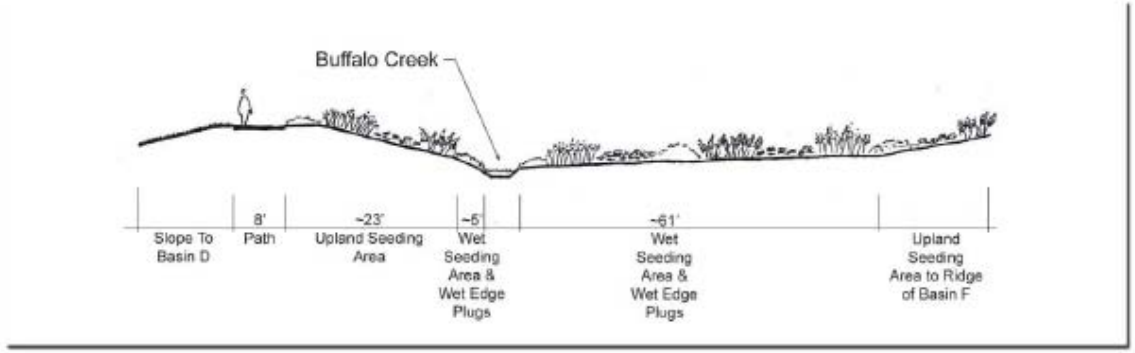




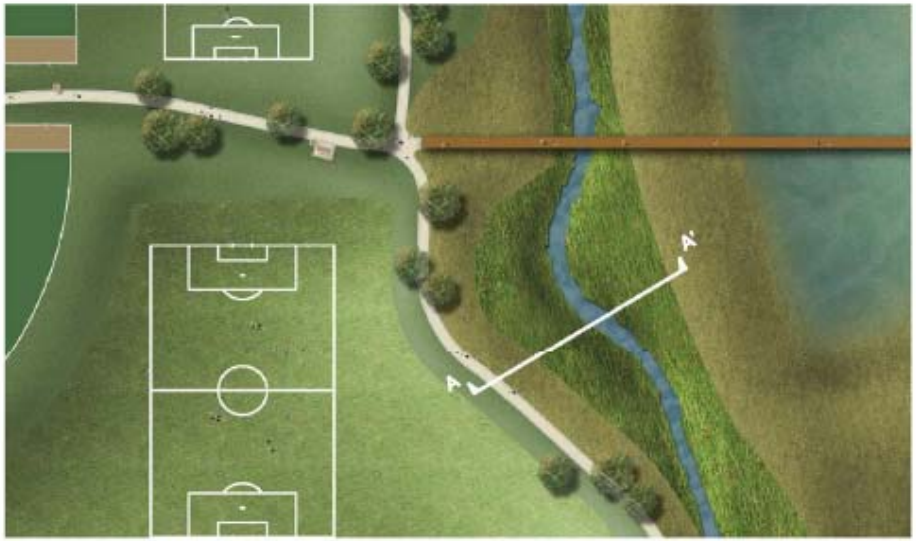




Landscaping

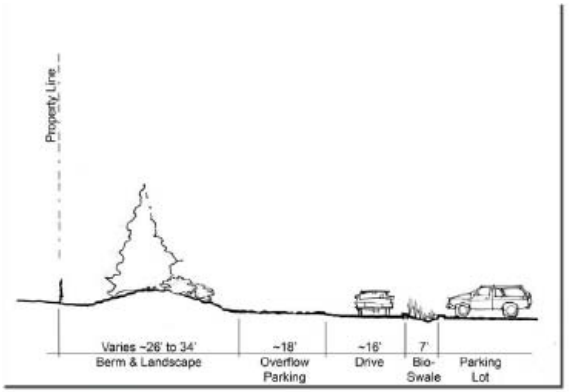


SECTION A - A'



PLAN

Parking Lot w/ Bioswale



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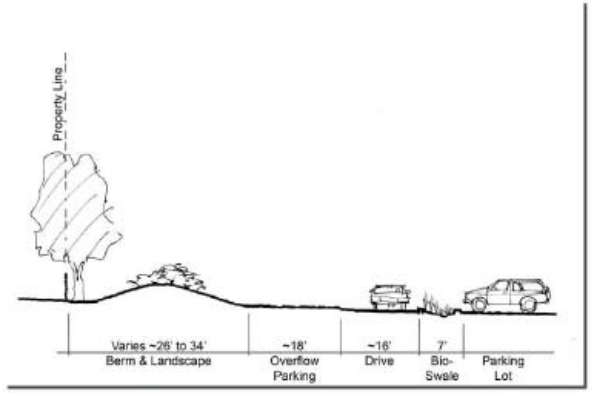


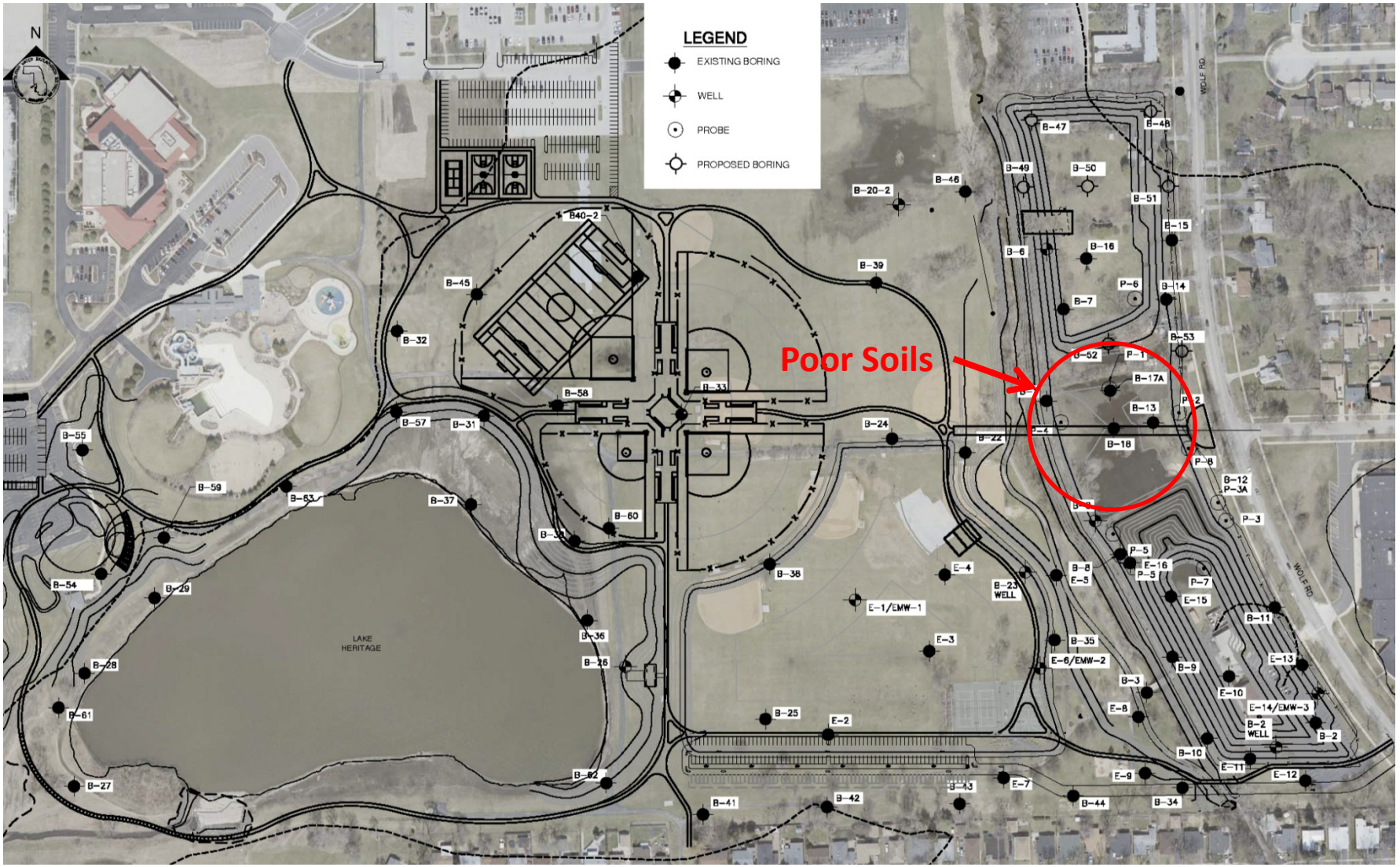
SECTION B - B'

PLAN

Project Challenges

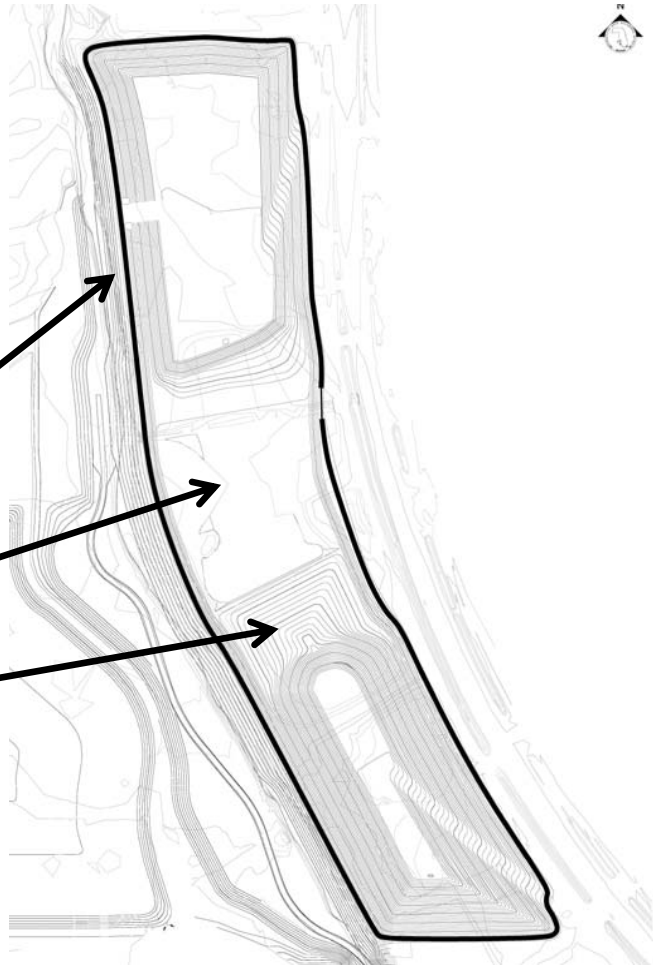
- Coordination with Stakeholders
- Geotechnical Issues
- Design Modifications
- Constructability

Geotechnical Challenges



Geotechnical Solutions

- Avoid Poor Soils to Maximum Extent
- Flatten Side Slopes in areas of weak soils
- Basin D
  - Bottom Elevation Above Groundwater Level
- Basin F
  - Cement Bentonite Groundwater Cutoff Wall
  - Leave Central Portion (weak soils) at Grade
  - 8:1 Slopes in some areas



Cement Bentonite Barrier Walls

Cement Bentonite Barrier Walls

MWRD Tinley Park Project - 1985

Design Modifications

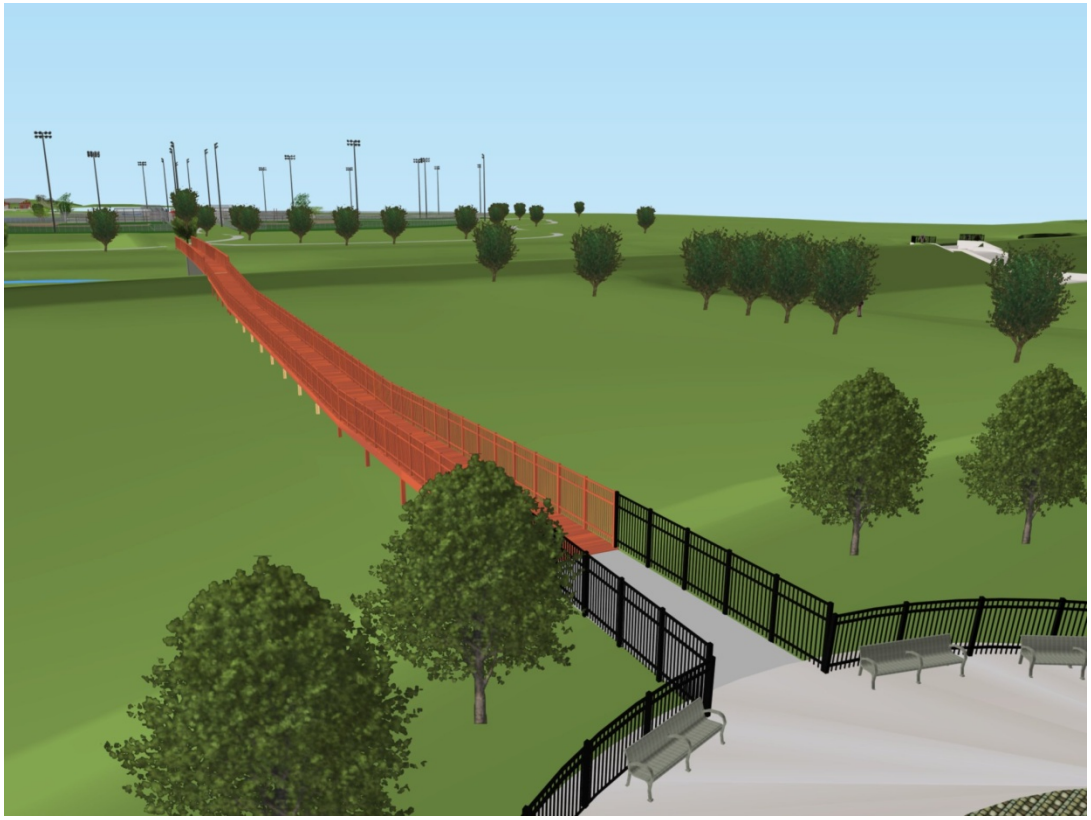
- Added above ground structure to house Basin F Pump Station controls
- Replaced Ped. bridge over Basin F with Boardwalk
- Minor changes to site features based on feedback from stakeholders/permitting agencies
- Relocated Bandshell and Pavilion

Design Modifications

- Added above ground structure to house Basin F Pump Station controls

Design Modifications

- Replaced Pedestrian bridge over Basin F with Boardwalk



Constructability

- Construction hour waivers
  - 24-hour construction for:
    - Cement-Bentonite Wall Installation
    - Lining of the existing Storm and Sanitary Sewers
    - Bypass pumping for work in Buffalo Creek
  - Extended work hours for Basin F Excavation

Keys to Success

- Understanding Stakeholder Goals
- Frequent Communications
- Adapting to Constraints
- Recognizing Opportunities for Cost Savings

Current Status


CONTRACT DOCUMENTS
FOR
Heritage Park Flood Control Facility
Wheeling, Illinois
Contract 09-365-5F
Protecting Our Water Environment
Metropolitan Water Reclamation District of Greater Chicago
NOVEMBER 2011
Volume I of II
BOARD OF COMMISSIONERS
OFFICERS
DENICE E. KORCAL ..... DIRECTOR OF HUMAN RESOURCES
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- **Contract Advertised: November 9, 2011**
- **Bids Received: February 7, 2012**
- **Construction Estimate: ~$33 million**
- **Lowest Apparent Bid: ~$29 million**
- **Construction Period: ~2 years**

Closing

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Questions?

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