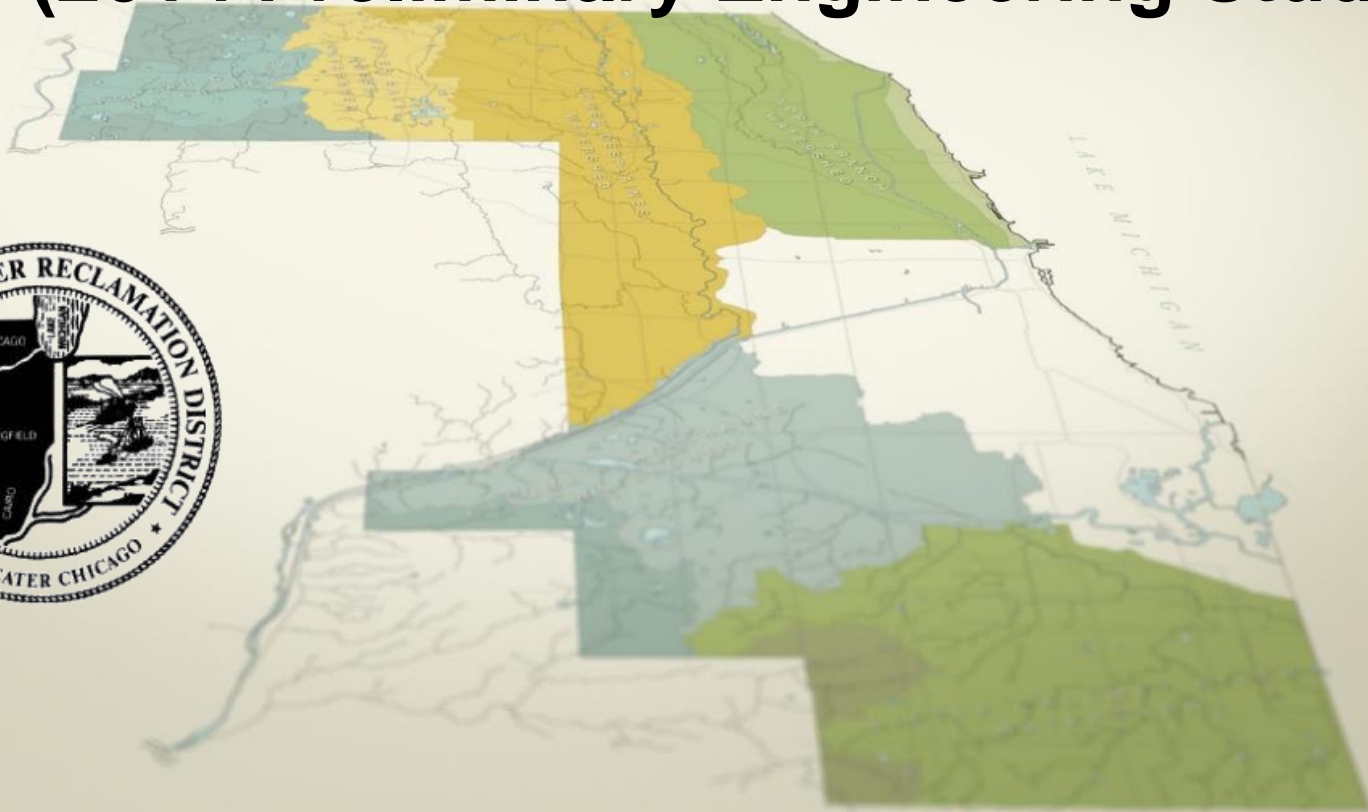


Natalie Creek Flood Control Project (2014 Preliminary Engineering Study)



Illinois Association for Floodplain and Stormwater Management (IAFSM)

March 9, 2016

Metropolitan Water Reclamation
District of Greater Chicago

Stormwater Management, Green Infrastructure, Tunnel and Reservoir Plan and Flood Control Projects and Facilities



Legend

- Stormwater Management Phase 1 Project
- Stormwater Management Phase 2 Project
- Flood Control Reservoir
- Green Infrastructure
- ★ Flood Prone Property Acquisitions
- Tunnel and Reservoir Plan Tunnel System
- Tunnel and Reservoir Plan Reservoir
- Cook County



Metropolitan Water Reclamation District of Greater Chicago
Stormwater Management, Green Infrastructure, Tunnel and Reservoir Plan and Flood Control Projects and Facilities

f t mwrdd.org





Outline

- **Project Overview**
- **Flooding History**
- **Coordination w/affected Stakeholders/Project Partners**
- **Resident Concerns**
- **Improvements Evaluated**
- **Investigation Results**
- **Alternative Comparison**
- **Recommended Alternative**
- **Summary**



Project Overview

- **Problem:** Overbank Flooding along Natalie Creek
- **Project Area:** Vicinity of 153rd St. and Lavergne Ave. (City of Oak Forest) to 146th St. and Pulaski (Village of Midlothian)
- **Design Consultant:** Burns & McDonnell Engineering Company, Inc. (BMcD)
- **Scope of Work:** Develop Flood Mitigation Alternatives for the Natalie Creek Project Area
- **Overall Goal:** Develop & Implement an Effective, Efficient, and Economical viable Flood Mitigation Solution for the affected Area

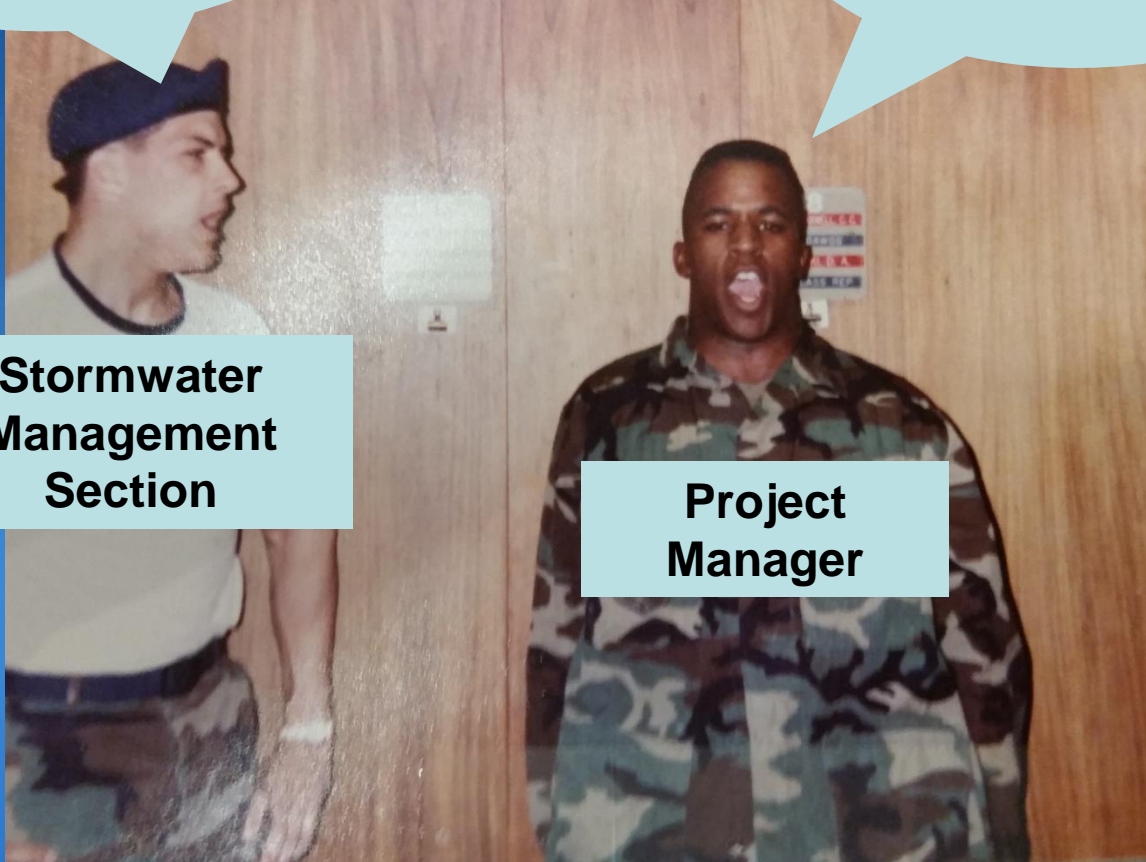


Mr. Robertson! Are you ready to take on the Natalie Creek Flooding Problem in Midlothian?

Yes Sir!, No Sir!, I don't know Sir!, I will find out Sir!

**Stormwater
Management
Section**

**Project
Manager**





MWRDGC & BMcD Project Team

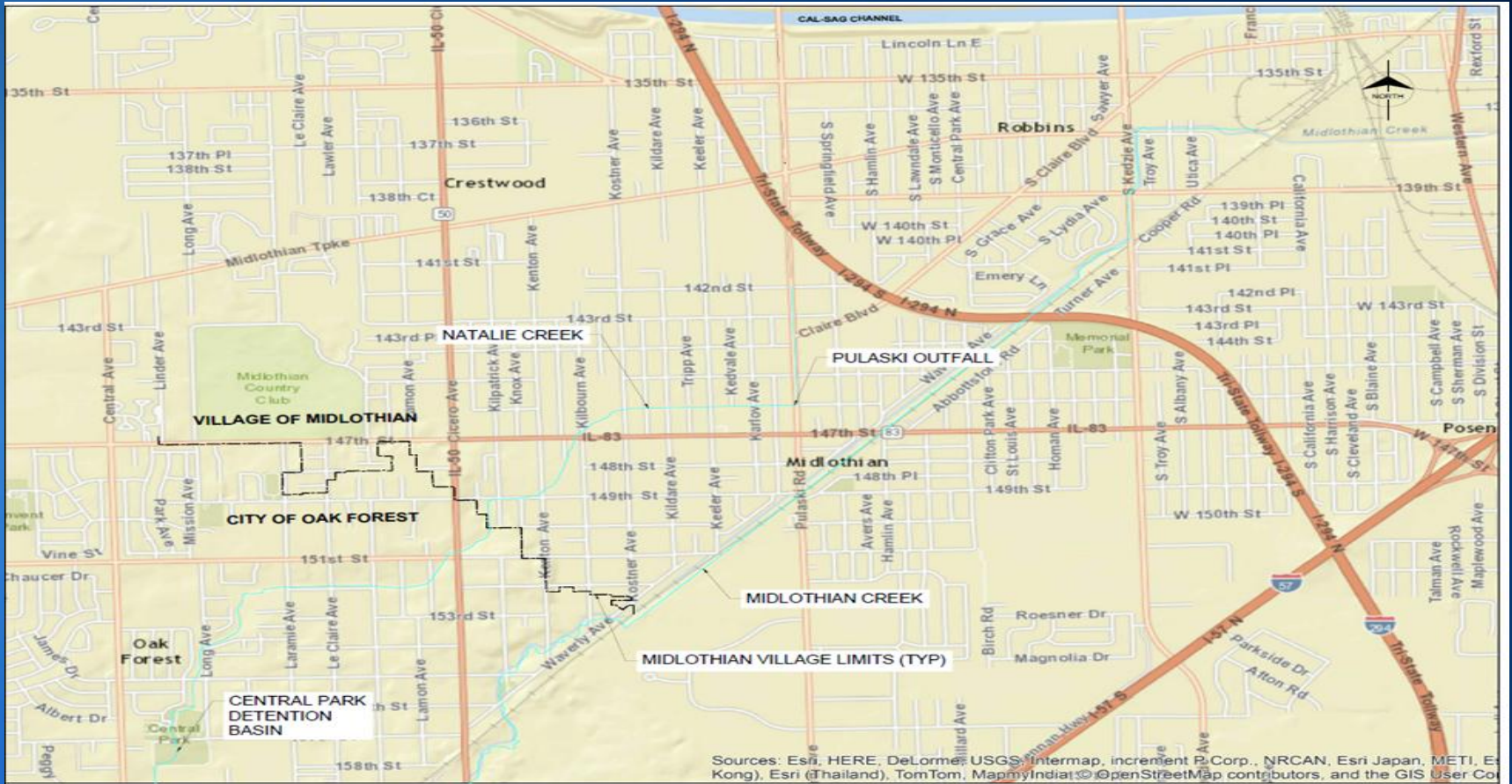


Community Group
Leader – Ms. Helen
Lekavich

**Floodlothian Midlothian Community
Group**



Project Area



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



Project Area (Orig. DWP Phase I Project)

Figure 3.4.11

**MIDLOTHIAN CREEK
ALTERNATIVE
NTCR-G1
Little Calumet River DWP**

Alternative Description:
Construct a 190 ac-ft detention facility at
Leclaire Avenue and 153rd Street and a 6600
LF diversion conduit from Kilpatrick to
Keystone Avenue

Conceptual Level Cost:
\$61,940,000
Benefit: \$14,700,000
B/C Ratio: 0.24

* Candidate Structures for
Floodproofing/Acquisition

Regional Problems

- Bank Erosion
- ▲ Maintenance
- Overbank Flooding
- Pavement Flooding

Local Problems

- Bank Erosion
- ▲ Maintenance
- Pavement Flooding
- ◆ Storm Sewer Flow Restriction

— River/Stream

— Municipality

— County Boundary

▨ Project Alternative Location

■ 100-year Inundation Area With Project

■ 100-year Inundation Area Without Project

■ 100-year Inundation Area Without Project

■ 100-year Inundation Area Without Project

■ 100-year Inundation Area Without Project

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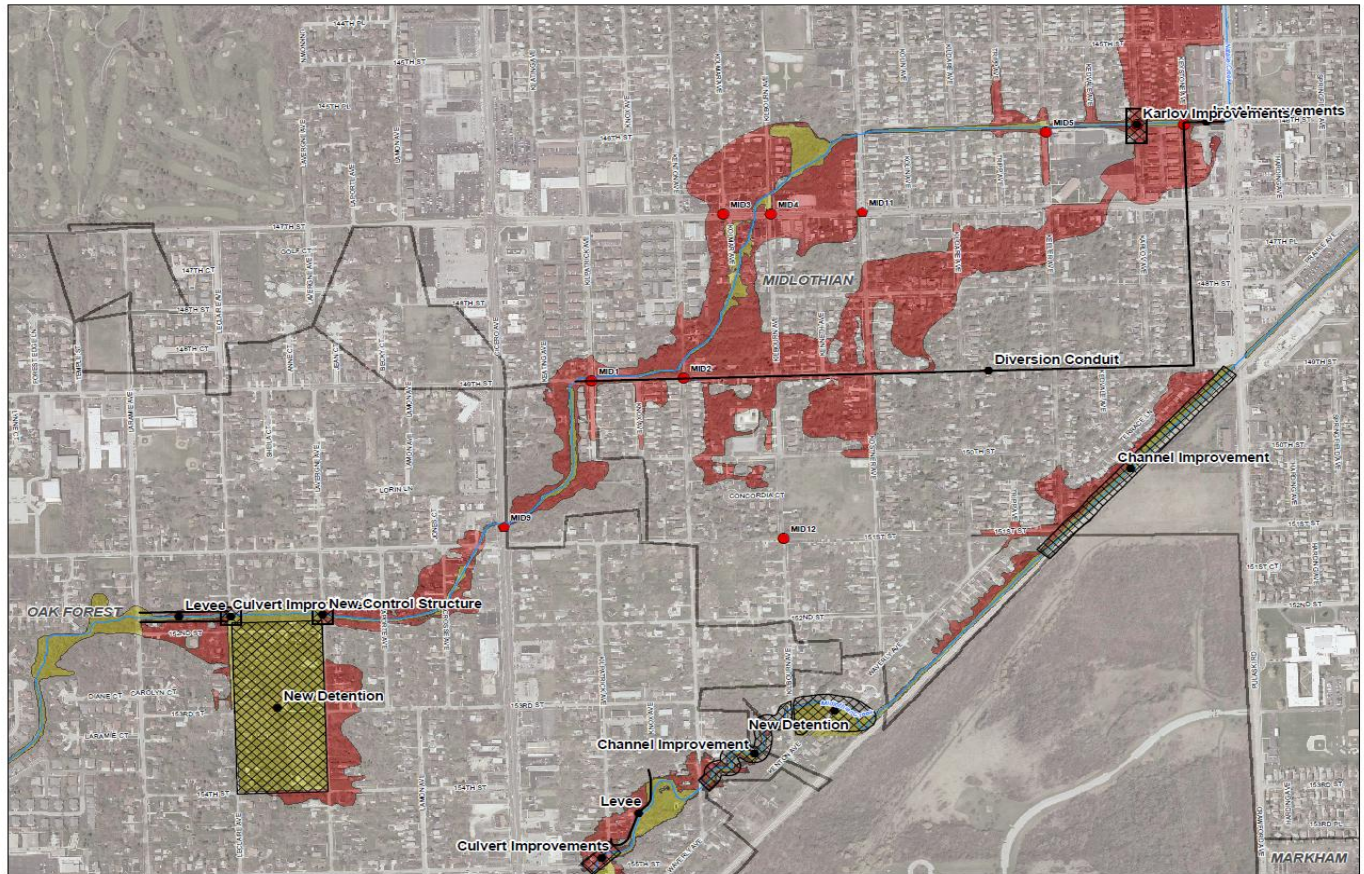
■ 100-year Inundation Area Without Project

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■ 100-year Inundation Area Without Project

■ 100-year Inundation Area Without Project



CDM

December, 2009



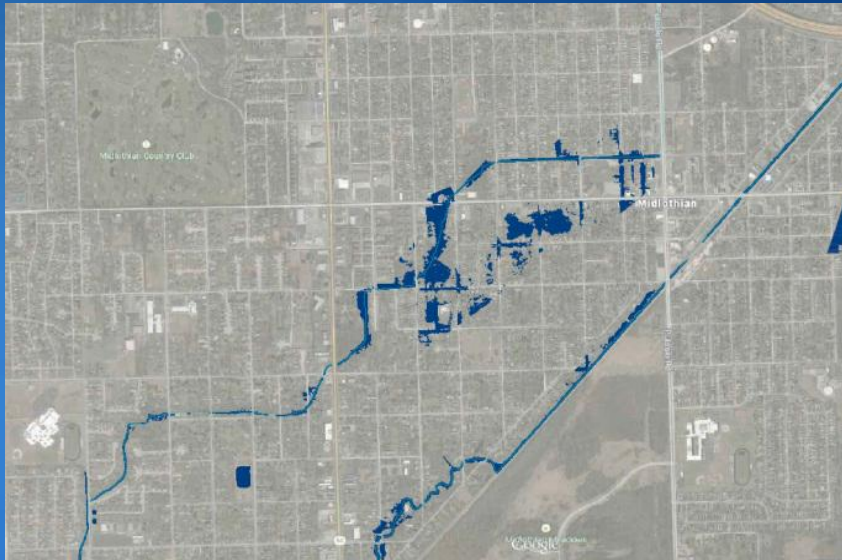


Flooding History

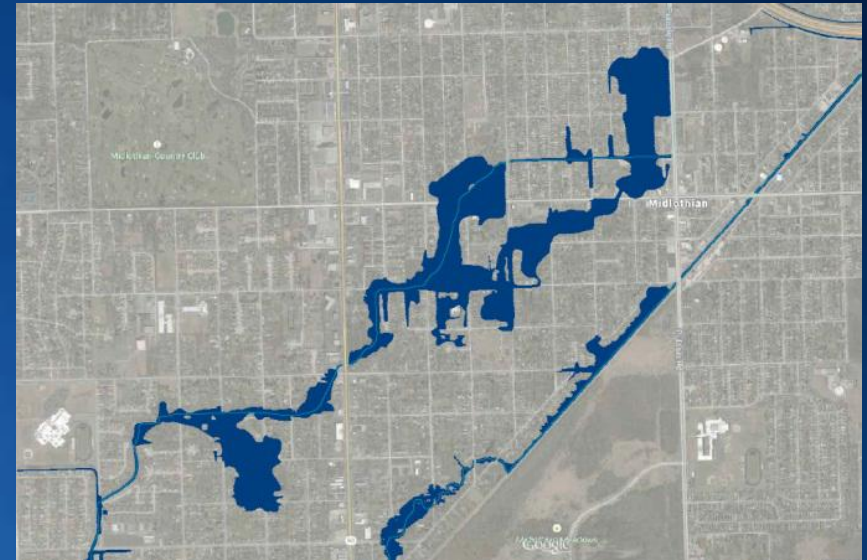
- From 1981 to 2014, the recorded Natural Hazard Flood Events the area experienced were:
 - One – 100 Year Storm, Two – 50 Year Storms, Two – 25 Year Storms, Three – 5 Year Storms, & Three – 2 Year Storms
 - The remainder were 1 Year or Less Storms out of a total of 31 events
- In 2014, the Village of Midlothian experienced flooding five times in a nine week period
 - Only 1 Year or Less Storms occurred during the nine week period
- This History reflected that the Village was flooding starting at smaller storm events



Flooding History (Con't)



10 Year Storm Event



100 Year Storm Event



Flooding along the Creek at 149th Street
between Kilpatrick & Knox – 7/12/2014



The 149th Street (concrete channel) between Kilpatrick & Knox during Dry Weather



Coordination w/affected Stakeholders/ Project Partners

- MWRDGC & BMcD
Project Team worked with the following groups:
 - City of Oak Forest
 - Village of Midlothian (RainReady Midlothian Steering Committee)
 - Robinson Engineering, Ltd. (Midlothian's City Engineer)
 - United States Army Corps of Engineers
 - The Center for Neighborhood Technology
- List Con't:
 - Floodlothian Midlothian Community Group & Affected Area Residents
 - Forest Preserve District of Cook County
 - Cook County Department of Transportation & Highways
 - United States Geological Survey



Resident Concerns

- Study Results established in MWRDGC's Little Calumet River Detail Watershed Plan (Alternative NTCR-G1) & Information provided by the Affected Stakeholders/Project Partners were key in H&H model revision & verification,
- And in helping the Project Team to fully understand the Residents' expectations & concerns
 - Reduce the Frequency of Flooding
 - George Dunne National Golf Course Flooding Effects on the Project Area
 - Possible Central Park Detention Basin Modifications



Improvements Evaluated

- BMcD developed a list of 96 potential flood control improvements which involved:
 - Diversion Conduits
 - Detention Ponds
 - Culvert Upsizing
 - Creek Modifications
- Potential flood control improvements were incrementally added to the model in ever increasing flood control benefit configurations until a potential 100 Year Storm protection Alternative was achieved



Investigation (Model) Results

- Existing system provides less than a 2-year level of storm protection
- Channel Improvements are Required
 - Remove Channel Restrictions (including restrictive retaining walls)
 - Restore/Stabilize Degraded (eroded) Channel Banks
 - Remove Sediment Build-Up in Culverts
- Culvert Improvements are Required
 - Culverts located in the City of Oak Forest have adequate open area to convey flow downstream
 - Culverts located in the Village of Midlothian are typically smaller (restrictive)
 - Restrictive culverts are severely affecting the flow of water through Natalie Creek and are contributing to the flooding being experienced by the Village



Left: Sediment Build Up at Laporte Ave.
Right: Non-Engineered Rip Rap at Laverne Ave.



Left: Restrictive 149th St. Culverts
Right: Restrictive Kilpatrick Ave. Culvert at 149th St.



Investigation Results (Con't)

- George Dunne National Golf Course

- Model was done to simulate the golf course as a forested area in order to compare the effects on Natalie Creek
 - *Model showed that the golf course had almost no effect on the water surface elevation (WSEL) downstream*
 - *Primary reason for flooding is due to runoff from developed areas downstream of the golf course and Central Park Detention Basin*

- Central Park Detention (CPD) Basin

- The CPD Basin was designed for a 100-year event
 - *Modeling was performed to simulate the effects of lowering the spillway. Results showed only slight impact on flood elevations downstream.*
 - ***Other improvements such as culvert enlargements and detention will better mitigate the flooding effects of minor storms such as the 2-year storm event***



Left: George Dunne National Golf Course
Right: Central Park Detention Basin



Alternative Comparison

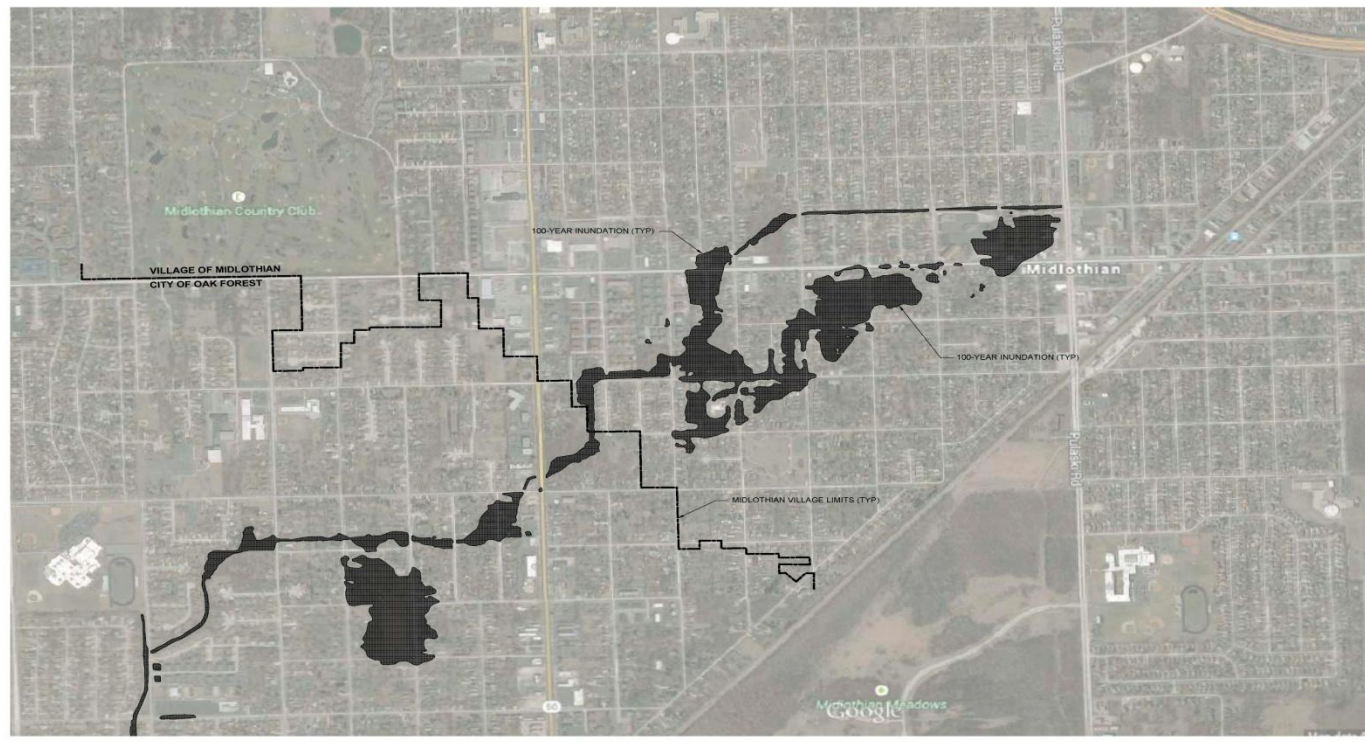
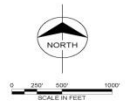
- From the 96 Potential Improvements, Six (6) Alternatives were Developed & Investigated
 - Cost ranged from \$5.8 to \$56.1 Million (M)
 - Storage (Detention Pond) Alternatives ranged from 3 to 150 Acre-Ft (50M Gallons)
 - Total Structures Protected ranged from 208 to 391
- Recommended Alternative will provide a 25-year level of Storm Protection
 - Estimated Construction Cost - \$8.3 M (\$9 M including O&M costs)
 - Structures Protected – 237
 - Conveyance (Channel) Improvements – 5500 Feet
 - Storage (Detention Pond) – 3 Acre-Ft (1M Gallons)
 - Upsizing of Culverts at six different locations



PDR Summary	10-Yr. LOS	25-Yr. LOS	30-Yr. LOS	45-Yr. LOS	50-Yr. LOS	100-Yr. LOS
Sediment Removal	2 Culverts	2 Culverts	2 Culverts	2 Culverts	2 Culverts	2 Culverts
Upsizing Culverts	5 Culverts	6 Culverts	6 Culverts	5 Culverts & 1 Open Channel	5 Culverts & 1 Open Channel	5 Culverts & 1 Open Channel
Bank Stabilization	3000 LF	3000 LF	3000 LF	3000 LF	3000 LF	3000 LF
Creek Widening	200 LF	200 LF	200 LF	200 LF	200 LF	200 LF
Channel Reshaping	2300 LF	2300 LF	2300 LF	2300 LF	2300 LF	2300 LF
Detention Requirements	0	2.9 Acre-Ft	67.9 Acre-Ft	88.8 Acre-Ft	98.6 Acre-Ft	152.4 Acre-Ft
Diversion Conduits	N/A	N/A	60 inches	60 inches	60 inches	30 & 60 inches
Structures Protected	208	237	243	249	251	391
Estimated # of Property Acquisitions Required	0	8 Vacant Land	11	16	23	23
Cost	\$5.8 M	\$9 M	\$24.2 M	\$32.1 M	\$35.3 M	\$56.1 M
B/C Ratio	0.52	1.30	0.51	0.37	0.35	0.22



1 2 3 4 5 6 7 8 9 10 11 12 13 14



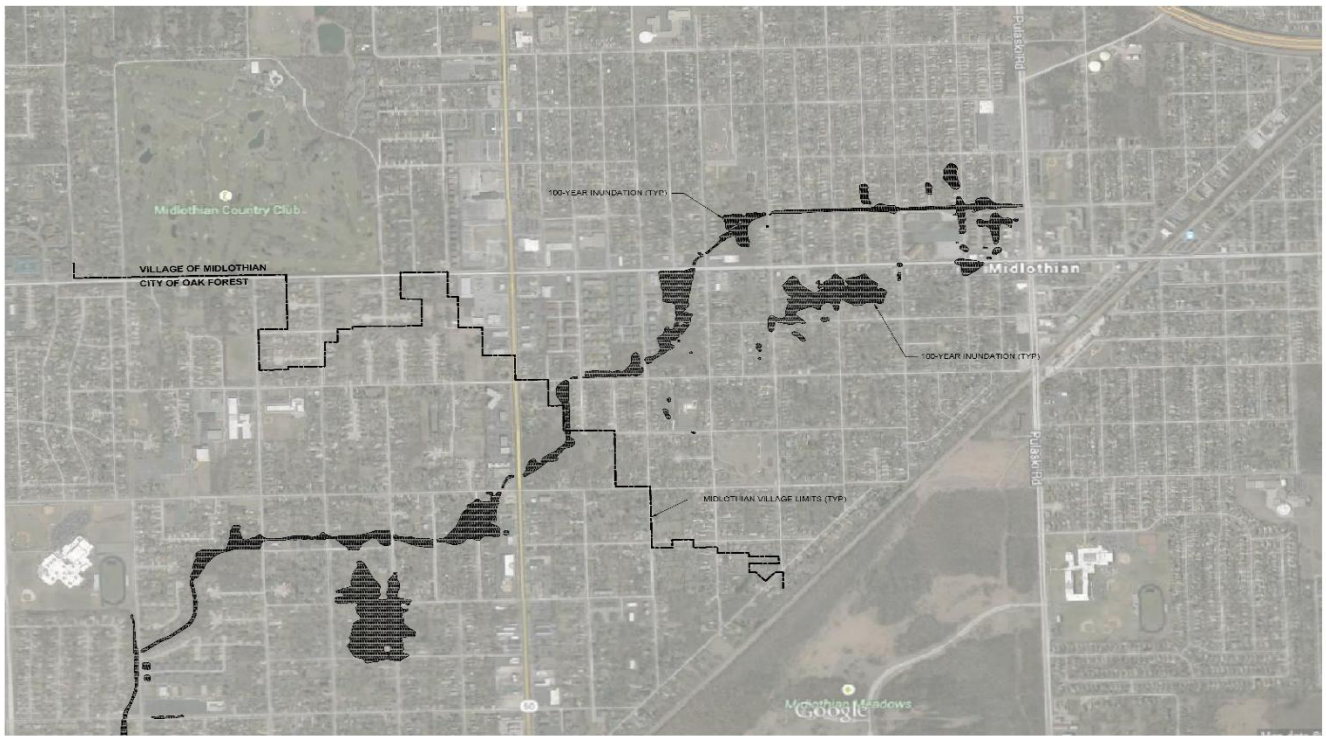
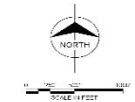
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BURNS & MEDONNELL			
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<small>date</small>	JUNE 2015	<small>designed</small>	M. DUNLOP
<small>designed</small>	J. PATTERSON	<small>checked</small>	A. BRYANT
NATALIE CREEK FLOOD CONTROL PROJECT			
EXISTING CONDITIONS / 100-YEAR STORM INUNDATION EXHIBIT			
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<small>drawing</small>	A-15	<small>rev.</small>	
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SCALE

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PROJECT: MIDLOTHIAN CREEK FLOOD CONTROL IMPROVEMENTS
DRAWN BY: J. PATTERSON

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1471 CRENSHAW BLVD SUITE 400
DOLANSVILLE, PA 15032
TEL: 717-352-9200
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date	JUNE 2015	designed	M. DUNLOP
designed	J. PATTERSON	checked	A. BRYANT

NATALIE CREEK FLOOD CONTROL PROJECT 25-YEAR IMPROVEMENTS / 100-YEAR STORM INUNDATION EXHIBIT I			
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Summary

- **Keys to a Successful Preliminary Engineering Study:**
 - Coordination w/affected Stakeholders/
Project Partners, especially Local Community Groups
 - Establishing the right Goal/Mission to meet all affected Parties' Expectations
- **Disclaimer** – This is not an approved project. The study is nearing completion and we hope to move forward with final design this summer.



Questions?

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Stormwater Management

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