

A photograph of a residential yard. In the foreground, a stone patio made of rectangular pavers leads to a garden bed filled with tall, green grasses. In the middle ground, a green metal patio set with four chairs and a small table is situated. The background shows a brick house and more trees under a clear sky.

RainReady Midlothian

Interim Report

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PREPARED BY
THE CENTER FOR NEIGHBORHOOD TECHNOLOGY

JUNE 2015



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MIDLOTHIAN STEERING COMMITTEE

CO-CHAIRS

Karen Kreis	Resident + Village Trustee
Joe Sparrey	Resident + Public Works Superintendent

MEMBERS

Jeff Koza	Village Engineer, Robinson Engineering
Helen Lekavich	Resident + Founder of Floodlothian Midlothian (FM)
Mary Chiz	Resident + Floodlothian Midlothian (FM)
Ruben Pesina	Resident + Floodlothian Midlothian (FM)
Chris Parker	Business Owner + Floodlothian Midlothian (FM)
Jerry Gillis, Jr.	Resident + Village Trustee
Carl Ivan	Resident + Chairman, Midlothian Beautification Committee + Village Trustee

ABOUT CNT

RainReadySM is an initiative of the Center for Neighborhood Technology (CNT). As an award-winning innovations laboratory for urban sustainability, CNT is dedicated to taking on big challenges, starting in small places. CNT helps make neighborhoods, cities, and regions work better, for everyone.

INTRODUCTION

Since September 2014, the Center for Neighborhood Technology (CNT) and the US Army Corps of Engineers (USACE) have worked closely with the Village of Midlothian and a variety of community and agency partners to assess the cause and characteristics of chronic urban flooding in Midlothian, a southwest suburb of Chicago. During this time, data has been collected through a resident survey, expert analysis of existing storm sewer systems and watershed topography, a newly installed streamflow gage on Natalie Creek, as well as archived and recent precipitation data from the National Oceanic and Atmospheric Administration (NOAA); the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS); the Cook County Rain Gage Network and the United States Geological Survey (USGS) monitoring station at Midlothian Creek in Oak Forest.

Additionally, CNT reviewed prior and current Village plans related to stormwater management, including the following:

- Midlothian Village Center Plan (2005)
- Midlothian Village Center Plan, led by students at the University of Illinois at Chicago (UIC)
- Phase II Project on Natalie Creek commissioned by the Metropolitan Water Reclamation District of Greater Chicago (MWRD) (planned 2016)
- Cal-Sag Tributary C Preliminary Engineering Plan (2015)
- The Midlothian Creek Green Infrastructure Plan (2013)
- Illinois Green Infrastructure Grant-Funded Greenway Project (2015)
- Active Transportation Plan (2011)
- The Cicero Corridor Commercial Revitalization Plan, led by students at the UIC (2014)
- Regional Transportation Authority-funded study of transit-oriented development (TOD) opportunities around the Midlothian Metra Station (2012)
- The Kedzie Corridor Commercial Revitalization Plan, led by students at the UIC (2014)



These plans highlight the considerable effort already made toward community resilience in Midlothian. The RainReadySM approach builds on these plans. USACE provided technical expertise to inform the community risk assessment, and solutions are being explored that emphasize speedy implementation and community-driven action.

Household flood impact data amassed through a RainReady survey of 253 residents enabled a more nuanced assessment of the source and quality of flooding across the village. When mapped, these data points begin to paint a picture of the scope and severity of the resilience challenge in the Midlothian community.

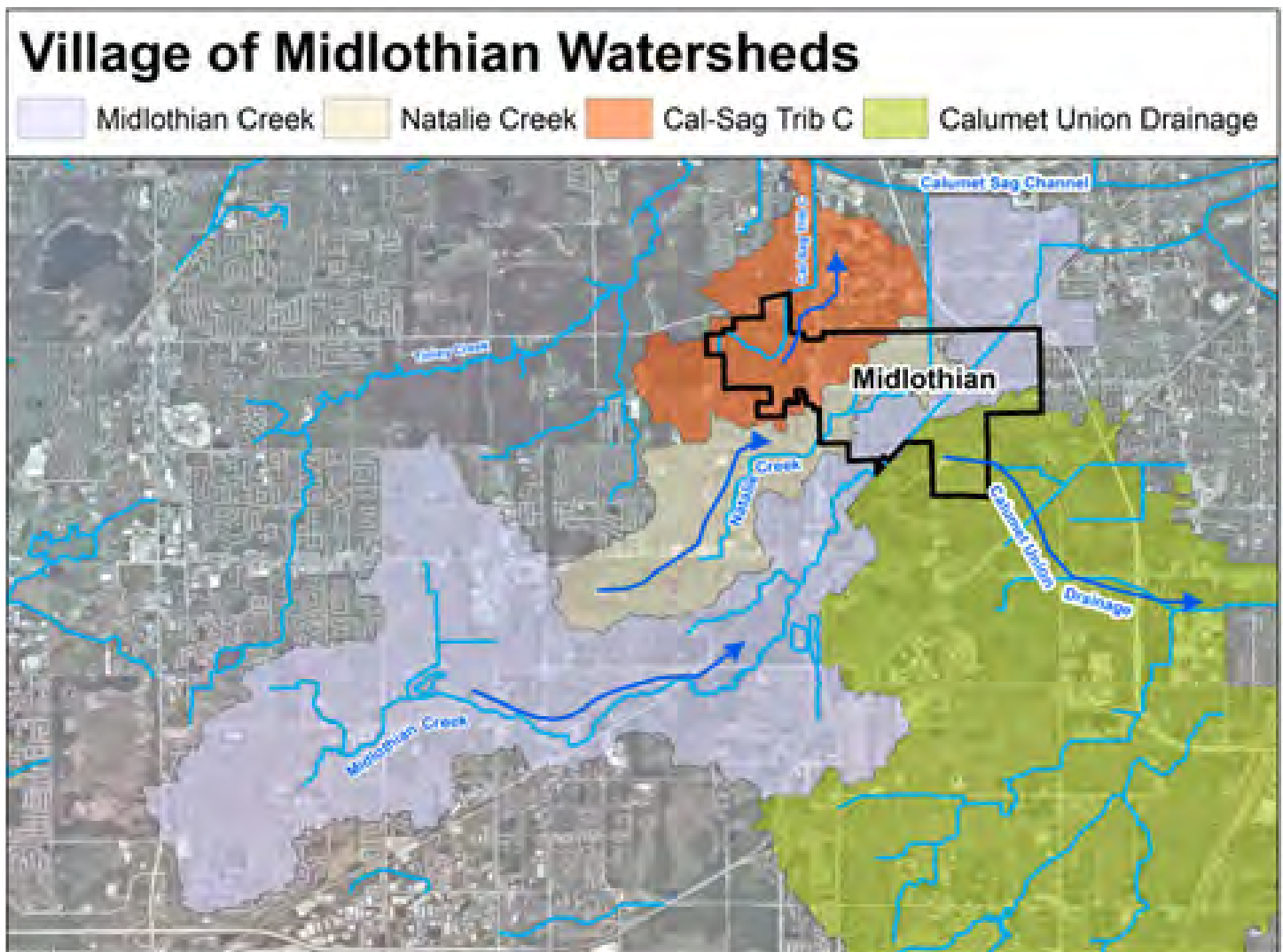
With the RainReady Community planning process underway, the RainReady Home team has begun conducting home assessments for select Midlothian residents. Through this program, owners of single-family homes who have experienced repeated basement flooding related to sewage backup and seepage receive customized guidance on how to retrofit their home to ensure it is RainReady.

The Midlothian RainReady Steering Committee was

established in April 2014 with the objective to guide and oversee the RainReady Community planning process as managed by CNT staff and partner organizations. CNT will report to the Steering Committee throughout the planning process, and transition responsibility for implementation to the Committee throughout 2015.

This interim report summarizes and synthesizes these many sources of information collected to date,

and begins to identify opportunities for intervention to support resilience in Midlothian. The RainReady Plan for Midlothian is expected to be completed in September 2015. This work is generously supported with grants from The Boeing Company, the Grand Victoria Foundation, the Joyce Foundation, the Charles Stewart Mott Foundation, the Prince Charitable Trusts, and the Surdna Foundation.



EXECUTIVE SUMMARY

According to the historic record, flooding in Midlothian is not a new problem. The village is comprised of four watersheds, located where the boundaries of ancient Lake Chicago created a small plateau in the surrounding topography. Like much of Chicago, the local ecology was characterized by meandering creeks and marshland prior to urbanization. When the area began to develop in the mid 20th century, the creeks were channelized and much of each watershed was paved over, creating an additional challenge for urban water management. In the last decade, the flood risk inherent to Midlothian's natural ecology and its increasingly impervious watershed has been amplified by aging infrastructure and higher intensity storm events. Midlothian residents and businesses frequently experience damaging floods from relatively minor storm events.

Figure 1 on the next page depicts these four main sources of flooding and their scope of impact (street/yard or inside structures).

According to survey data collected from 253 Midlothian community members, the majority of flood victims live outside of FEMA-designated floodplains. The survey also made clear the impact of flooding on overall quality of life in Midlothian. Flood damages were cited as a common cause of foreclosures and abandoned properties in the village. Flood victims reported feelings of isolation and anxiety associated with flooding, sleeplessness on rainy nights from fear of basement flooding, and general frustration with the perceived inaction of municipal leaders.

Previous plans for economic revitalization, transportation improvements, and green infrastructure opportunity mapping have all acknowledged the profound impact of flooding on the vitality of Midlothian. Given the scope of flooding outside of FEMA-designated floodplains, village documents make a distinction between the floodplain, and the 'floodway,' the area where flooding actually occurs. Recent plans prioritize development outside of

URBAN FLOODING TAKES FOUR PRIMARY FORMS IN MIDLOTHIAN

1

OVERBANKING FROM NATALIE CREEK

Relatively minor storm events upstream in the watershed can cause flooding near the banks of the creek, causing destruction and distress for those who live in the vicinity. Many residents affected by creek overbanking experience overland flooding on their property and in their basements and garages.

2

SANITARY SEWER BACKUP

Much of Midlothian experiences backup in the sanitary sewer caused by aging infrastructure in both the public and private rights of way. Damaged or improperly connected lateral lines overwhelm the sanitary sewer with rainwater during storm events ("infiltration and inflow"). The resulting sewage backup in basements or through overflowing manholes is both a nuisance and a health hazard.

3

STORM SEWER BACKUP

Portions of the storm sewer conveyance are also susceptible to backup, causing street and yard flooding. Overtopping of ditches is largely due to insufficient capacity in the drainage system and issues with the outfall to the creek downstream.

4

GROUNDWATER SEEPAGE IN BASEMENTS

In some parts of the village, high groundwater levels and overland flooding cause basement seepage, contributing to foundation rot and indoor flooding.



Solving this issue will help return some of our lost home values, and improve the atmosphere for economic development within the village.



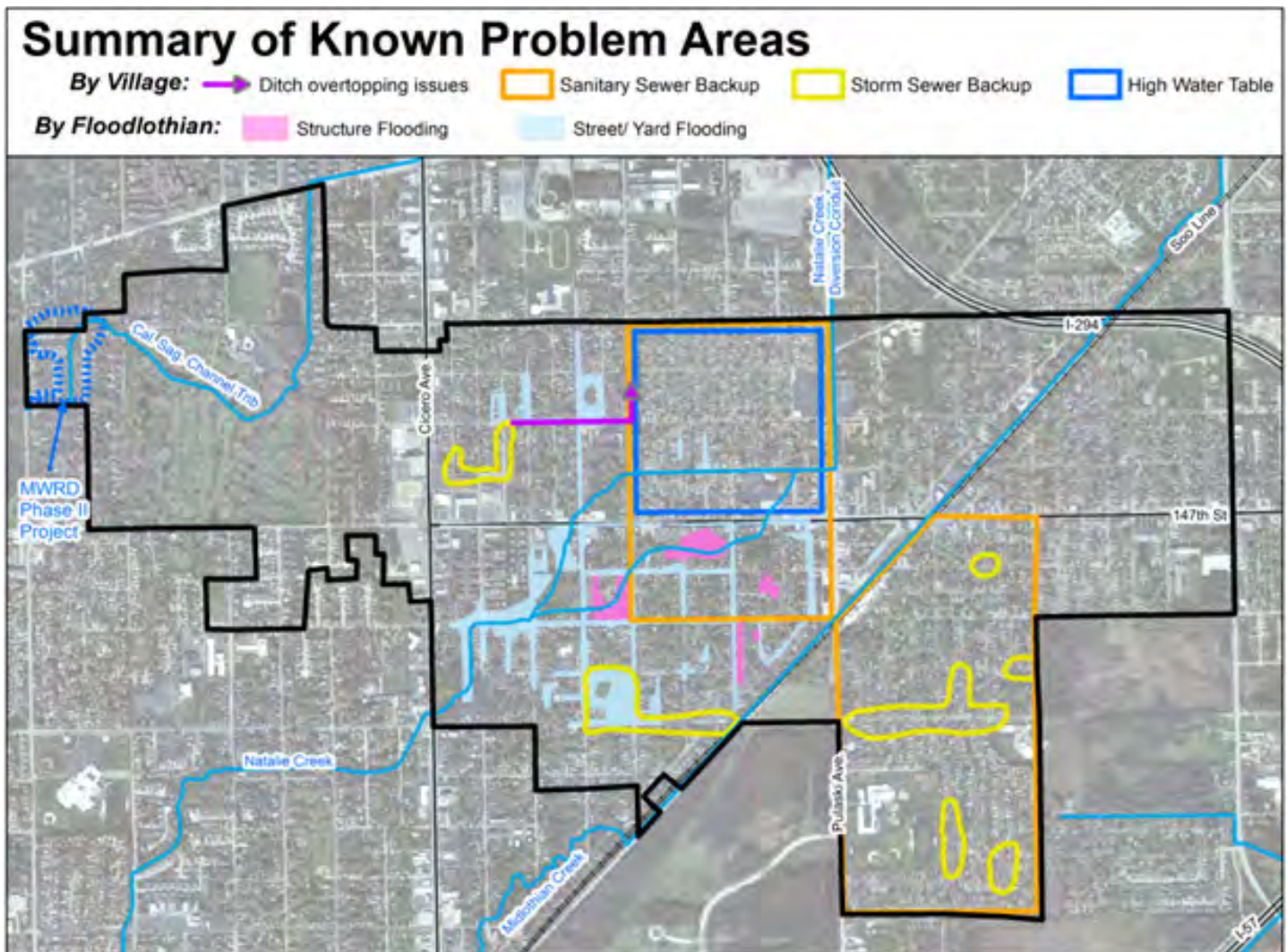
the floodway. Green infrastructure opportunities have been identified along both creeks, where recreational amenities could provide additional transportation and aesthetic benefits to the Village.

The Metropolitan Water Reclamation District of Greater Chicago (MWRD) has commissioned a Phase II Study to develop Alternatives to reduce the impact of overbanking on Natalie Creek from 153rd Street and Lavergne Avenue to 146th Street and Pulaski Road. The plan builds on a prior study completed during the 2009 Little Calumet

River Detailed Watershed Plan (DWP). The current planning process is expected for completion in June 2015, and will be incorporated into this document and the Midlothian RainReady Plan once complete.

Another MWRD Phase II study is underway at 143rd Street and Linder Avenue. The goal of this project is to address roadway and residential flooding, as well as streambank erosion on Cal-Sag Tributary C. Alternatives under consideration include improvements to stormwater conveyance and storage.

FIGURE 1: SUMMARY OF KNOWN PROBLEM AREAS
Map courtesy of the US Army Corps of Engineers



RAINREADY COMMUNITY OVERVIEW

TEN CORE PRINCIPLES CHARACTERIZE THE RAINREADY APPROACH:

- 1 EASILY IMPLEMENTABLE AND REPLICABLE SERVICES**
We work to ensure that our programs can be widely and quickly adopted by towns and cities across America.
- 2 MARKET-BASED APPROACHES**
RainReady meets the needs of individual property owners and leverages local and private investment for wider public gain.
- 3 COMMUNITY-WIDE EFFORTS**
We bring efficiency savings by serving the whole community and addressing the multifaceted mix of flooding problems that residents face.
- 4 EVIDENCE-BASED PLANS**
The investments we recommend are prioritized based on a robust analysis of the risks property owners face.
- 5 AFFORDABLE AND FAIR PROGRAMS**
RainReady solutions can benefit everyone, wealthy and poor.
- 6 MULTI-TIERED SOLUTIONS**
Flooding problems occur at many levels, and thus action is needed at all levels – from individual residents to municipalities, regions, states, and the nation.
- 7 NO NEGATIVE DOWNSTREAM IMPACTS**
Our solutions are designed to avoid pushing stormwater runoff into neighboring homes.
- 8 NATURE-BASED SOLUTIONS**
We advocate using green infrastructure as often as possible, since it brings wider benefits to the community than large-scale, engineered fixes.
- 9 FISCAL FAIRNESS AND TRANSPARENCY**
All property owners generate stormwater runoff, so everyone should help pay for the services managing it.
- 10 PREVENTATIVE MEASURES**
We promote the adoption of zoning ordinances, permits, and incentives to encourage development consistent with RainReady practices.

In 2012, CNT started working with insurance companies, large and small businesses, state and federal agencies, municipalities, and individuals to better understand the scale and impact of flooding. Working directly with affected homeowners, we learned of the toll that repeated flooding has taken on their lives, their finances, and their health. We also identified barriers preventing flood victims from getting help, and of the inequity of that help. Working with residents from a few of the worst impacted communities, we designed and tested strategies and services, using simple technologies, to mitigate the impacts. From this, CNT's RainReady initiative was born.

Recognizing that urban flooding problems are generated by stormwater runoff from roads, parking lots, yards, and roofs across neighborhoods, RainReady Community takes a neighborhood-scale approach to addressing urban flooding. Participating neighborhoods receive an in-depth, community-wide RainReady plan. In addition to home upgrades, the plan proposes flood prevention measures that extend to streets, parkways, forest lands, and public spaces. These preventive measures include the use of porous paving, rain gardens, bioswales, and trees. The cost of each measure varies.

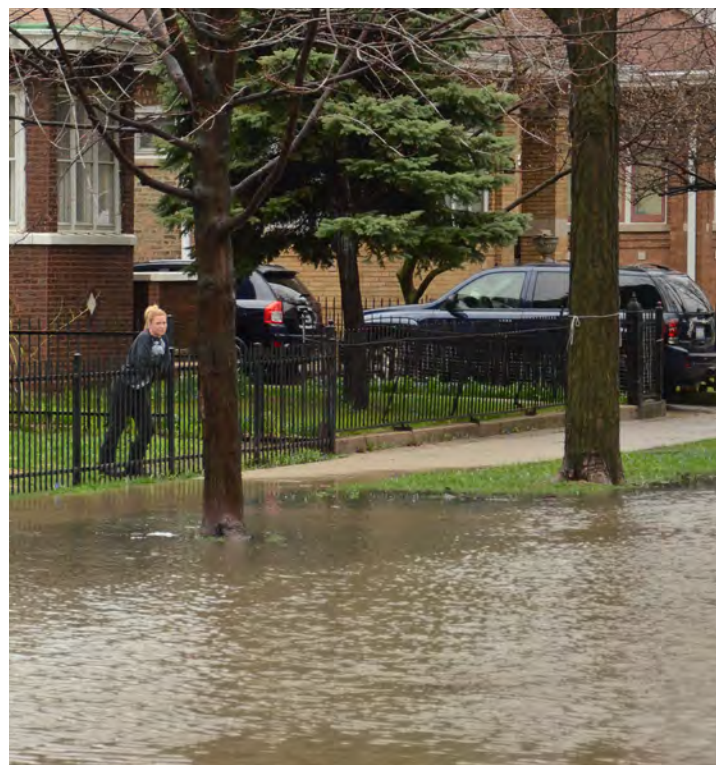


URBAN FLOODING IN COOK COUNTY

In May 2013, Cook County received a Federal Disaster Declaration due to flooding from severe storms (DR-4116). The US Department of Housing and Urban Development (HUD) determined all of Cook County to be most impacted and distressed. This series of storms overwhelmed the County's stormwater system, resulting in widespread flooding and inundation of over 30,000 basements. The Federal Emergency Management Agency (FEMA) Verified Loss totaled \$62.7 million. Of nearly 34,000 FEMA-inspected households, 35% had incomes less than \$30,000 per year; 19% were over the age of 60; and 6% had flood insurance coverage. As an indication of the magnitude of the flooding, 6,675 households had high water on the first floor of their residences (20%), and 304 had basement flooding in excess of four feet. While Cook County has obtained \$130.5 million in direct funding and other resources, unmet housing need totals \$904.6 million and affects an estimated 25,768 units (Cook County HUD National Disaster Resilience Competition; Phase I Submission March 2015). Unmet infrastructure needs also remain.

Despite its many assets, Cook County also has a disproportionate share of vulnerabilities, regionally and nationally. Industrial decline and shrinking job opportunities coupled with the foreclosure crisis in recent years have contributed to the increasing suburbanization of poverty, particularly in south suburban Cook County. The County has also experienced multiple hazard events over the last few decades and currently leads the nation in disaster fatalities. Given the confluence of these challenges and opportunities, Cook County is well positioned to drive and implement resilience within its suburban communities, starting with a south suburban pilot area, and contribute to region-wide resilience efforts in a way that builds upon existing partnerships and enhances current planning and programming initiatives. The County's approach is to focus on building the capacity for resilience: the physical capacity, individual capacity, and governmental capacity.

“When a storm of any magnitude is predicted on the weather I become ill with stress as I know that I will have either a sleepless night or will be worried while out or at work.”



HISTORY OF FLOODING

Topography and Elevation

The Village of Midlothian is composed of four watersheds (watershed boundaries provided by MWRD). Three of those watersheds include upstream drainage areas that are then transported through Midlothian: Natalie Creek, Midlothian Creek, and a tributary of the Calumet-Saganashkee Channel (Cal-Sag Trib C). A tributary of the Calumet Union Drainage Watershed begins in southeastern Midlothian, draining away into Markham. As a result of local drainage networks, Midlothian waterways are impacted by precipitation in several surrounding communities, including Oak Forest,

Tinley Park, and portions of Orland Park. In the same way, runoff in Midlothian contributes to flooding in communities further downstream. Figure 2 (next page), prepared by the US Army Corps of Engineers (USACE), identifies neighboring communities that are impacting and impacted by Midlothian watersheds – the thick blue line indicates watershed boundaries, the thin aqua line indicates creek flow, and community boundaries are indicated by different background colors. All water-ways flow toward the northeast/southeast, as seen in Figure 3 (next page).

JUNE 5, 1969

Workers clear debris and vegetation from Midlothian Creek at 147th Street and Hamlin Avenue.



MAY 17, 1974
Don Krueger and Fred Lange clear the Midlothian Creek near 146th Street after heavy rains caused flooding in the village.



Communities Impacting and Impacted by Midlothian Watersheds

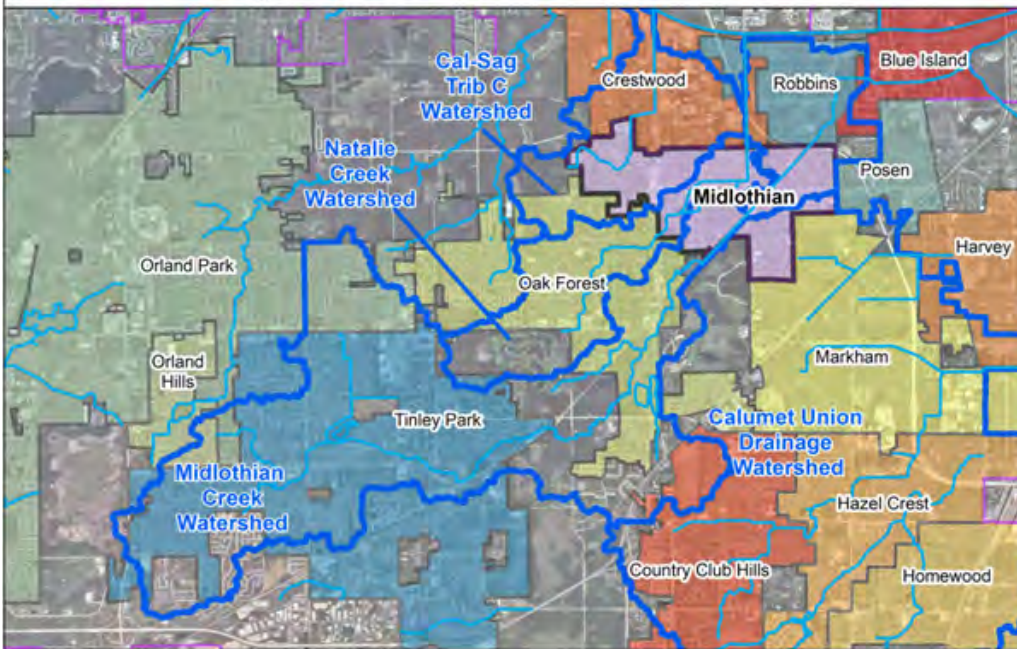


FIGURE 2: COMMUNITIES IMPACTING AND IMPACTED BY MIDLOTHIAN WATERSHEDS
Map courtesy of the US Army Corps of Engineers

Village of Midlothian Watersheds

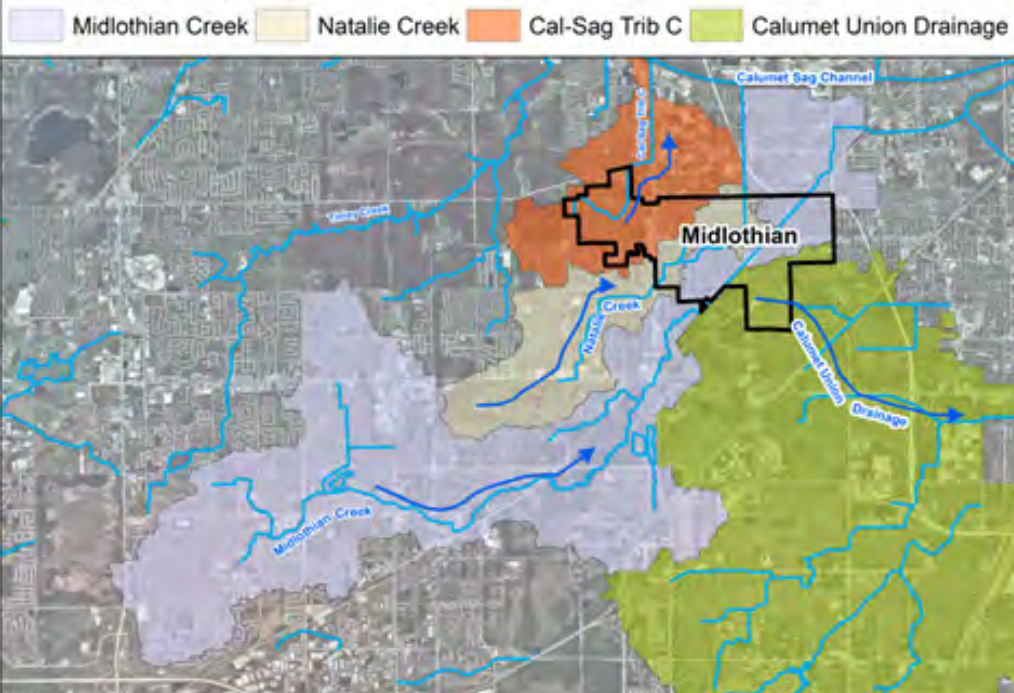


FIGURE 2: VILLAGE OF MIDLOTHIAN WATERSHEDS
Map courtesy of the US Army Corps of Engineers

In addition to Midlothian's location within these watersheds, the village is positioned at the western edge of ancient Lake Chicago. Figure 4 (USACE 2015) depicts this approximate boundary with a dashed yellow line, marking a drop-off in elevation along the western side of the village, followed by a minor plateau in elevation across the central part of the village. The relatively flat topography is responsible for some of the outfall issues in the storm sewer; the gravity-fed conveyance backs up on flat ground, causing water to pool and overflow its banks.

According to a US Geological Survey (USGS) map from 1901 (Figure 5, USACE 2015), the modern waterways of Natalie and Midlothian Creeks once formed marshlands and meandering creeks. Though the modern footprint of these creeks mimics their historic course, the gentle slope across central Midlothian could account for some of the overland flooding that occurs near the forked legs of Natalie Creek, as well as ditch overtopping on the Calumet Union Drainage Watershed near the Jolly Homes neighborhood in southeastern Midlothian.

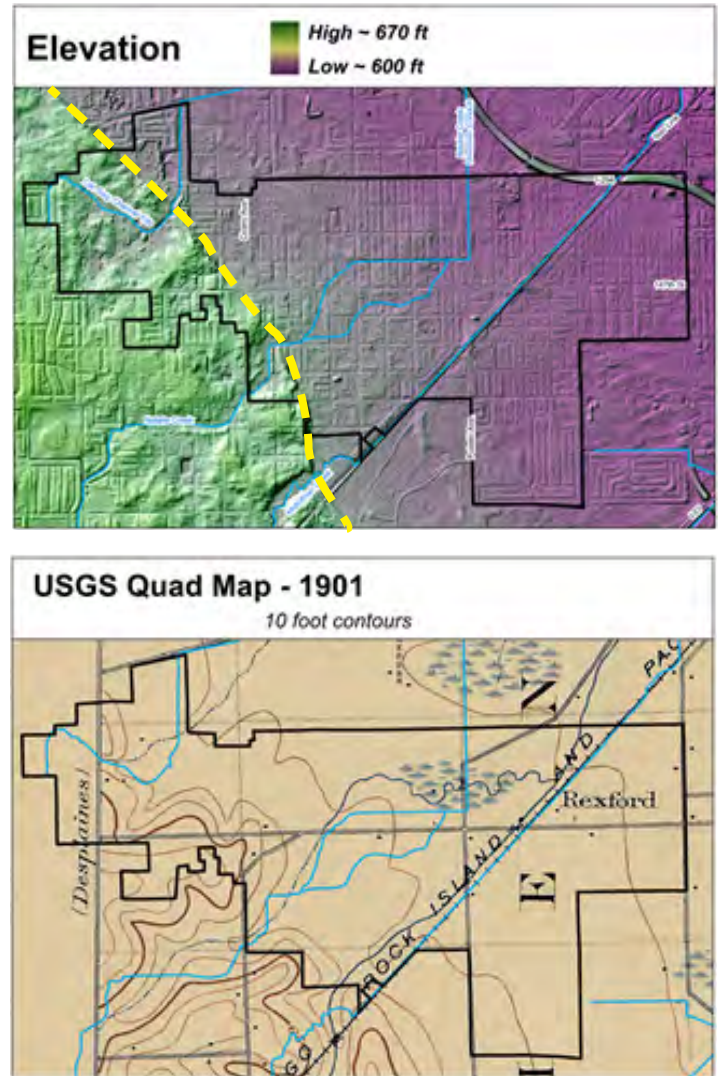


FIGURE 4 AND 5: ELEVATION; USGS QUAD MAP
Map courtesy of the US Army Corps of Engineers



MAY 17, 1974
A car drives down the 14500 block of Karlov Street after heavy flooding hit Midlothian.

Historic Development Patterns

Because of the topography and drainage systems in Midlothian, the village has been susceptible to flooding since its earliest settlement in the 1920s. Flood risk has increased over time as development decreases the total area of permeable surfaces, placing greater strain on nearby waterways.

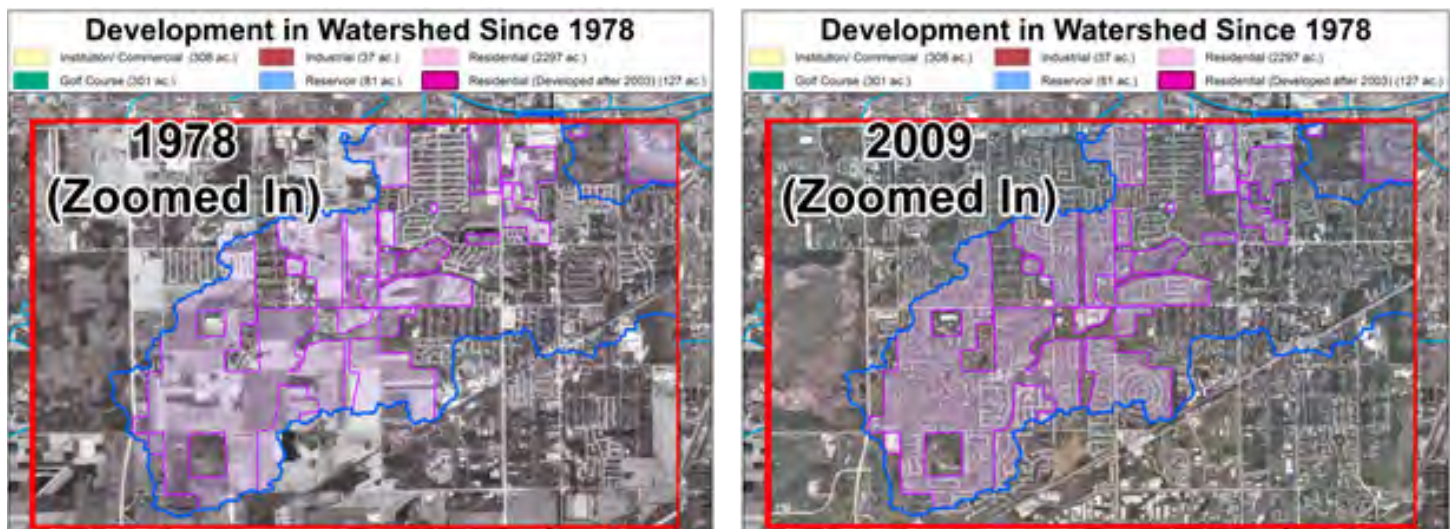
The watersheds that comprise Midlothian, like many suburban areas of Chicago, experienced a surge in residential development in the second half of the 20th century. Consider Figures 6 and 7 (USACE 2015), below, depicting aerial images of Tinley Park in 1978 and 2009. This development would have had a significant impact on the Midlothian Creek watershed. Likewise, development that occurred in Midlothian Village around the same time contributes to present-day runoff in the Natalie Creek watershed. Anticipating the impact of this development on stormwater infiltration

and retention, the Metropolitan Water Reclamation District (MWRD) passed the Sewer Permit Ordinance in 1972, requiring that the release rate of stormwater runoff on new developments not exceed the runoff rate prior to development. The ordinance applied only to developments sized five acres or greater and connected to a separate sewer. In this way, smaller developments were not subject to a stormwater requirement.

The creeks were hydromodified, channelized, and constrained to accommodate development along their marshy banks. Huge volumes of fill were imported to elevate the footings of new development. Early residents of Midlothian experienced overland flooding along the channelized creeks and marshy plateaus that characterized Midlothian's undeveloped habitat. Images on pages 5 and 7 depict flooding in suburban Midlothian in the 1960s and 1970s (Chicago Tribune Archive).

FIGURES 6 AND 7: DEVELOPMENT IN WATERSHED SINCE 1978

Maps courtesy of the US Army Corps of Engineers



Flooding Today

Residents of Midlothian have suffered flooding-related problems for decades. However, residents say the frequency and intensity of flooding has increased in the last decade, so that even small rain events result in flooded homes, garages, and streets. Over time, flooding in Midlothian has become a serious issue with severe impacts on quality of life and health in the village.

In part, the recent rise in flooding can be attributed to an increase in precipitation, particularly the high-intensity, short-duration storms associated with global climate change. According to a recent MWRD study, Cook County has experienced “above average precipitation” in seven of the last nine years (Figure 8 MWRD). The climate is changing, and Midlothian residents are experiencing a “new normal” in weather patterns.

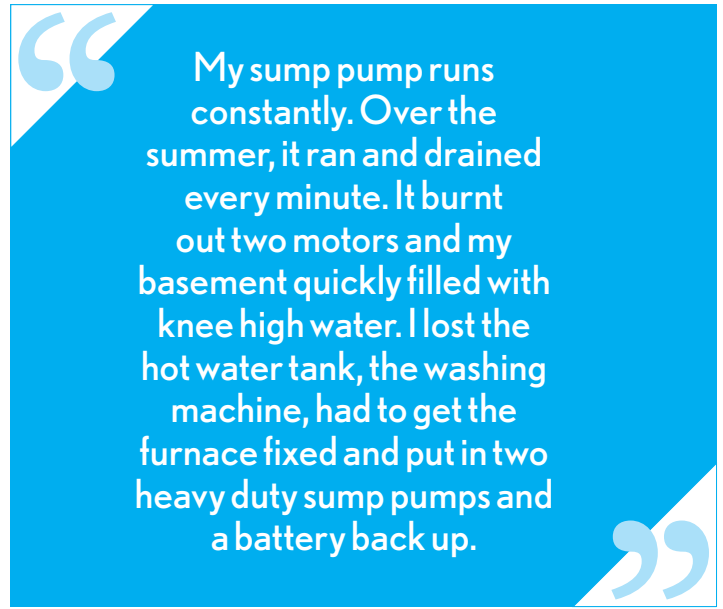
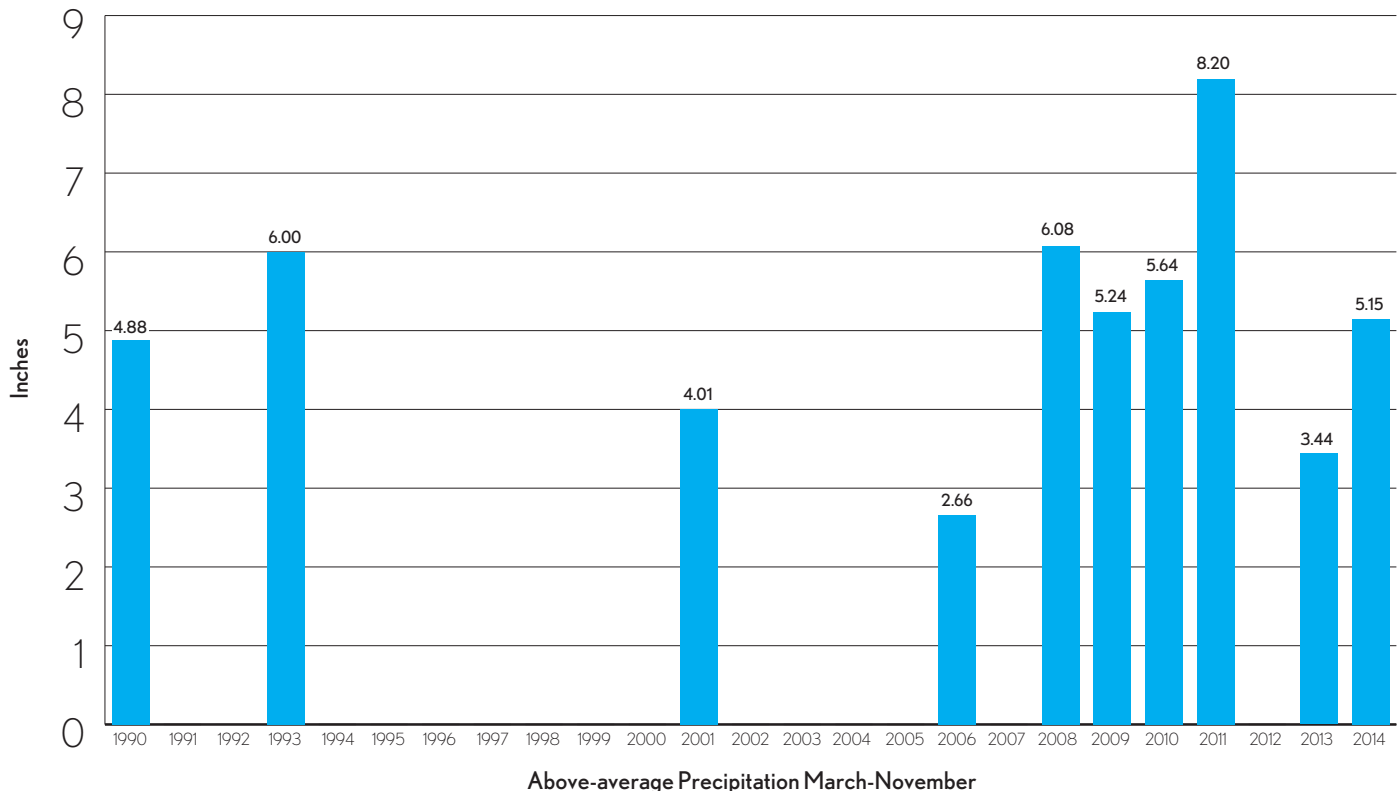


FIGURE 8: ABOVE-AVERAGE PRECIPITATION MARCH-NOVEMBER (INCHES)
Data courtesy of MWRD



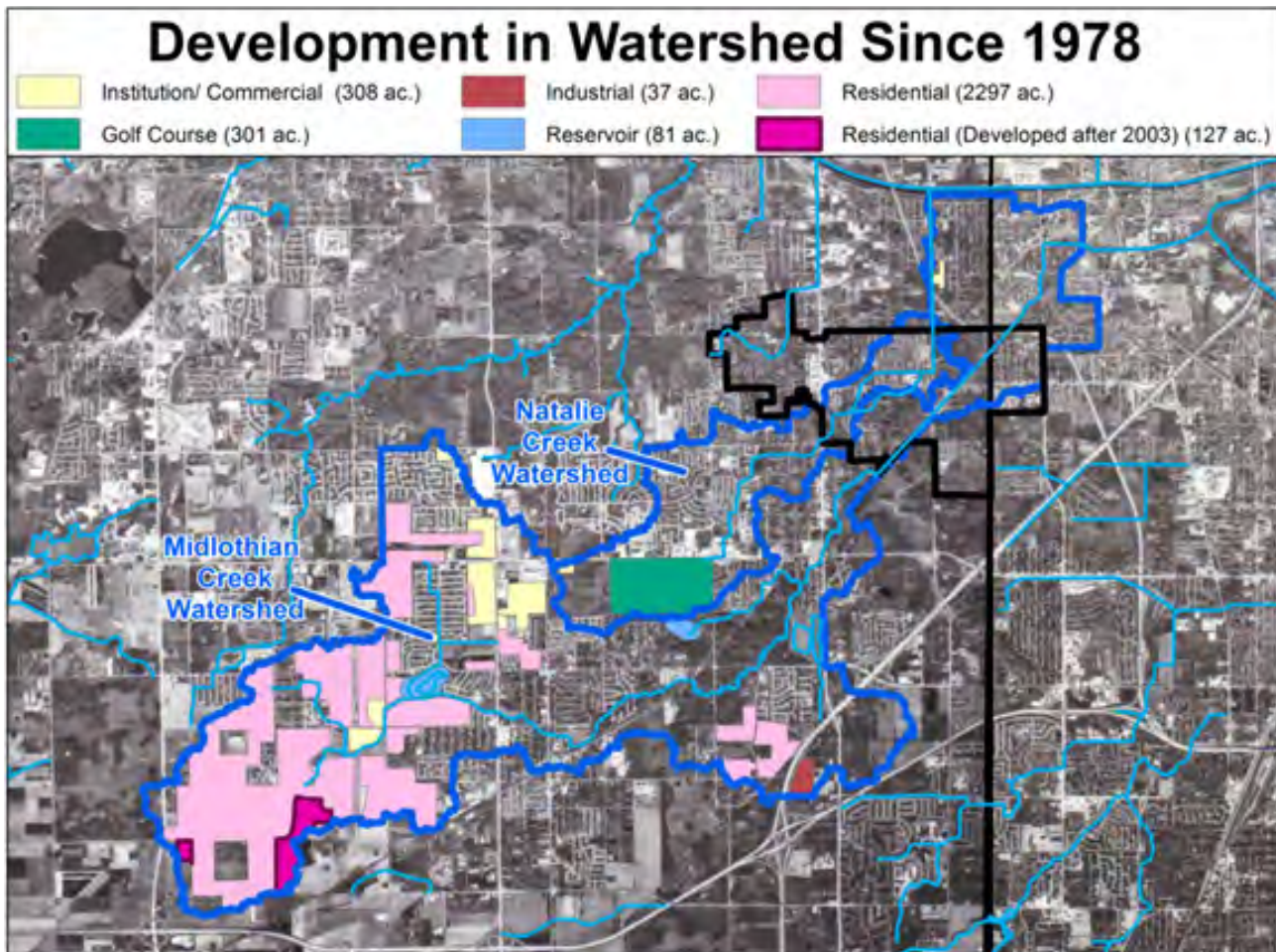
Flooding in the Watershed

As increased precipitation falls on the community, it finds fewer opportunities for retention and infiltration into the groundwater table. As noted in Figure 9 (USACE 2015) below, upstream residential development in the Midlothian Creek Watershed expanded rapidly between 1978 and 2003. In both watersheds, the net change in permeable surfaces in the watershed has been minimal over the last 10 years. The increasing intensity of overbanking flood risk in Midlothian, therefore, would be largely a result of 20th century impervious surfaces, increased precipitation, and the deterioration of infrastructure. The latter two are most likely to have experienced the greatest change in the last decade.

The most significant development in the Natalie Creek watershed since 2003 is the George Dunne National Golf Course.

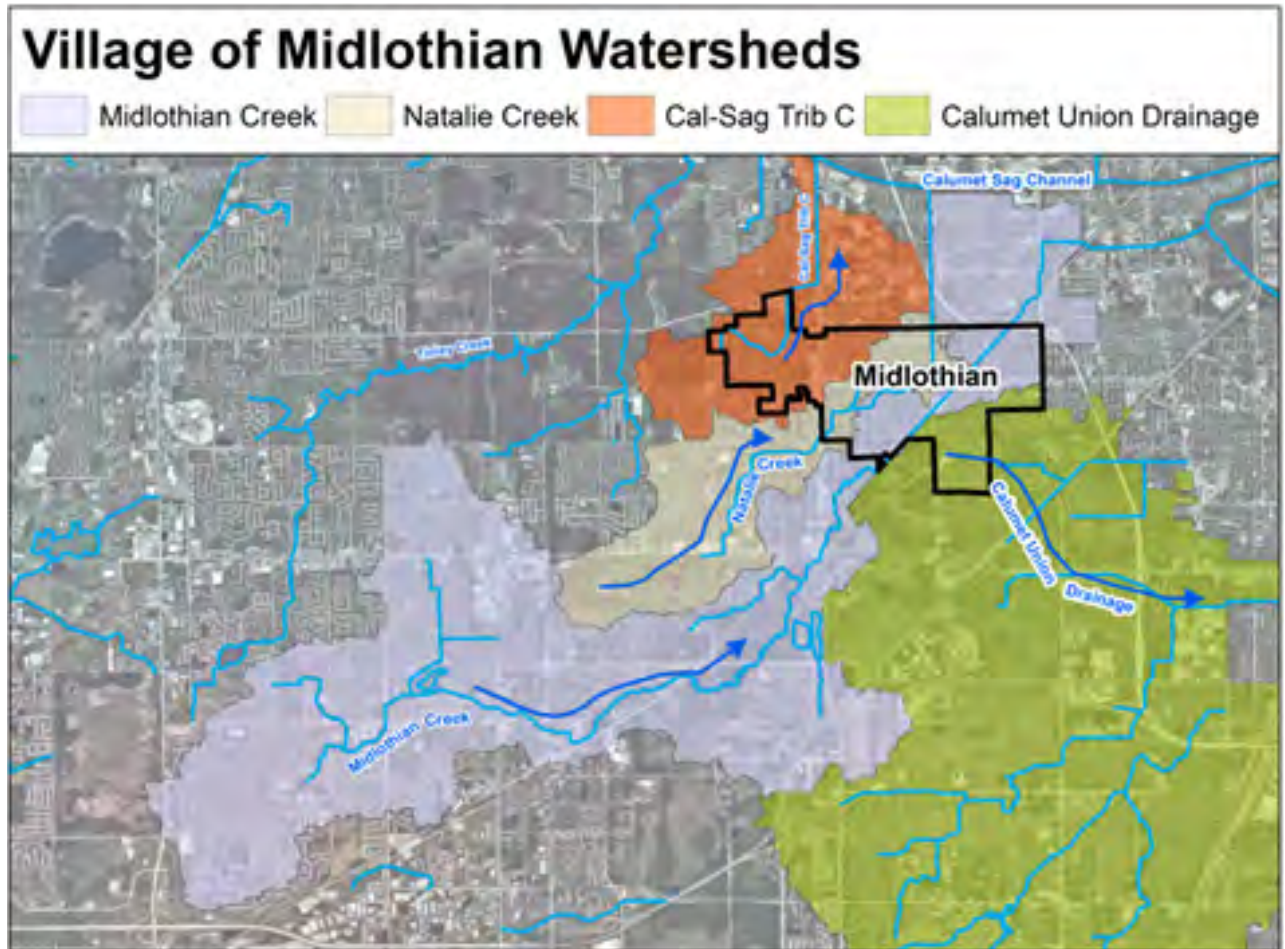
New bridges installed at Keeler, Karlov, and Keystone in 2010 helped to improve conveyance on Natalie Creek and decrease overbanking in their vicinity.

A new Cook County ordinance implemented in 2015 requires all developments larger than .5 acres to incorporate on-site retention of the first one inch of rain. It would not cover smaller developments, e.g. expansion of a driveway, garage, or a new development with a footprint less than .5 acres.



**FIGURE 9:
DEVELOPMENT
IN WATERSHED
SINCE 1978**
Map courtesy
of the US
Army Corps of
Engineers

**FIGURE 10:
VILLAGE OF
MIDLOTHIAN
WATERSHED**
Map courtesy
of the US
Army Corps of
Engineers



SEWER-RELATED FLOODING

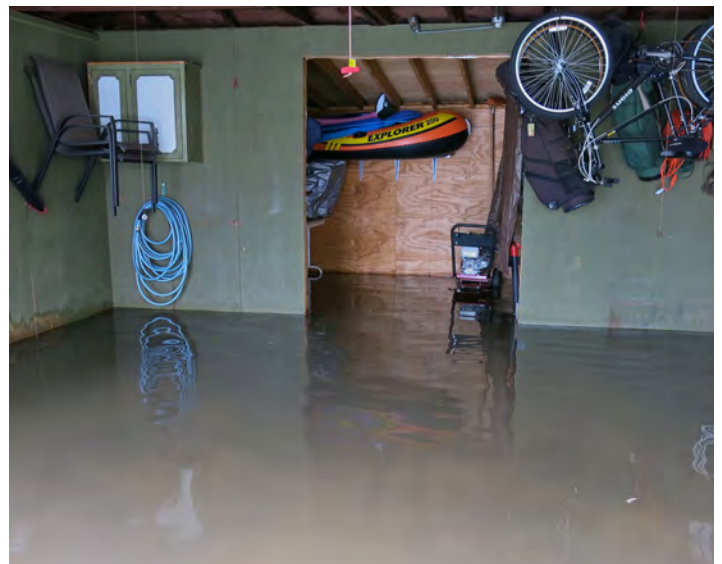
Creek overflow is not the only source of residential flooding in Midlothian. Backup in both the storm and sanitary sewer systems cause flooding of streets, yards, and buildings in the village. Figure 11 on pages 14 and 15 (USACE 2015) shows two maps depicting pipe size and direction of flow of the storm sewer and the sanitary sewer.

Storm Sewer Backup

Even during relatively minor storm events, the storm sewer system is overwhelmed, causing backup and ditch overtopping in streets and yards. This overland flooding can often cause seepage into building foundations or through basement windows. The storm sewer system is particularly prone to backup in the Jolly Homes area of southeast Midlothian, and the area surrounding Kostner Park, or “Belly Button Hill,” located near Kostner Avenue and 146th Street. In these areas, the stormwater conveyance system overflows its banks due to an outfall issue into Cal-Sag Tributary and Midlothian Creek. The ditches have insufficient capacity and minimal limited elevation change, causing backup and overbanking into nearby streets and yards. (Sewer data provided by Village of Midlothian.)



We have to stay alert when the water starts coming in. If our pump can't keep up or goes out, the water will raise too high and drown our furnace, water heater, washer and dryer. Therefore whenever it rains, someone needs to be here to monitor the pump. Our ears stay tuned to the running pump as we sleep.



Sanitary Sewer Backup

Sanitary sewer backup is common in large portions of the village. It is considered by Village staff to be largely a result of infiltration and inflow (I/I) issues on private rights-of-way. Clogged, damaged, or improperly retrofitted lateral lines connecting individual residences to the mainline sanitary sewer are known to collect stormwater, overwhelming the sanitary sewer and causing backup into basements and manholes. Lateral lines are the responsibility of the homeowner, whereas maintenance of the sewer network is under the purview of Village leadership.

Basement Seepage

Much of Midlothian has a high groundwater table, contributing to foundation seepage and basement rotting. In many homes, sump pumps work around the clock to keep the basement clean and dry, and the foundation walls experience structural damage from excess moisture.

“ We recently excavated...the inside and side perimeter of our home to put a sophisticated drainage system (cost \$32,000). We now have four sump pumps that run constantly. Even when there is little rain. ”



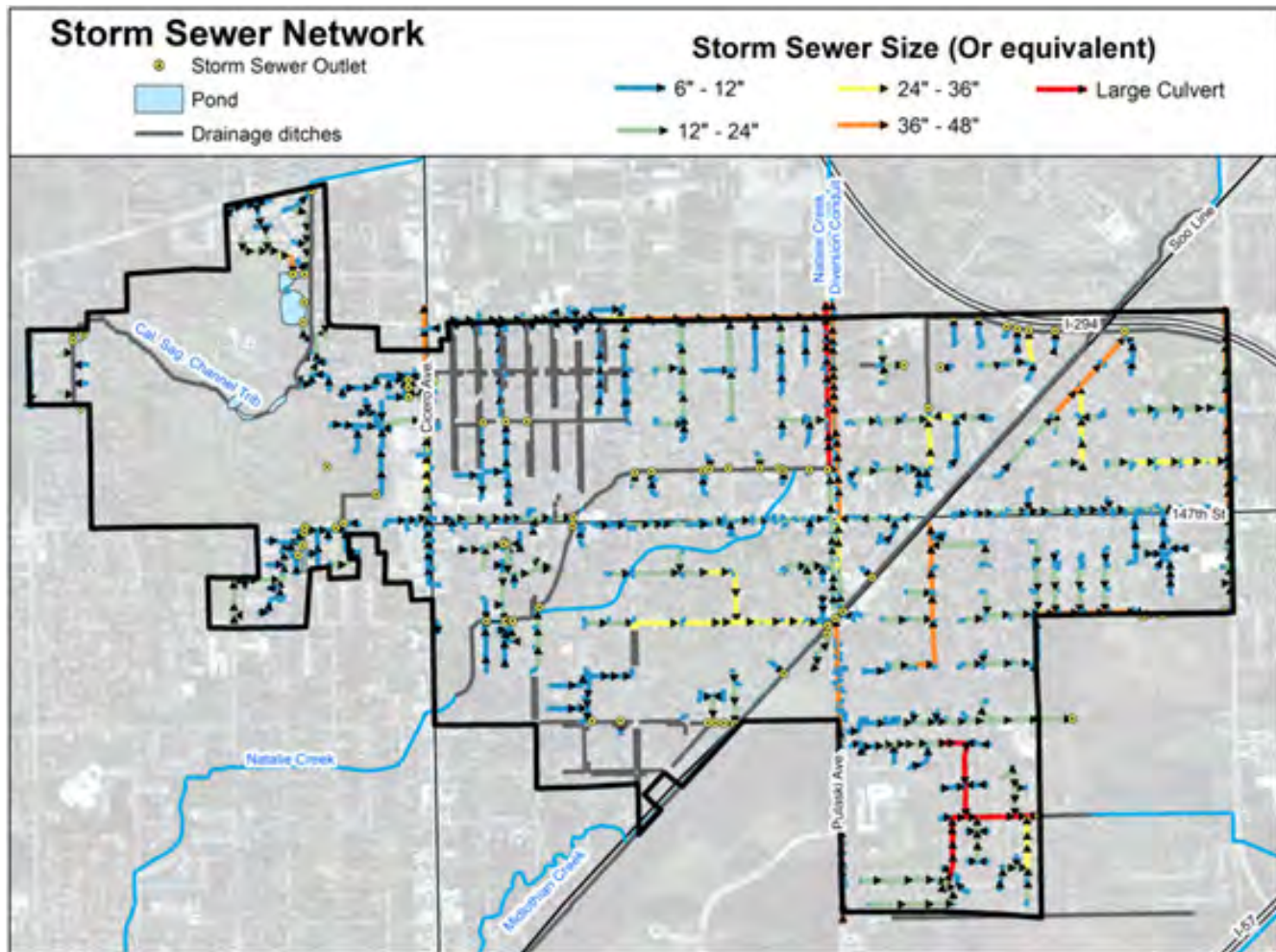
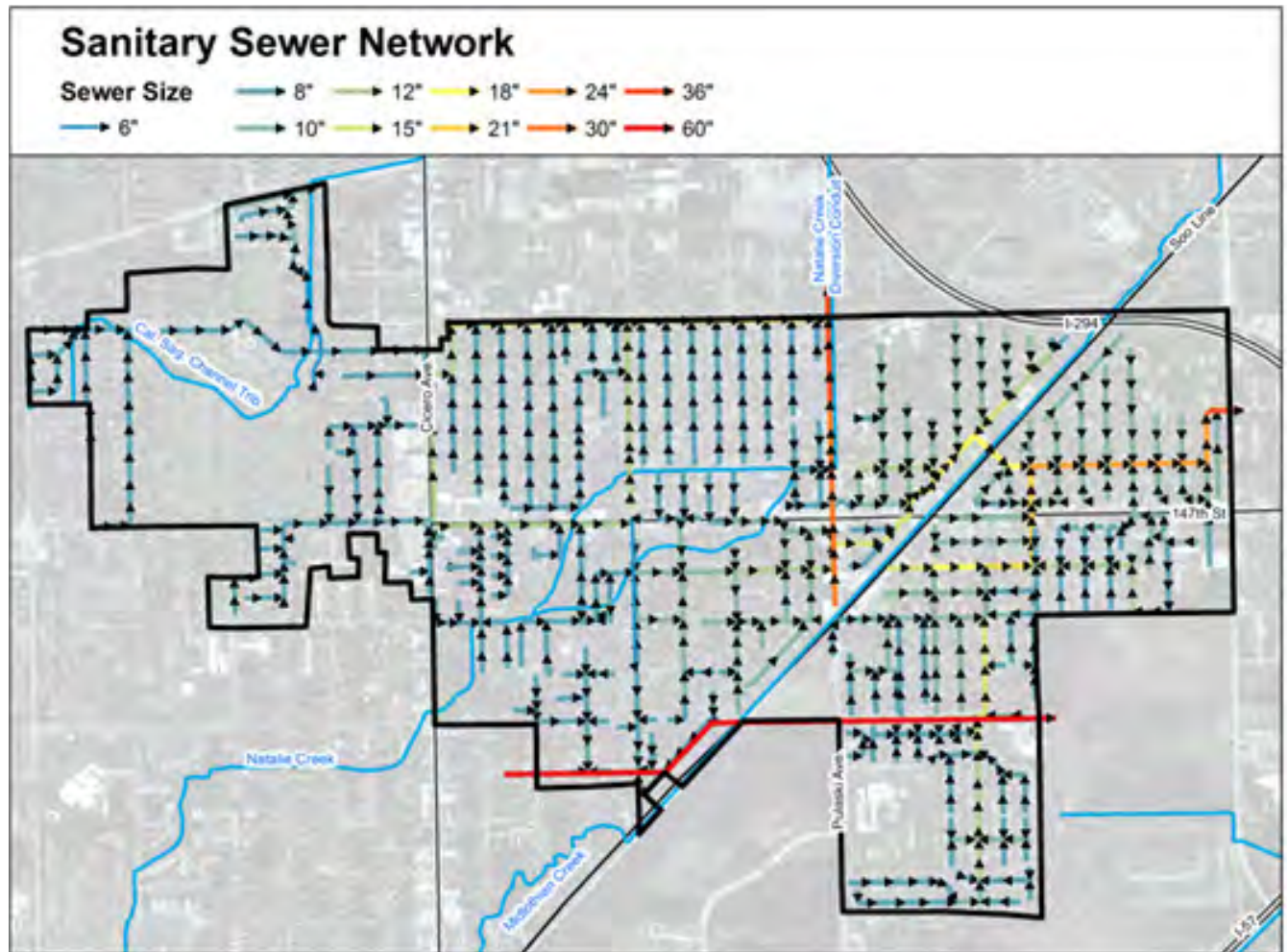


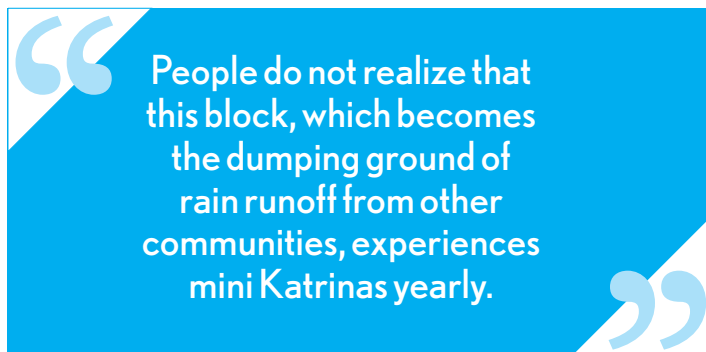
FIGURE
 11 (BOTH
 PAGES):
 STORM
 SEWER
 NETWORK;
 SANITARY
 SEWER
 NETWORK
 Maps
 courtesy of
 the US Army
 Corps of
 Engineers



MIDLOTHIAN TODAY

Today, Midlothian is comprised of just under 15,000 residents, of which approximately 62% are white, 24% are Latino and 8% percent are black (CMAP, 2014). The largest age cohort in the village is under age 18 at 31.5% of the village's population (CMAP, 2014). The median income is just slightly higher than that of Cook County at almost \$61,000 (CMAP, 2014). The village's housing stock is 71% single-family homes that were predominantly built between 1940 and 1970 (CMAP, 2014). The village is facing some challenges with over 8% of its housing stock sitting vacant and its unemployment rate in 2012 was measured at 13.7% (CMAP, 2014)

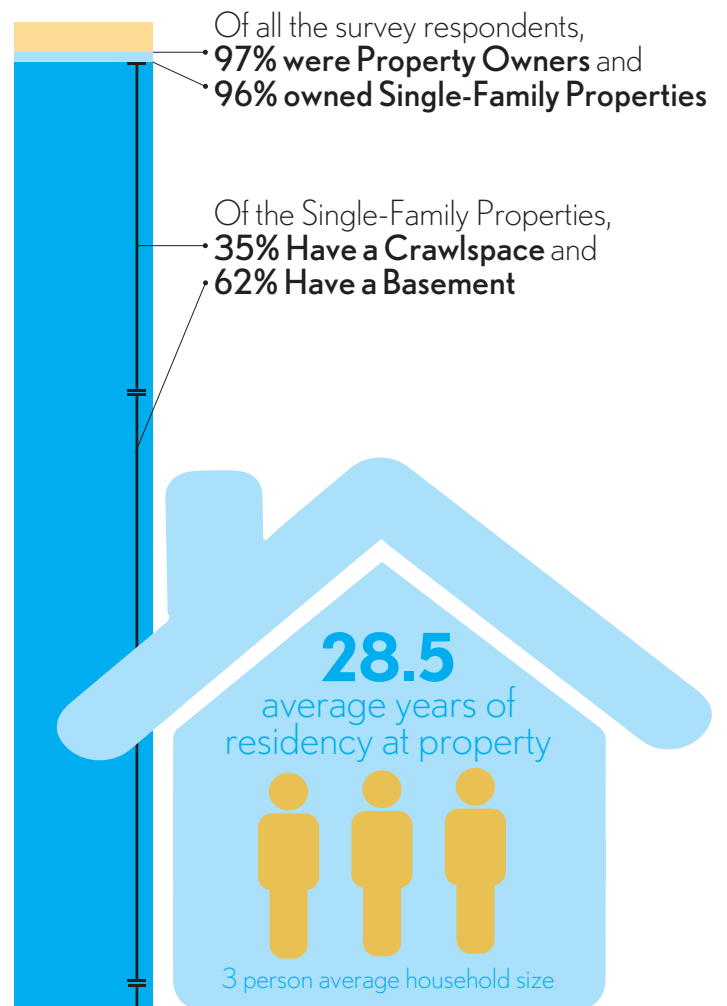
The frequency and intensity of flooding during the rainy season in 2013 inspired the creation of the "Floodlothian Five," a group of Midlothian flood victims united to advocate for flooding awareness and mitigation projects. As numbers grew, the group changed its name to "Floodlothian Midlothian," and in 2014, the group attracted the attention of the RainReady program at the Center for Neighborhood Technology (CNT). In order to better understand the severity and impact of flooding in the community, RainReady began working with Floodlothian Midlothian and the Village of Midlothian to devise a plan of action for flood risk mapping and implementable solutions for the community. As part of this effort, CNT designed and conducted a 39-question household survey of Midlothian residents.



Midlothian Resident Survey

In January 2015, RainReady sent postcards to each household in the village, 4,335 in total, inviting participation in an online survey. Paper copies of the survey were made available at the local library. There were 253 valid responses, a response rate of 6%. Approximately 91% of responses were submitted online. The objective of the survey was to better understand how flooding impacts the private property of residents and business owners, and to solicit property owners' opinions on water management in the village.

Respondent Property Type



Type of Flood Impact

Analysis found that 72% of survey respondents are affected by flooding on their property. Furthermore, the majority of flood victims surveyed live outside the FEMA-designated floodplain:

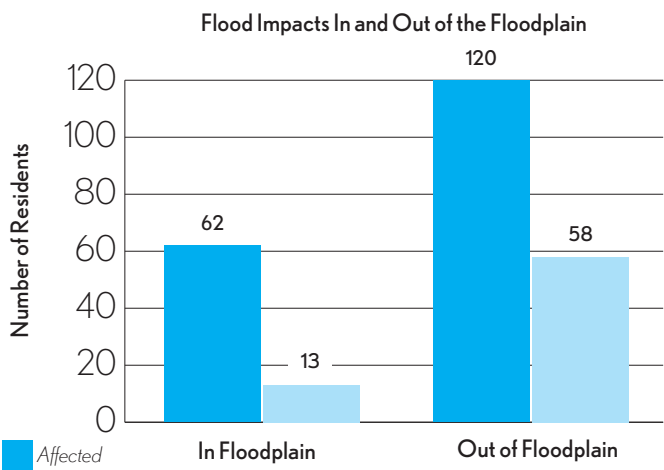


FIGURE 12: FLOOD IMPACTS IN AND OUT OF THE FLOODPLAIN

Tables 1 and 2 break down the specific types of flooding experienced by survey participants:

TABLE1: Indicators of Flooding	Yes	
Wet basement and flooding	120	47%
Foundation cracks or damage	119	47%
Erosion	37	15%
Leaking pipes*	9	4%
Unexpectedly high water bill*	83	32%

TABLE2: Specifics of Water Entry	Yes	
Seepage	57	23%
Water pooling in yard	37	15%
Water backups (e.g. through drains)	32	13%
Water overflowing to the property	24	9%
Water flow though doors and/or windows	20	8%

*Leaking pipes and unexpectedly high water bills can indicate flooding associated with infiltration and inflow. Given the uncertainty, however, these impacts are not included in our analysis of 72% flood impact among survey respondents.

“ [Flooding] is something that has drastically lowered my quality of life while living in the village and I do not know for how long I can tolerate this stress on my life. ”

“ The one neighbor next to me built a huge garage with no gutters that all drains to me as does the cement drive he put in which is much higher than my property by about eight inches. ”

“ The water problem is the worst; our neighbors are going to put their house for sale in the spring but we can’t afford to move. ”

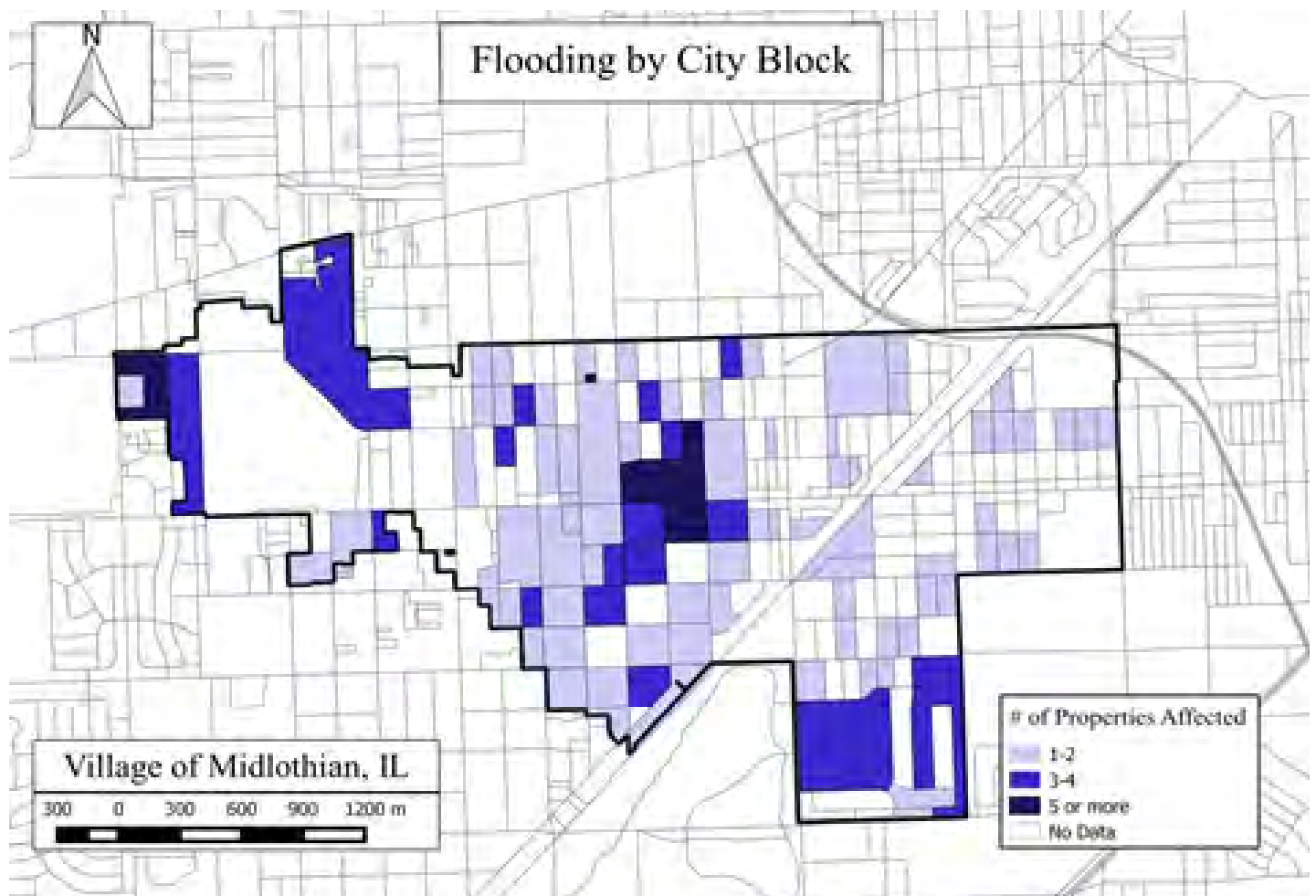
Flooding Location

Survey flood impact data roughly mirrors the assessment of Village engineers and Floodlothian Midlothian records (“Summary of Known Problem Areas,” Figure 1, page 2). As seen in Figure 13 (RainReady Midlothian 2015) below, the greatest density of property flooding occurs in the central part of the city, roughly following the south fork of Natalie Creek and 147th Street. Yet survey data mapped across the neighborhood shows few areas that

are immune to flooding. Flood damages in Midlothian are widespread, and not limited to creek overbanking or FEMA-designated floodplains (Figure 14). Neighbors on the same block do not necessarily have the same flooding experience; some flooded properties are adjacent to properties that do not flood. Flooding also occurs on properties that are not adjacent to waterways.

FIGURE 13: FLOODING BY CITY BLOCK

Survey data, while providing a valuable summary of the scope and characteristics of urban flooding in Midlothian, is incomplete and should be considered within the broader context of analysis.



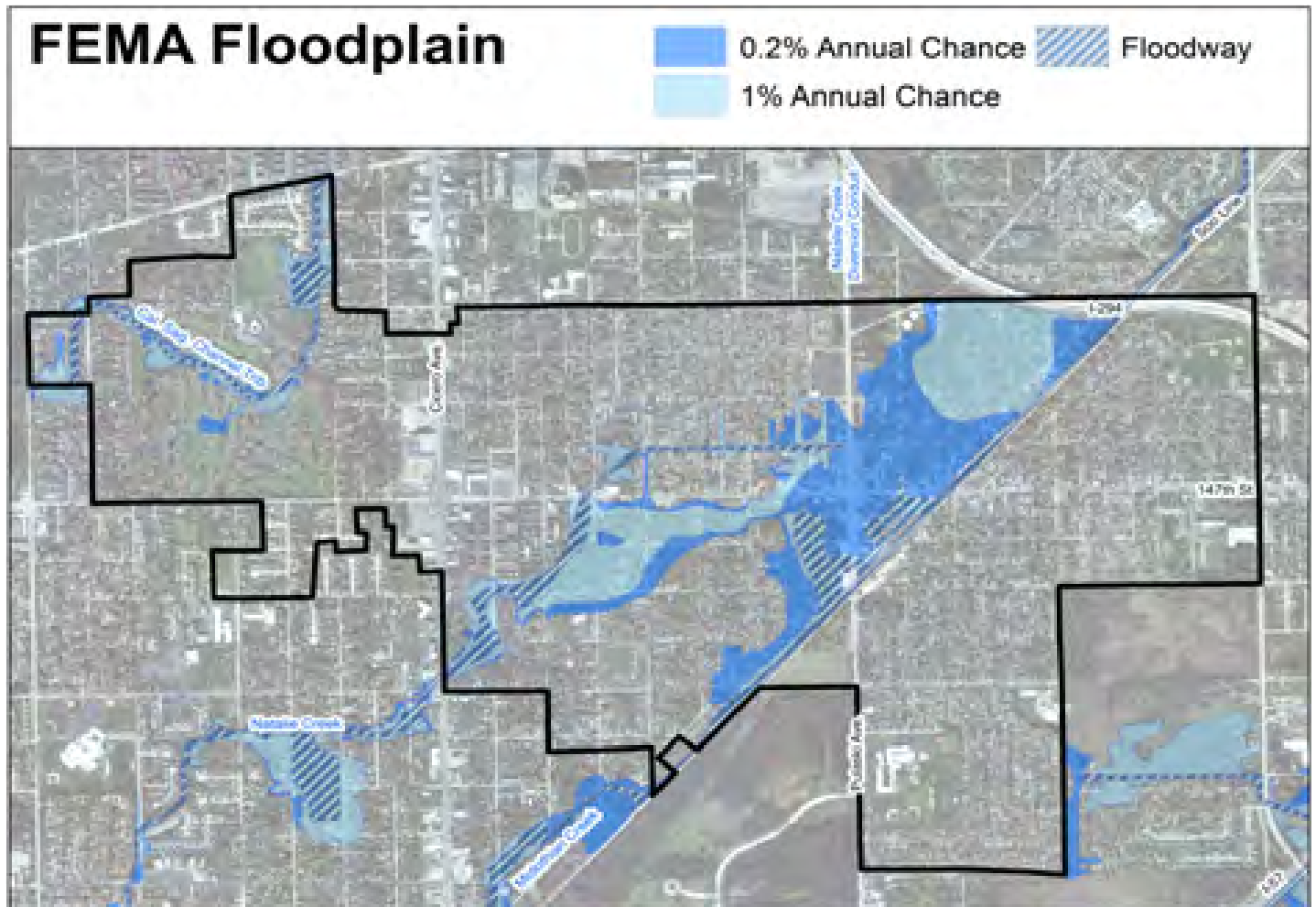


FIGURE 14: FEMA FLOODPLAIN
Map courtesy of the US Army Corps of Engineers

Do you experience flooding?

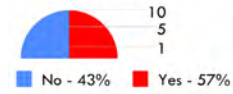


FIGURE 15:
FLOODING
EXPERIENCED

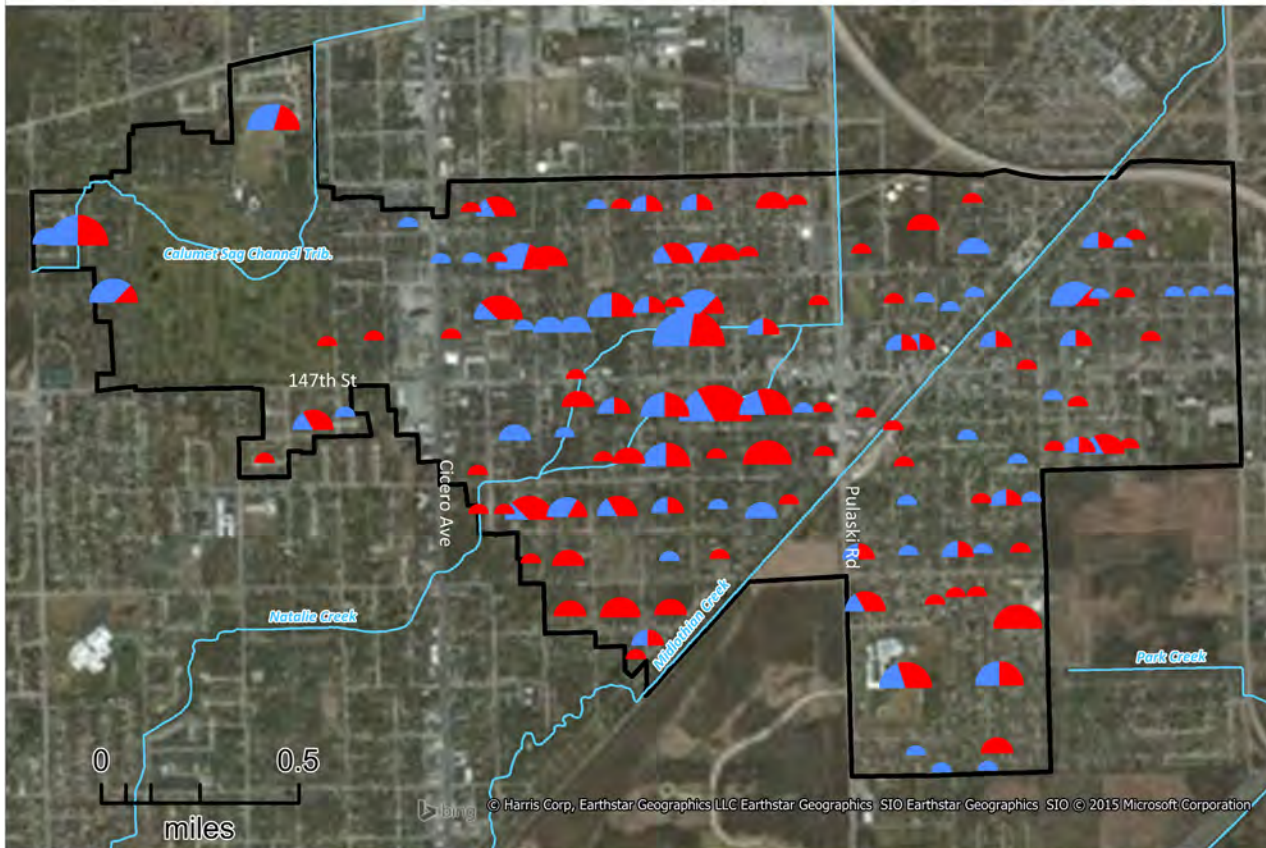
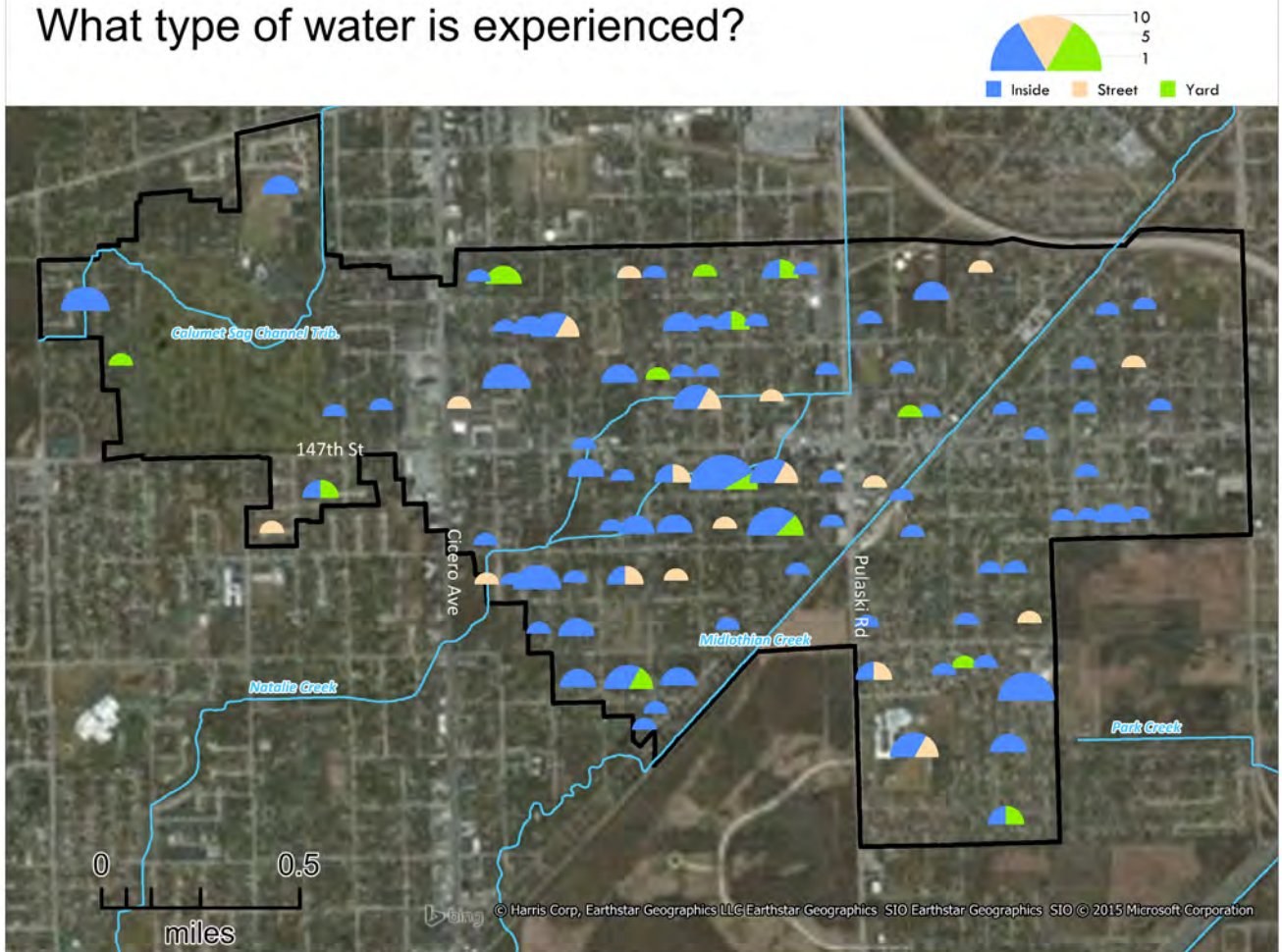


FIGURE 16:
TYPE OF WATER
EXPERIENCED

What type of water is experienced?



Concerns about Water Management

Midlothian survey respondents know that flooding is a shared problem in the village. Concern about the impact of flooding on personal property and overall quality of life in the village is widespread, and residents know that these concerns transcend property boundaries. More than half (56%) of residents believe runoff from neighboring properties affects their property, while about one third (32%) of residents believe their runoff affects a neighbor’s property. See Table 3 for resident responses to queries regarding water management in the village.

In addition to the quantitative data summarized above, the survey included a General Comments section, in which respondents shared some of the social, psychological, and economic impacts of flooding on the individual and the village at large. Comments revealed the following:

- In previous years, public discussion of residential flood impacts has been minimal, contributing to feelings of isolation among flood victims
- Flooding has negative psychological impacts on residents, including anxiety, sleeplessness, and resentment of government service providers
- Repetitive flood damage to real estate and personal property is a financial burden to residents and lowers property values
- Flood impacts are considered a primary cause of residential foreclosures, failed commercial enterprises, and rising rates of property abandonment and blight
- Flooding reduces the functionality of public and private land, preventing the use of personal living space, yards, streets, sidewalks, and parks
- Flooding has a significant and destructive impact on the overall quality of life in the neighborhood

TABLE 3: Opinions About Water Management	Agree
I am concerned about water-related problems on my property	82%
Water-related problems affect the quality of life in the village	85%
When it rains, runoff from my property affects my neighbors	32%
When it rains, runoff from neighboring properties affects me/my property	56%
Property owners can work together to tackle water management problems in the village	61%
Stronger regulations are needed to prevent development from making the situation worse	71%

Table 4, below, summarizes some common themes identified from the qualitative data received.

TABLE 4 Comment Response Themes	Flood Impact Status		
	All	Affected	Unaffected
Systemic flooding	52%	54%	48%
Abandonment of property	29%	29%	28%
Anxiety	24%	31%	7%
Need for municipal action	22%	25%	17%

“ Now, all we have is flooding and empty stores and homes. Something needs to occur to fix these situations. ”



PROPOSED STORMWATER SOLUTIONS

There have been numerous planning efforts to address flooding in Midlothian and throughout the entire Calumet region. We have summarized current and recent stormwater solutions below, and seek integration of these efforts with the RainReady planning process.

LITTLE CALUMET RIVER DETAILED WATERSHED PLAN

In 2009, MWRD adopted a detailed plan for all of the Calumet River Watershed. The plan reviewed flood risk along both Midlothian and Natalie Creeks.

On Natalie Creek, 130 building structures in Midlothian and Oak Forest were identified as flood-vulnerable. According to the Stormwater Planning Database Tool used, property damages for these building structures were estimated at roughly \$12.8 million; transportation costs were estimated around \$1.9 million.

To protect the surrounding communities from a 100-year storm, a set of Flood Control Best Management Practices were evaluated, and a preferred alternative was determined. At a cost of roughly \$63 million, MWRD recommended Alternative NTCRG1-A4 for implementation:

The proposed engineering improvements are significant in size, as well as cost. The proposed detention facility was sized at approximately 180 acre-feet, and the concrete diversion conduit was recommended to be 4’ by 6’ in size, running from 149th Street and Kilpatrick Street to 146th Street and Pulaski Street. The size of these improvements underscores the scale of the flooding challenge around Natalie Creek.

The plan identifies five properties that would remain at risk to flooding, even following implementation of Alternative NTCRG1-A4. For those properties, the plan recommends floodproofing or acquisition.

Midlothian Creek was also analyzed for the Little Calumet River Detailed Watershed Plan. The majority of recommendations involved channel improvements in upstream communities, though the plan did recommend a new detention facility on the village’s border with Oak Forest.

Alternative	Location	Description
NTCRG1-A1	153 rd Street and Leclaire	New detention facility to detain the peak flows
NTCRG1-A2	149 th Street and Kilpatrick Diversion Conduit	Construct new diversion conduit to divert peak flows
NTCRG1-A3	Between Laramie and Karlov Avenue	Culvert improvements to increase hydraulic capacity
NTCRG1-A4	153 rd Street and Leclaire, 159 th Street and Kilpatrick Avenue and Laramie to Karlov Avenue	New detention facility, new diversion conduit and culvert improvements (combination of Alternatives NTCRG1-A1, NTCRG1-A2, and NTCRG1-A3)

MIDLOTHIAN PHASE II PROJECT (NATALIE CREEK) *Currently Underway*

Alternative NTCRG1-A4 has not yet been implemented in either community, largely due to its prohibitive cost. In February 2015, MWRD commissioned a Phase II analysis of flood risk and mitigation strategies for the Natalie Creek Drainage Area, with an objective to identify potential lower cost solutions to the Natalie Creek flood challenge. The project area is defined by 153rd Street and Lavergne Avenue to the south and 146th Street and Pulaski to the north. The engineering firm Burns & McDonnell has been hired to conduct an assessment of existing watershed conditions, evaluate alternatives to address flooding, and develop conceptual costs for each alternative. The project team is considering the following solutions, depicted in Figure 16 below: detention, conveyance improvements, and potential property acquisition. In a preliminary presentation, it was communicated that the existing system provides protection from a two-year rainfall event.

Once made public, the report will be incorporated into the RainReady Planning process, and opportunities for collaboration will be pursued.

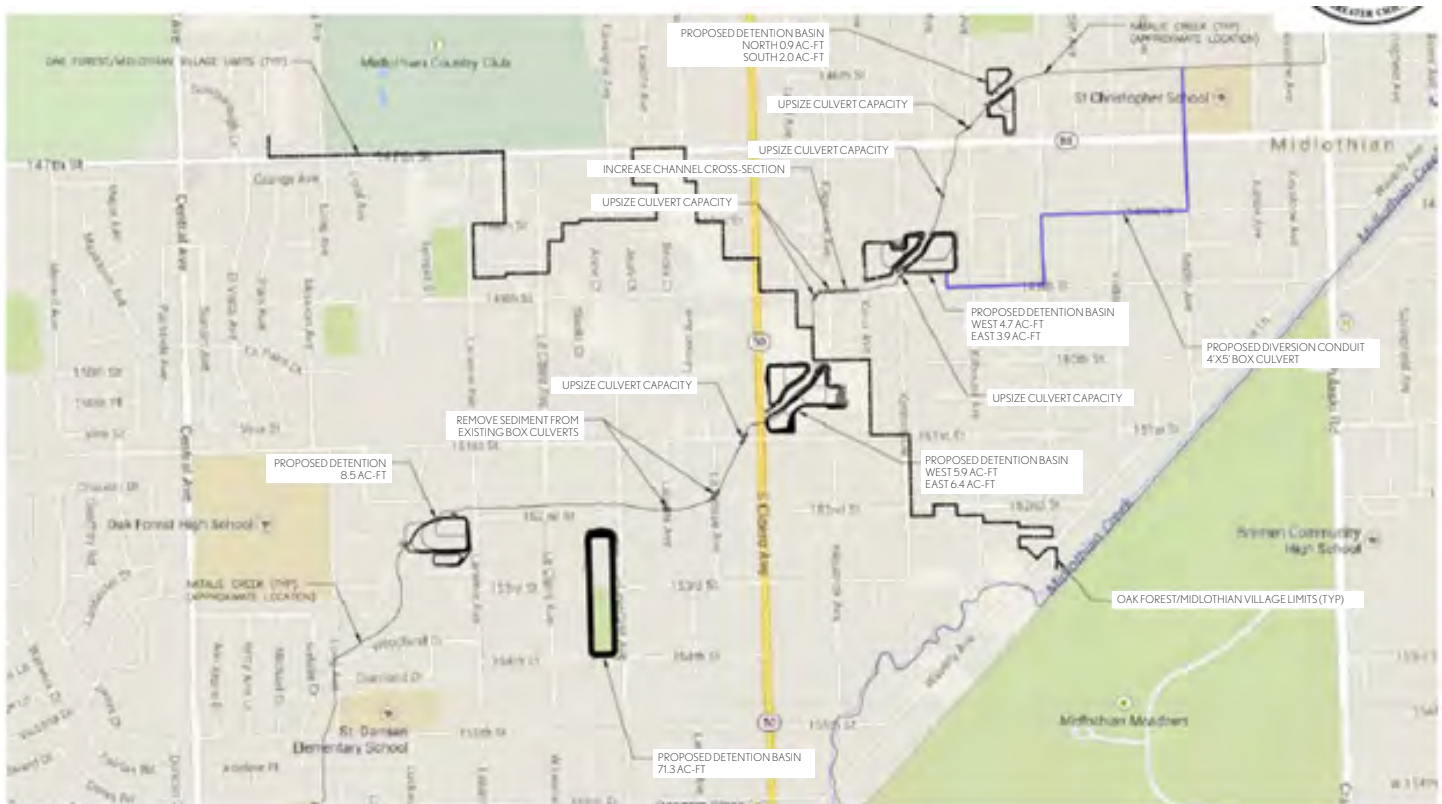


FIGURE 17: PROPOSED IMPROVEMENTS TO NATALIE CREEK

CAL-SAG TRIBUTARY C PRELIMINARY ENGINEERING

In the vicinity of 143rd Street and Linder Avenue, Infrastructure Engineering Inc. has been contracted by MWRD to model existing water conditions and make recommendations to address flooding and erosion control on the tributary. Preliminary plans are included in the image below.

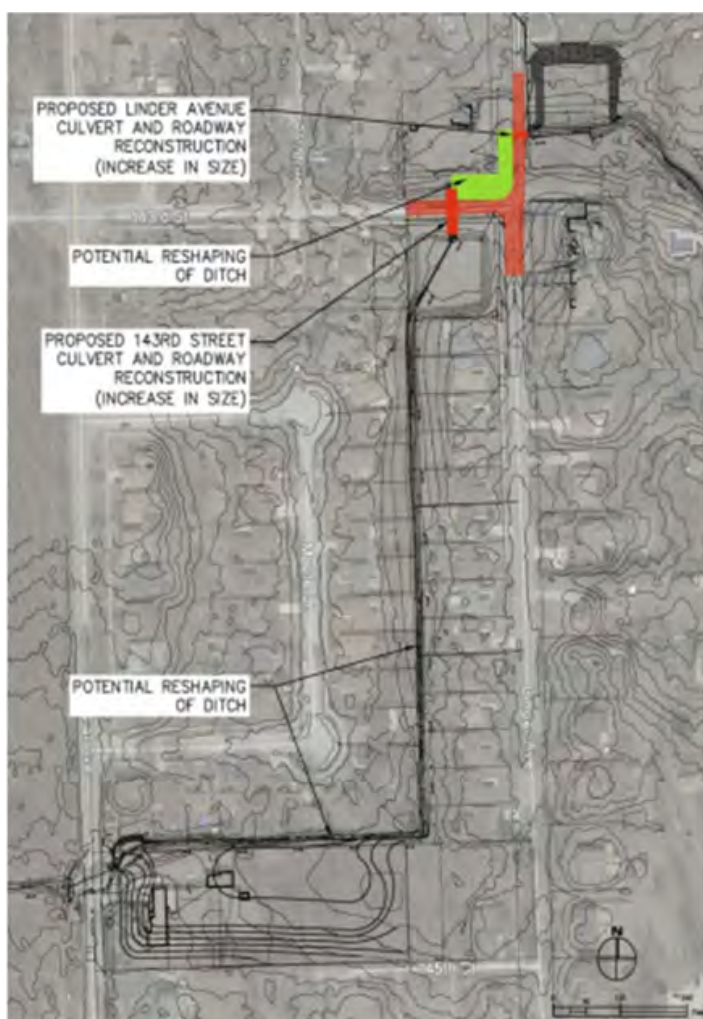


FIGURE 18

MIDLOTHIAN CREEK GREEN INFRASTRUCTURE PLAN

In June 2013, the Midlothian Creek Green Infrastructure Plan was completed in conjunction with the Millennium Reserve Project. Chicago Wilderness oversaw the planning process in conjunction with the South Suburban Mayors and Managers Association (SSMMA), with engineering support from Weaver Boos Consultants North Central, LLC and participation from the municipalities of Blue Island, Markham, Midlothian, Posen, and Robbins. MWRD, Illinois Department of Natural Resources (IDNR), Chicago Wilderness, the Field Museum, Cook County, and additional community organizations were also involved.

The plan includes a map of existing green infrastructure and proposed priority areas for expanded green infrastructure in the Midlothian Creek watershed. Note that the study employs the Chicago Wilderness' definition of green infrastructure, which emphasizes habitat connectivity and linking corridors of blue and green spaces. For this reason, decentralized pockets of green infrastructure were not considered.

Natalie Creek and Midlothian Creek are both identified as flood-prone areas well suited for green infrastructure treatment. A "Complete Streets" retrofit is recommended at 147th Street and Cicero Avenue, as well as a larger Green Neighborhood Retrofit in the neighborhood south of 147th Street between Cicero and Pulaski. For all sites, a list of green infrastructure Best Management Practices (BMPs) include the following:

- Bioswales and stormwater "bump-outs," implementable during roadways rehabilitation
- Rain gardens and rain barrels for businesses and households
- Stormwater tree plantings
- On-street trails to improve pedestrian and habitat connectivity

The plan refers to several vacant and underutilized parcels near Midlothian Creek, many of which are the result of foreclosed properties, and recommends their consideration for green infrastructure rehabilitation. Strategies for acquiring and rehabilitating these properties include sale to newly established land banks in the region and utilization of the no-cash tax bid process. The plan emphasizes collaboration between municipalities, state, and regional agencies working in the watershed.

Regarding implementation of recommended projects, the plan is not specific. The plan suggests pursuit of grant funding; consideration of green infrastructure tax incentives for private developers; review of local ordinances to incentivize green infrastructure development; allocation of municipal financial resources for green infrastructure, potentially via implementation of a Stormwater Fee; and review of the following documents for additional information:

- Chicago Wilderness Green Infrastructure Resources/Funding
- Center for Neighborhood Technology Codes and Ordinances Worksheet
- United States Environmental Protection Agency's Municipal Handbook: Funding Options
- United States Environmental Protection Agency's Municipal Handbook: Incentive Mechanisms

In the appendix of the Midlothian Creek Green Infrastructure Plan, a BMP Matrix provides a decision-making framework for municipalities making decisions about infrastructure development.

ILLINOIS GREEN INFRASTRUCTURE GRANT GREENWAY PROJECT

Following completion of the Midlothian Creek Green Infrastructure Plan, Weaver Boos Consultants and the Village of Midlothian submitted a successful application to the Illinois Green Infrastructure Grant Program, an initiative of the Illinois Environmental Protection Agency. Plans are currently being developed by the social enterprise High Bridge to construct an open space area including a rain garden, native species recreation area, and redesigned parking lot with porous asphalt just south of Village Hall at the currently vacant lot between Pulaski Road, 148th Street, and Midlothian Creek. Work is expected to get underway in the summer of 2015.

FEMA FLOODPLAIN MAP ADJUSTMENTS

Village staff are currently pursuing financial support to redraw the floodplain maps for Midlothian to exclude portions of the Village Center that do not flood, and include a larger portion of 147th Street along Natalie Creek. The Village has applied for a grant from the US Department of Housing and Urban Development (HUD) through the Community Development Block Grant – Disaster Recovery Program, administered by Cook County Department of Planning and Development.

ADDITIONAL PLANS IN MIDLOTHIAN

Modern urban flooding has arisen as a symptom of the way we develop and plan our cities. One of the most cost-effective ways to manage urban flooding is to see it within the context of the whole community and its historic and future patterns of development. Strategies that effectively address urban flooding can also provide recreation areas, improved sense of place, and economic resilience. A resilient RainReady plan will reflect the Village's broader planning vision and draw cost-effective links between these plans and the proposed stormwater solutions. To that end, the following section provides a review of previous plans completed in the Village of Midlothian, whether transportation or economic redevelopment.

2005 VILLAGE CENTER PLAN

In 2005, Midlothian adopted a plan to build a dense, pedestrian-oriented district in the center of the village. The plan identified steps to enhance the visual character of the area, improve the business mix and tax base, and maximize transit-oriented development (TOD) opportunities.

Recommendations were made to prioritize development outside of the floodway and maintain a "natural state" in the floodplain, wherever possible, to reduce long-term flooding issues. The plan emphasized "appropriate and creative" floodplain management, and identified three development areas for potential floodplain fill and elevation, with compensatory stormwater storage developed elsewhere in the village at a cost of \$5 million.

According to Village staff, the economic downturn in late 2000s left the community with a different set of priorities, after which previous plans for redevelopment were scaled back.

2014 MIDLOTHIAN VILLAGE CENTER PLAN - UIC

In 2014, a new plan for the Village Center was completed by a group of students from the University of Illinois at Chicago with more specific recommendations regarding the conflict between flood issues and development priorities. Whereas past planning efforts emphasized land west of the Metra railway as a focus for new development, the 2014 plan determined that this area was inappropriate for new development, given its location in both a 500- and 100-year floodplain.

Instead, new development has been prioritized for the area east of the Metra train line, where an anchor tenant in the Village Center could help spur new retail development outside the area of highest flood risk. For this area, the 2014 plan recommends a set of aesthetic improvements.

The plan also recommends a list of green infrastructure stormwater Best Management Practices (BMPs), including new green infrastructure design criteria for the Metra parking lot. 147th Street is again identified as a potential Complete Street project, and expansion and rewinding of parkways is established as a requirement throughout the village.

2011 ACTIVE TRANSPORTATION PLAN

The 2011 Active Transportation Plan emphasizes improvements to bicycle and pedestrian connectivity in the village. 147th Street is recommended as the primary east-west bicycle and pedestrian connection. As such, recommendations are made to fill sidewalk gaps and improve walkability of the corridor by adding a bikeway to buffer the sidewalk. The plan recommends consultation with IDOT to conduct a traffic study on 147th to assess feasibility of a road diet from four to three lanes, and the development of a Complete Streets plan. The Cicero Corridor is also identified as a priority pedestrian arterial.

Additional recommendations include:

- Improvement and extension of the existing Natalie Creek Walk Trail
- Creation of a Bike Boulevard Loop to provide a link between the Metra Station, the Village Green, parks, and residential neighborhood streets
- Adoption of a village-wide Complete Streets Ordinance

Landscape improvements are recommended for each of these streetscape proposals.

CICERO AVENUE

A series of vacant plots along Cicero Avenue north of 147th Street have been identified for redevelopment. These four parcels are comprised of 16 acres of brownfield land that were formerly car dealerships, three parcels that are owned by the Village, and one that is privately held.

Phase I and Phase II Brownfield Assessments have been completed with grants from the USEPA as of May 2015. Potential developers have been identified for two of the sites on Cicero Avenue.

REGIONAL TRANSIT AUTHORITY (RTA)

A grant from the RTA's Access to Transit Improvement Program funded a study of pedestrian connectivity and TOD opportunities in Midlothian. The resulting plan identifies a series of sidewalk replacements, decorative crosswalks, and decorative pedestrian lighting streets surrounding the Metra station.

Pending additional financial support from the Congestion Mitigation and Air Quality (CMAQ) Improvement Program at the Federal Highway Administration, the plan will be implemented with approximately \$825,000 in grant funds received from RTA. Many of the proposed improvements are focused on 147th Street and would complement a larger Complete Streets initiative.

KEDZIE CORRIDOR UIC COLLEGE OF URBAN PLANNING AND PUBLIC AFFAIRS

A group of students from the University of Illinois at Chicago completed a study of economic redevelopment opportunities along the Kedzie Avenue Corridor. Several potential sites were identified.

The "Superblock" is defined by 147th Street to the north and Sundrop Prairie Nature Preserve to the south. A 34,000 square foot building is vacant in the southern portion of the Superblock. This is a primarily residential area and was recommended for a large grocery store or an office park. The plan proposes a small neighborhood park at the southwest corner of 147th Street, extension of 147th Place to connect Kedzie Avenue and Turner Avenue, and conversion of Sawyer Avenue to a bicycle/pedestrian-only facility. The map below shows a schematic of the proposed

changes to improve pedestrian connectivity in the largely residential area. The proposed neighborhood node could be an excellent opportunity for green infrastructure implementation.

There are two additional parcels on Kedzie Avenue identified for redevelopment in the UIC plan: one at the northwest corner of 147th and Kedzie, and the other on the west side of Kedzie between 147th and 149th Streets.



FIGURE 19
Aerial rendering of the Superblock: Improved connectivity, redeveloped commercial and proposed neighborhood node park.

NEXT STEPS

The next steps for the RainReady planning process in Midlothian involve identification of potential solutions and strategies to address urban flooding in the village, and close coordination with Village staff and the Midlothian RainReady Steering Committee to review these options.

Upon completion of MWRD's Phase II Study on Natalie Creek, this information will be integrated to ensure complementary action across the village.

Midlothian's RainReady Plan has a targeted completion date of September 2015.



