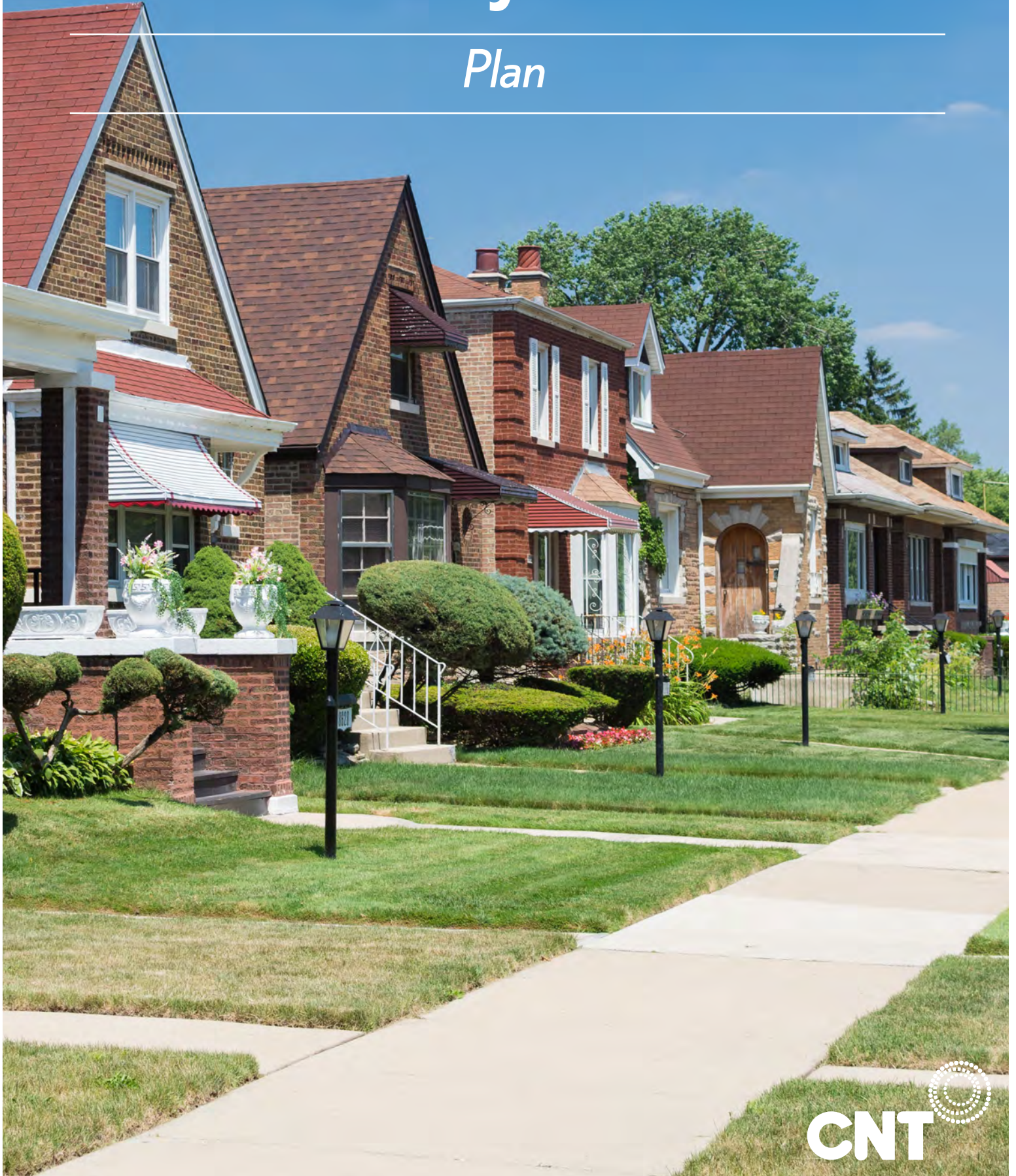


RainReady Chatham

Plan



RainReady Chatham Plan



PREPARED BY
THE CENTER FOR NEIGHBORHOOD TECHNOLOGY
DAWN THOMPSON + MOLLY OSHUN, RAINREADY MANAGERS

FEBRUARY 2017



**US Army Corps
of Engineers®**



**Metropolitan Water
Reclamation District
of Greater Chicago**

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INTRODUCTION



Photo Credit: The Bees, Flickr/Creative Commons

When a thunderstorm dropped 5-7 inches of rain within hours in the Chatham neighborhood in April 2013, Lori Burns' home flooded and sewage gushed up her toilet. It wrecked the water heater, disabled the deep freezer, and destroyed one of the few remaining mementos she had kept from her mother, her wedding veil. It was the third time that Lori's basement flooded in five years.

The story of her disaster and despair was featured in the Washington Post¹ and more recently in May 2016 on WBEZ's *Heat of the Moment*. The record devastation led the State to declare the Chatham neighborhood, an official flooding disaster. Unfortunately, Lori's situation is a common situation within Chatham.

As we outlined in our earlier publication, [RainReady Chatham Phase One Report](#),² the scope and severity of flood risk and flood-related damages in the Chatham community are among the worst in Cook County. Based on research conducted by our team at the Center for Neighborhood Technology (CNT), we found that of the two zip codes that Chatham occupies and shares (60619 and 60620), one (60619) had the highest number of payouts and the largest dollar value of damage payouts in the county.³ From 2007-2011, \$773 million in damage claims were filed for damaged property in Cook County, more than \$50 million in damage claims (6.5%) were paid out to residents throughout Chatham, which includes 2.9 square miles of land just south of the City of Chicago.

1. www.washingtonpost.com/news/storyline/wp/2014/07/23/attack-of-the-chicago-climate-change-maggots/

2. www.cnt.org/publications/rainready-chatham-phase-one-report

3. The Prevalence and Cost of Urban Flooding, CNT 2014 (www.cnt.org/sites/default/files/publications/CNT_PrevalenceAndCostOfUrbanFlooding2014.pdf)

At the Center for Neighborhood Technology (CNT), our water program promotes practical changes in the way people manage water as a resource and changes that are good for residents, good for businesses, and good for the environment. Through programs like our [RainReadySM](#) Initiative, we help homeowners and municipalities save money by installing green infrastructure solutions like rain gardens and bioswales for stormwater management. Much of our work is done to prevent and alleviate flood issues which includes community outreach and development of the RainReady Midlothian Plan and six community plans in Suburban Cook County, Illinois. The Chatham neighborhood was an obvious opportunity to make a difference and provide assistance. However, to implement a successful program, we needed resident and financial support.

Back in September 2013, we began our Chatham program outreach. We worked with Chatham resident groups, local agencies, and elected officials to host a “Gross Gathering” – a meeting where the Chatham community shared their personal “gross” stories about sewage entering their homes, the amount of water accumulated, the number of flooding instances and the financial and health impact they experienced. Over 100 residents attended hoping to gain a reaction and support from the Metropolitan Water Reclamation District (MWRD), the City of Chicago Department of Water Management (DWM), and other agencies.⁴ They did just that.



RainReady Chatham was launched in January 2015 as a partnership between resident leaders, CNT and the U.S. Army Corps of Engineers (USACE). Thanks to all parties, especially funders, CNT has been working collaboratively to identify opportunities for reducing community flooding in a way that simultaneously brings beauty, recreation, retail, and job benefits to the area.

This document outlines the plan for achieving these goals. It builds upon our earlier publication, [RainReady Chatham Phase One Report](#),⁵ that summarizes the scope and severity of flood risk currently faced by the Chatham neighborhood. In preparing the Plan, CNT worked closely with the City of Chicago and the MWRD. As a result of these efforts, CNT will initiate a RainReady pilot program including 40 homes in Chatham in 2017. For the latest news on progress or for more information about RainReady efforts in Chicago, please contact Dawn Thompson, RainReady Manager at the Center for Neighborhood Technology: dthompson@cnt.org.

4. Wet Basements, Flooded Yards: the Gross Gatherings in Chatham + Rogers Park, <https://vimeo.com/85965629>

5. RainReady Chatham Phase One Report, www.cnt.org/publications/rainready-chatham-phase-one-report

PARTNERS AND ACKNOWLEDGEMENTS

CNT would like to extend a heartfelt “thank you” to the residents of Chatham for sharing their personal situations and partnering with us on this innovative project. We are confident that with your continued assistance and the collaboration of our partners, we will achieve great results for you and the Chatham neighborhood.

We are moving forward on our Chatham project thanks, in large part, to the generous financial support and professional services offered by the following organizations:

- The Boeing Corporation
- Chicago Conservation Corps
- City of Chicago
- Community Investment Corporation
- Federal Emergency Management Association (FEMA)
- Gathering Point Community Council
- Greater Chatham Initiative
- Historic Chicago Bungalow Association
- Illinois Department of Natural Resources (IDNR)
- Illinois Coastal Management Program (ICMP)
- Joyce Foundation
- Metropolitan Water Reclamation District of Greater Chicago (MWRD)
- Charles Stewart Mott Foundation
- Neighborhood Housing Services (NHS) of Chicago
- The Prince Charitable Trusts
- The Surdna Foundation
- United States Army Corps of Engineers (USACE)
- United States Environmental Protection Agency (EPA) Environmental Justice Grant
- WRD Environmental/ Greencorps Chicago

Our outreach and public education efforts would not have been possible without the help of the local community churches, resident organizations, and business coalitions. Thank you.

We are also appreciative to the City for its support on future efforts. The RainReady program in part grew out of CNT’s management of the City of Chicago’s Sustainable Backyards program in 2015. The program helped residents create a more sustainable Chicago by providing training and small grants for rain barrels, native plants, and trees to be installed in their backyards.

RAINREADY CHATHAM STEERING COMMITTEE

CO-CHAIRS

Cheryl Watson Chicago Conservation Corps
Richard Wooten Gathering Point Community Council

MEMBERS

Lorri E. Baldwin, Resident
Lori Burns, Resident
Ora Jackson, Resident
Tanjua Robinson, Resident

EXECUTIVE SUMMARY

As cities, towns, and villages have developed to accommodate an increasing population, the once fertile farmlands have been replaced by more impervious surfaces like sidewalks, parking lots, and rooftops. Natural drainage systems created by soil and grass have been replaced with man-made sewers and stormwater pipes, tunnels and reservoirs. This infrastructure in many cities, including Chicago, is aging and undersized. As a result of the additional impermeable surfaces and declining sewer systems, flooding can occur even after modest rain with water runoff containing pollutants (e.g. oil, grease) flows to rivers and streams, damaging homes and property. Ever more intense storms and rain make flooding even more likely.

While development in a floodplain generally correlates to flooding, there are no floodplains in the Chatham community (Figure I). Yet, elevation and landscape negatively impact this Chicago neighborhood. Located in an area previously known as “Hogs Swamp” because of its swamp-like environment, the Chatham community is one of the lowest elevation points in Chicago.

With population growth and residential expansion beginning in the 1880s, the landscape changed from one of permeable grassland, which captures rainwater, to a neighborhood of over 50% impervious surfaces, resulting in prevalent flooding.

According to CNT’s RainReady survey of 208 residents, representing 0.7% of Chatham’s current population affected by flooding found that 84% have flooded on their properties. More than 40% of flooded survey respondents have experienced at least ten flooding events on their properties. Fifty-three percent of these flood victims have accumulated more than \$10,000 in damages, with 25% reporting more than \$20,000 in damages. Previous work by CNT found that in Chatham zip codes 60619 and 60620 urban flooding resulted in 16,790 claims and \$50 million in payouts between 2007 and 2011.

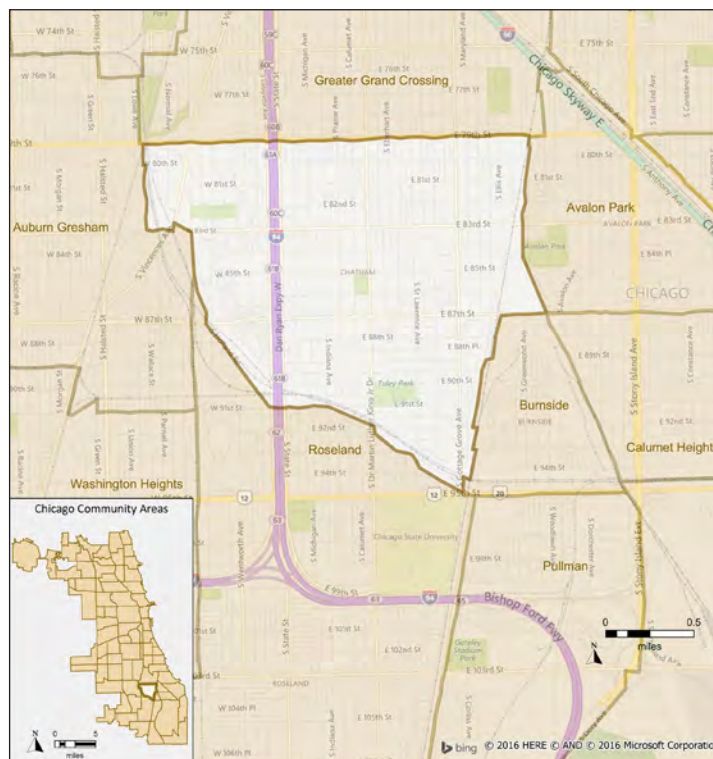


FIGURE I: CHATHAM AND SURROUNDING AREAS

Awards to CNT RainReady

2016, American Society of Civil Engineers

Infrastructure Game Changers designation

2016, Association of State Floodplain Managers

National 2016 James Lee Witt

Local Award for Excellence in Floodplain Management

2016, Illinois Association for Floodplain and Stormwater Management

Public Outreach Award

2016, Metropolitan Water Reclamation District of Greater Chicago

Honoring of CNT/RainReady

2015, US Army Corps of Engineers

Silver Jackets Interagency

Nonstructural Flood Risk Management Program Award

2014, Illinois Association for Floodplain and Stormwater Management

Public Outreach Award

2014, US Army Corps of Engineers

Silver Jackets Interagency

Nonstructural Flood Risk Management Program Award

ZIPCODE	Rank in Total Amount of Claims in 169 Cook County Zip Codes	Rank in Total Number of Claims in 169 Cook County Zip Codes	Number of Claims	Amount of All Claims
60619	1	1	9,350	\$29,357,563.01
60620	9	4	7,440	\$20,940,290.26

Source: *Prevalence and Cost of Urban Flooding*, Center for Neighborhood Technology 2013

Localized flooding and municipal infrastructure are also key contributors to the problem. For example, if your neighbor has a broken downspout, it may cause runoff in your yard. If the sewage system in your neighborhood is backing up from the main sewer system, this will cause problems for you and your neighbors.

Due to the range of problems, the RainReady Plan includes solutions at multiple scales: the individual property, the street and neighborhood, and community.

DEDICATED DELIVERY TEAM

Several existing City of Chicago initiatives form the foundation of this Plan, including the Green Alleys Program and Greencorps Chicago, both managed by the Chicago Department of Transportation (CDOT), the sewer rehabilitation work led by the Department of Water Management (DWM), and the Space to Grow program that greens schoolyards. While wide-ranging and often impressive, several of the programs suffer from severe funding constraints. Often, the programs are run by different City departments, to varying schedules or in different parts of the City, making it difficult for residents or aldermen to know how to benefit. That's why our first recommendation is for the City to create a Dedicated Delivery Team to provide cohesive and coordinated services to residents and communities. Given the urgency of the flooding problems facing Chatham, and indeed many Chicago communities, the team should establish a multi-partner campaign, with funding and high-level leadership.

Since many properties in Chatham (and the wider City area) are flooding as a result of the runoff from their own properties, we recommend that the City pilot a Home Upgrade Initiative with a focus on low-cost strategies, such as disconnecting downspouts, raising utilities off basement floors, removing carpets, sealing foundation cracks, and regrading the yard to prevent pooling near the foundation. Our research has found that homeowners are somewhat willing to pay for these improvements, but it will be necessary for the City to provide some subsidies.

HOME AND NEIGHBORHOOD UPGRADE INITIATIVE

Because sewer backup is a major cause of flooding in the City, we also recommend a Neighborhood Upgrade Initiative. The large upfront cost of retrofitting every household with a backwater valve or overhead sewer, or constructing traditional grey infrastructure to protect neighborhoods, is a major barrier to the timely reduction of community flood risk. A more practical solution involves a block, street, and neighborhood approach to rehabilitate strategic sewer lines and invest in an overall reduction in the volume of stormwater runoff entering the sewer system. Because this approach uses parkway and streetscape redesigns that unite stormwater planning with better pedestrian and bicycle facilities, tree plantings, and beautification, it has the added benefit of stabilizing property values in the community.

We recommend that the City adopt a sewershed approach when delivering these initiatives, wherein risk and solutions are mapped within a discrete urban drainage network. This approach encourages outreach



and engagement of homeowners, who may not flood but contribute to flooding downstream in the sewershed. In this way, opportunities to reduce runoff in strategic upstream locations can be valued for their downstream impact. For example, stormwater interventions on vacant lots, City parks, schools, and commercial corridors may be more easily pursued than a network of residential improvements with comparable storage potential.

Early engagement with local land owners – residential, commercial, and public – will help identify low-hanging fruit as well as potential barriers. Some of these land users, like Chicago Public Schools, may also be eligible for outside grant opportunities. Studies including the City of Chicago’s Green Healthy Neighborhoods Planning Strategy and MWRD’s Phase II Pilot Study (*Southside Chicago Green*, page 24) would be useful resources to inform this process.

RAINBLOCKER PROGRAM

We recommend revisiting the Rainblocker Program with the aim of replacing blockers that have been removed by residents and adding new ones. This will require improved community engagement, an alert system to notify residents of flooding streets, emergency parking facilities, and an integrated network of rain gardens to drain street flooding via curb cuts.



Photo GollyGloire/Flickr/Creative Commons

BROADER COMMUNITY IMPROVEMENTS

Ordinances

In addition to making physical changes to the community, the City should commit to a fundamental shift in the patterns of urban development that have contributed to flood risk across the neighborhood. This includes ordinances that set new development standards to protect homeowners and businesses. We recommend that an ordinance is passed in each of Chatham's wards mandating future universal downspout disconnection, preventing rooftop runoff from overwhelming the City sewer system. We recommend that this mandate be accompanied by a robust public outreach campaign and financial support from the City to cover the costs of safe downspout disconnection on every neighborhood property. The work can be led by CDOT's Greencorps Chicago – the City's workforce development program – and executed in tandem with the City's program to help homeowners retrofit their residences.

Improved Data-Sharing

Investments in grey infrastructure in Chatham will be among the most visible, costly, and critical elements of the overall strategy for flood mitigation. The City of Chicago Department of Water Management (DWM) has committed \$1.6 billion to begin upgrading the City sewer infrastructure by 2020.⁶ In other public documents, the City cited a \$250 million annual budget necessary to expand and modernize the sewer network.⁷ However, the relevance or impact of these upgrades to residents in Chatham is difficult to ascertain because residents are unable to access information on sewer cleaning, lining, replacing, and upsizing the network. For this reason, a key element of our Plan is improved data-sharing and public education.

As of November 2016, CNT's RainReady team has received over \$500,000 to initiate a full-scale Chatham program rollout. As a result, we will pilot a new initiative in Chatham in 2017, partially funded through our partners. Since Chatham's flooding issues are similar to many of its South Side neighbors, we recommend that the resulting program, along with the broader recommendations laid out in this Plan, be subsequently rolled out to those communities via the delivery team (*Solutions for a RainReady Chatham*, page 29), leveraging the same services, partnerships, and funders.

6. City of Chicago Capital Improvement Program 2014 – 2018

7. City of Chicago Resilient Revitalization Phase 2 Draft Application National Disaster Resilience Competition, October 2015

Purpose of the RainReady Plan

CNT developed the RainReady Chatham Plan with the following objectives:

1. Establish a shared understanding of community flood risk: how, where, and why flooding occurs
2. Articulate a unified vision to reduce the negative impacts of flooding
3. Provide a roadmap for implementation, including key partners and financing solutions
4. Create a reference document for future planning, grant opportunities, and capital planning

CNT partnered with USACE to complete its initial research, with an additional goal of establishing a replicable RainReady Community service to help other communities in the United States pursue collaborative solutions to water management challenges.



Planning Priorities

Chatham is facing a set of complex and interrelated challenges: vulnerability to several types of flooding, years of deferred maintenance on public infrastructure, economic divestment, and the lingering impacts of the 2009 housing crisis, with clusters of vacant and foreclosed homes throughout the neighborhood.⁸ As a result, residents throughout Chatham report a loss of community pride and neighborhood identity.

The following planning priorities were established:

1. Reduce flood risk to the highest number of residents in the most cost-effective manner
2. Bring investment to the community
3. Restore Chatham's unique sense of place

Given these priorities, we have recommended solutions that bring multiple benefits to the community, including economic development, recreation, and beautification. The Plan is intended to appeal to all Chatham residents, regardless of individual household flood risk. As such, implementing the Plan will require collaboration among a wide range of government and community groups, including the Chicago Departments of Water Management and Transportation, Aldermen, CNT, and resident leadership and local community groups.



8. Greater Chatham Initiative Leadership Committee. (2015). *The Greater Chatham Initiative. Comprehensive Plan for Economic Growth and Neighborhood Vitality*.

Planning Process

In 2013, the Gathering Point Community Council, a nonprofit based in Chatham, approached CNT and the Greater Chatham Alliance to co-host the first flood-focused event in the neighborhood, *Wet Basements, Flooded Yards: The Gross Gatherings*. The event brought together over 100 flood victims, neighbors, and agency officials to discuss the problems faced by residents and businesses. Residents were invited to map flood event locations that had impacted their neighborhood and learn about prevention measures and existing government programs to reduce their flood risk.

In order to better understand the severity and impact of flooding in the community and the range of solutions, CNT, USACE, and a resident RainReady Steering Committee joined together in April 2015 to launch RainReady Chatham.

The process included:

- Two Community Meetings
- Monthly RainReady Steering Committee Meetings in 2015
- Community Survey completed by 208 residents
- Flood Risk Analysis conducted by USACE
- Phase 1 Risk Report published in October 2015
- Ten RainReady Home Assessments
- One WBEZ 91.5 Chicago *Heat of the Moment* Feature titled, "The Gross Gatherings, a Climate Fight on Chicago's Southside"
www.heatofthemoment.org/features/flood/
- Establishing a Facebook Group titled, "The Gross Gathering: Fighting Urban Flooding"

In preparing the plan, CNT worked closely with the City of Chicago and MWRD. As a result of these efforts, we will move forward on a RainReady pilot initiative in 2017 funded by these partners.



COMMUNITY OVERVIEW

FIGURE 1: WEST CHATHAM HISTORIC DISTRICT



Chatham occupies a special niche in the regional economy of Chicago's South Side, serving as a long-time home to middle-income African American residents and businesses.⁹ Straddling the Dan Ryan Expressway, located approximately 10 miles from the Loop and encompassing 2.9 square miles; Chatham has been described as "the jewel of the Southeast Side of Chicago"¹⁰ and home to African-American entrepreneurship in Chicago.¹¹ In fact, Chatham was once the headquarters of many leading black-owned businesses including Johnson Products, Ultra Sheen Hair Products, Independence Bank of Chicago, and Seaway National Bank of Chicago.

Annexed to Chicago in 1889, most of Chatham remained grassland and sparsely settled. As the community began to develop, it experienced a population boom from 9,774 people in the 1920s to 36,000 residents in the 1930s largely due to manufacturing growth. During the 1950s and 1960s, Chatham's population increased to 41,000 and by the 1970s it changed from a largely white-immigrant population to predominantly African American. At that time, the total population increased to

more than 47,000; it declined to 40,725 by 1980.¹² Today, Chatham is home to 31,520 residents and includes 13,480 households.¹³

Chatham's residents are aging: the second-largest cohort in Chatham is aged 60 to 64. This group makes up 21.2% of the population in the Chatham community area compared to 16.3% of the City of Chicago's population. Those aged 65 to 79 make up 10.3% of the Chatham community area's population and 7.6% of the City of Chicago's. However, Chatham's largest group is aged 19 and under, which makes up 26% of Chatham's population, approximately the same as the 25.6% of Chicago's population.¹⁴ Chatham's housing stock is predominantly single-family homes.¹⁵ The neighborhood has its own unique stamp as home to the West Chatham Historic District of 347 buildings – including 281 Chicago Bungalows over 100 years old.¹⁶ Chatham is also considered a transportation hub, ranking a score of 9.1 out of 10 from CNT's AllTransit Performance Score Index, which evaluates a community's connectivity to transit, how frequent transit is available and its economic benefits.¹⁷

9. Greater Chatham Initiative Committee. (2015). *Greater Chatham Initiative Comprehensive Plan for Economic Growth and Neighborhood Vitality*. www.rw-ventures.com/GCI/GCI%20Draft%208.01c%20SL.pdf (accessed September 16, 2016).

10. IBID

11. Encyclopedia of Chicago, www.encyclopedia.chicagohistory.org/pages/232.html

12. University of Illinois at Chicago. (1984). *Local Community Fact Book Chicago Metropolitan Area Based on the 1970 and 1980 Censuses*. Chicago: The Chicago Fact Book Consortium,

13. Community Data Snapshot, Chatham. Chicago Metropolitan Agency for Planning. www.cmap.illinois.gov/documents/10180/126764/Chatham.pdf (accessed October 3, 2016).

14. 2000 and 2010 Census, 2013 American Community Survey five-year estimates

15. CMAP Parcel-Based Land Use Inventory

16. Historic Chicago Bungalow Association

17. Center for Neighborhood Technology 2016, AllTransit™, alltransit.cnt.org

The community has a rich history of civic leadership, as evidenced by the number of active community groups working to bring public safety, economic investment, and affordable housing to the neighborhood. Despite this leadership, the vitality of the community has suffered in the wake of the 2008 recession and the housing crisis. Since 2008, the unemployment rate has risen to 15.32%, more than double the Cook County average of 6.2%. The median household income is \$36,910, compared to the Cook County median household income of \$54,548.¹⁸

Chatham’s economic plight has prompted community leaders to establish the Greater Chatham Initiative aimed at unifying residents and civic leaders to bolster the economic, cultural, and infrastructural vitality of the community.¹⁹



18. 2010 U.S. Census

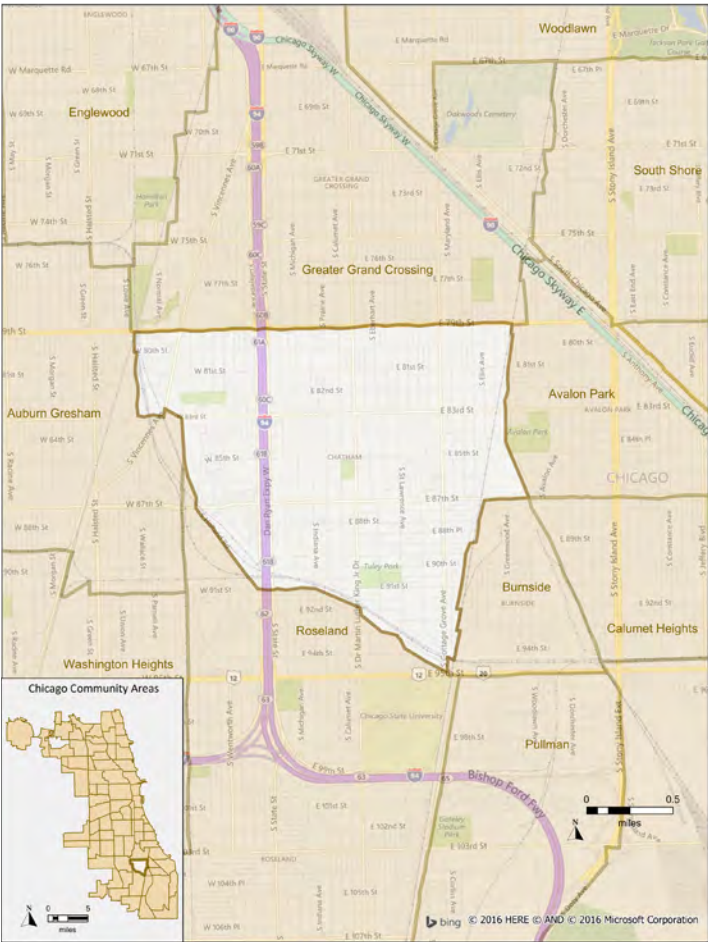


FIGURE 2: CHATHAM AND SURROUNDING COMMUNITIES



19. Greater Chatham Initiative 2015

EXISTING FLOOD CONDITIONS

In Chatham, the flooding problem is chronic. Several publically available documents depict extreme vulnerability to flooding in Chatham. As an example, the Great Lakes and Mississippi River Interbasin Study suggests a 10-year flood risk in portions of Chatham, and a 25-year level in the rest of the neighborhood (USACE 2014). CNT's report, *The Prevalence and Cost of Urban Flooding* reports Chatham's flood risk is among the highest in Chicago.

CNT's analysis of flood damage payouts from private insurance companies and federal disaster relief funds found the Chatham zip code, 60619, ranked the highest among all of the 169 Cook County zip codes, both in the number of claims paid out and the total value of damages paid to residents. The neighboring Chatham zip code of 60620 was ranked fourth and ninth in number of claims and total value, respectively. In these two zip codes, more than \$50 million in damages were paid out from 16,790 claims occurring between 2007-2011.²⁰

Among flood victims, damages are repetitive and costly. Over 40% of the 208 flood victims in Chatham who participated in our survey, 87% reported flooding more than two or more times. Fifty-three percent of flood victims have accumulated more than \$10,000 in damages and over 25% reported more than \$20,000 in related expenses.²¹ In addition to the direct costs of property damage - carpets, furniture, and heating units - there are less direct costs; residents may lose valuable memorabilia, there are safety risks to children and animals, and street flooding can damage parked cars and may hinder residents from traveling to work.

The financial burden has pushed many families into financial distress. Floods have been linked to a decreased quality of life in the neighborhood, as well as to home foreclosures and economic divestment.



20. *The Prevalence and Cost of Urban Flooding*, Center for Neighborhood Technology 2013

21. *Phase One Report, RainReady Chatham*, Center for Neighborhood Technology 2015

FLOODING IN CHATHAM TAKES THREE PRIMARY FORMS

- 1 SEWER BACKUP** into basements through floor drains and below-ground toilets
- 2 FOUNDATION SEEPAGE** through walls, cracks, and corners of water that pools in the yard or seeps in through the groundwater
- 3 STREET FLOODING** due to sewer backups

Residents frequently experience multiple types of flooding.

Types of Flooding

The table at right and Figure 3, below, summarize the types of flooding reported by survey respondents.

Type of Flooding	Respondents Reporting
Basement backup	63%
Seepage	54%
Through windows and doors	20%
Pooling in the yard	29%
Street overflow	23%
Other	9%

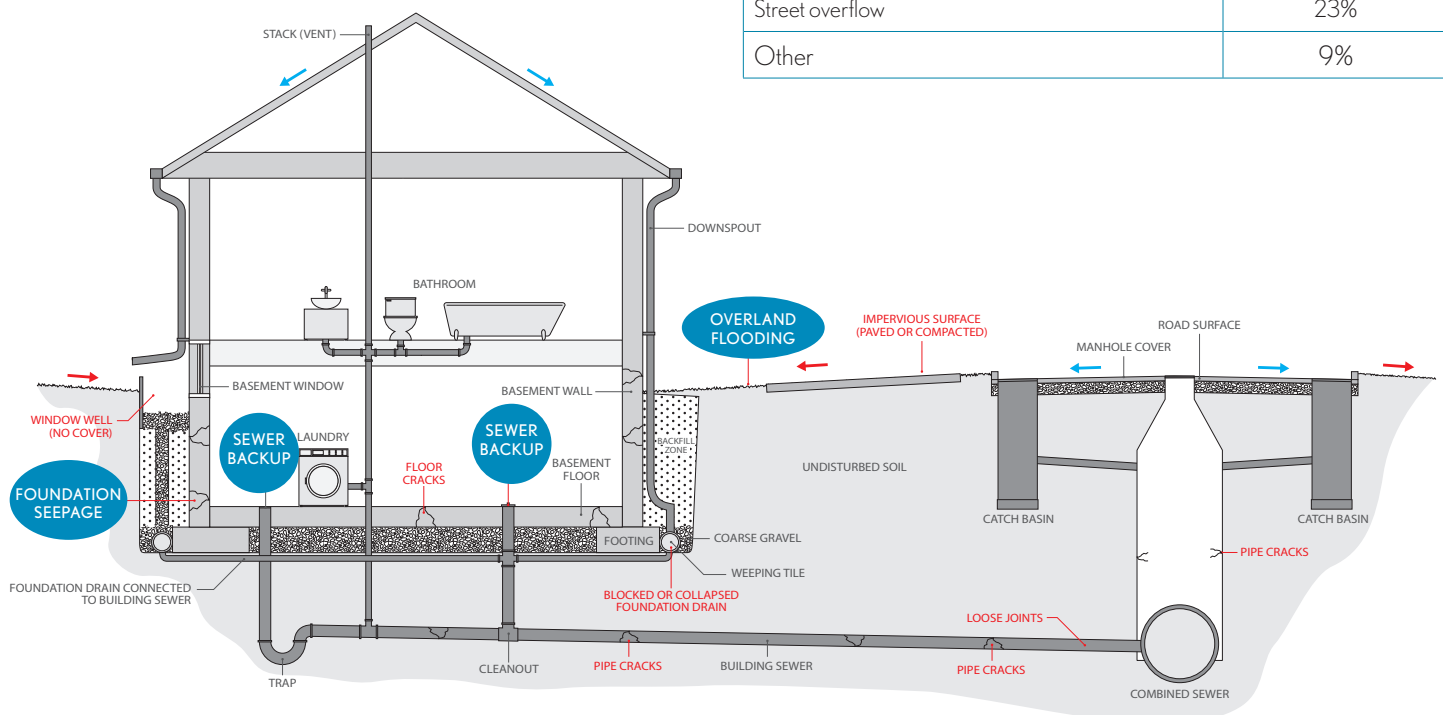
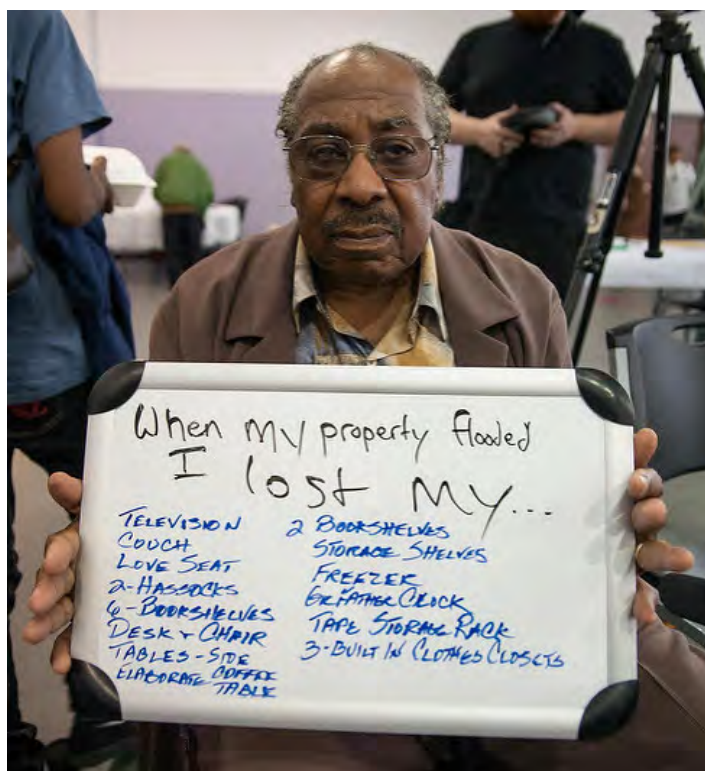


FIGURE 3: TYPES OF URBAN FLOODING THAT CAN AFFECT A TYPICAL RESIDENCE
Modified from Institute for Catastrophic Loss Reduction 2009

SEWER BACKUP

Sewer backup is common throughout the Chatham neighborhood, frequently affecting floor drains and toilets in basements, and manholes in public streets and alleys. This type of flooding occurs when local sewer networks are overwhelmed by a high-intensity storm, causing mixed rainwater and raw sewage to back up into basements and streets through the sewer lateral lines that connect each building to the mainline sewer running under City streets. Basement backup can also occur when lateral lines are collapsed, clogged, or become damaged by tree roots. If household water is blocked from exiting the sewer lateral line, water from the building roof or indoor plumbing can also back up into basements. In this case, some flood victims are flooding themselves.

Basement backup is not only a nuisance, but also a serious public health hazard when residents attempt to clean up raw sewage without necessary protection.



FOUNDATION SEEPAGE

Foundation seepage is the process by which water enters a basement through cracks in the foundation walls, floors, or at the cove joint, the place where the walls and floor meet. Left unaddressed, seepage can cause rot and the growth of mold and mildew. Over time, this can lead to costly structural damage and health problems for residents. In Chatham, seepage is commonly caused by rain pooling in the yard adjacent to the building foundation or slipping into cracks between the sidewalk and the foundation. All of the surveyed respondents who reported seepage also experienced damage related to mold.

STREET FLOODING

The sewer pipes serving Chatham are roughly the same age as its building stock – between 50 and 75 years old. Though Chatham's population has declined by 22.6% since 1980, the amount of impervious surface in the community contributes to increased flooding (Combined Sewers, City of Chicago website 2015). Paired with the increasing frequency of high-intensity storms, the combined sewer system is susceptible to backup, causing street and yard flooding as overflows from storm drains occur along residential streets.



THERE ARE FOUR FACTORS CONTRIBUTING TO FLOODING

1 LOW-LYING TOPOGRAPHY

3 INCREASING IMPERVIOUS SURFACES

2 CHANGING CLIMATE

4 AGING AND UNDERSIZED INFRASTRUCTURE

Causes of Flooding

In Chatham, these factors are compounded by an unusual sewershed configuration, which places Chatham at the top of two distinct drainage networks. This sewer configuration, combined with the neighborhood's low elevation and aging and undersized infrastructure

makes Chatham unusually susceptible to basement backups during big storms. Heavy rains in downstream communities frequently overwhelm the aging sewer network, making it difficult for water to get out of Chatham. Figure 4 depicts areas with chronic flooding.

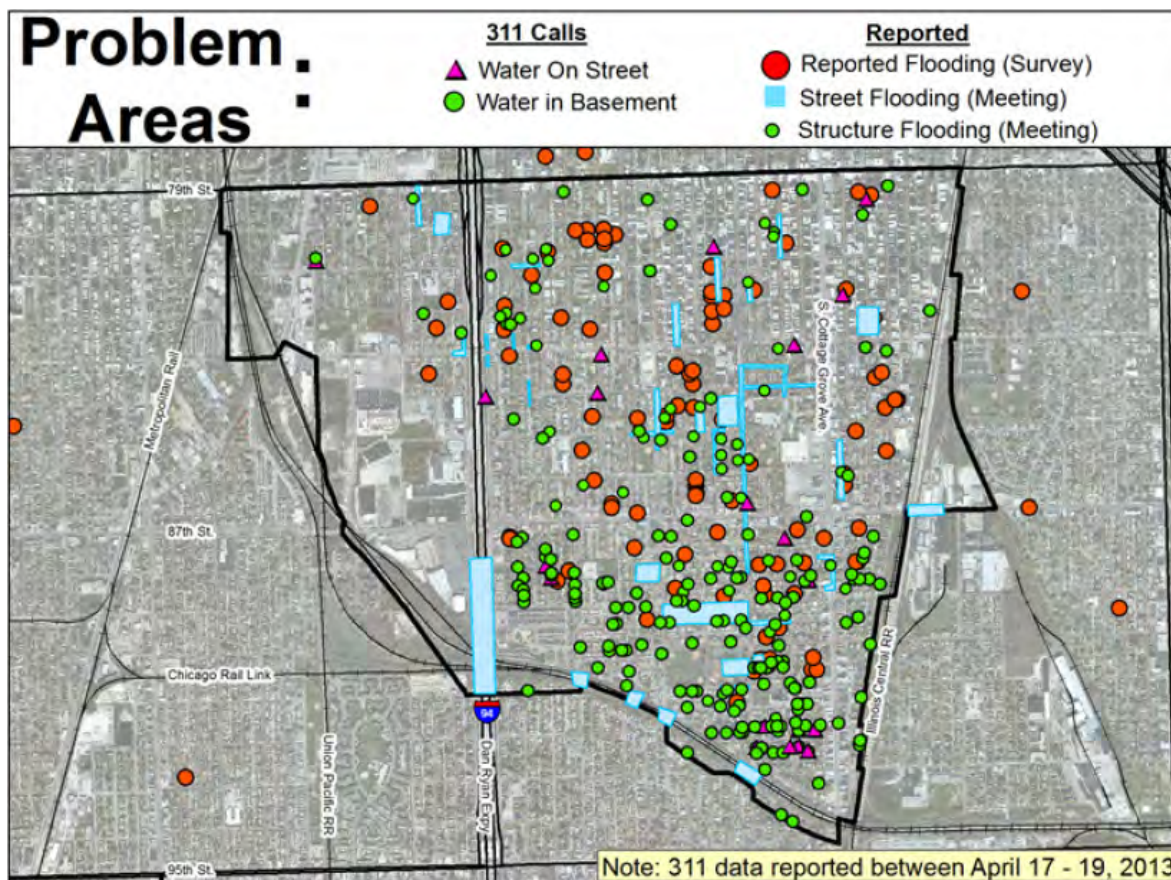
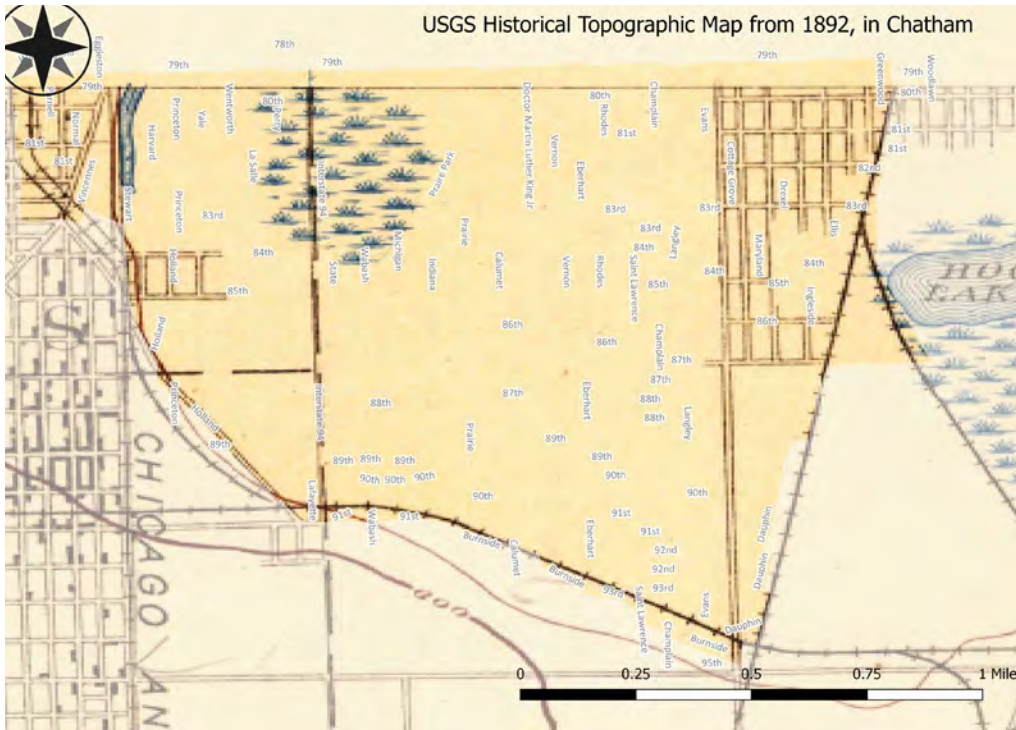
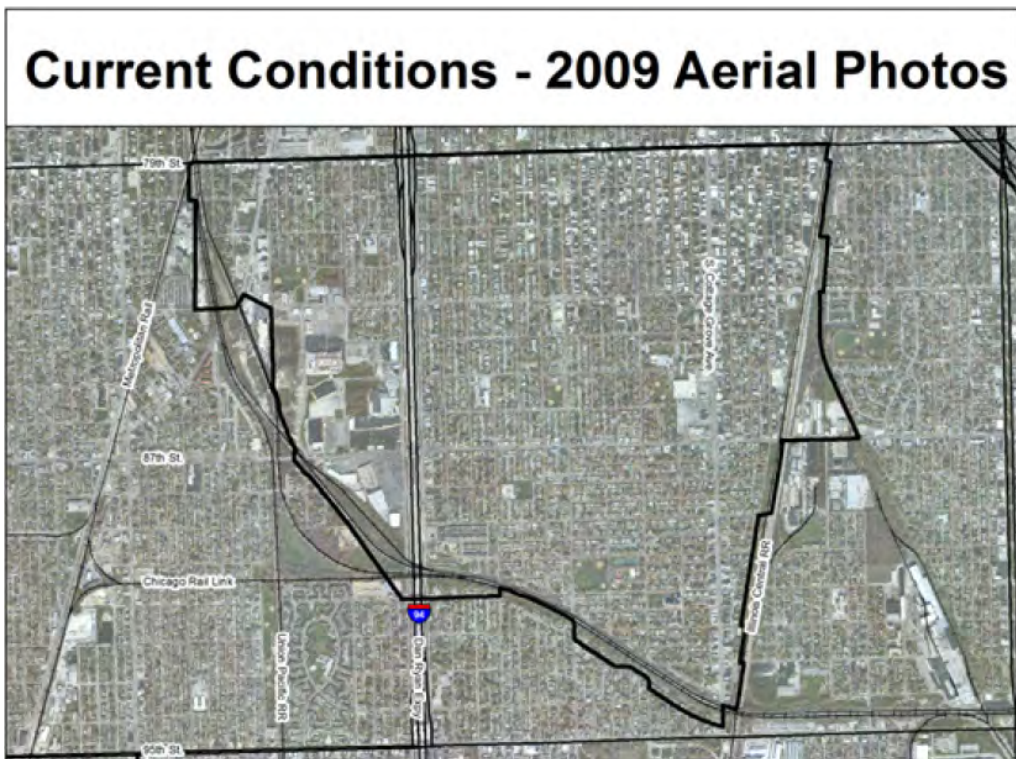


FIGURE 4: PROBLEM AREAS
Map courtesy of the U.S. Army
Corps of Engineers



FIGURES 5 AND 6: DEVELOPMENT IN CHATHAM
 Second map courtesy of the
 U.S. Army Corps of Engineers



“Annually, approximately 51 million gallons per inch of rain falls on the Chatham community, which if not conveyed through sewers overflows into the community.”

TOPOGRAPHY AND DEVELOPMENT

The Chatham neighborhood, located in an area once known as Hogs Swamp, is one of the lowest points in Chicago. The low elevation causes water to pool in the streets and contributes to backup in the sewer system. In the second half of the 20th century, uncontrolled urban development occurred within natural floodplains, paving over wetlands and low-lying areas to meet demand for residential and commercial development.²² Chatham changed rapidly from open, permeable grasslands into impervious residential and commercial development (Figures 5 and 6, page 16). Whereas stormwater was previously slowed and stored in the ground by native grasses, trees, and ponds, the water now runs off paved parking lots, buildings, streets, sidewalks, and turf grass, overwhelming the storm sewer network.

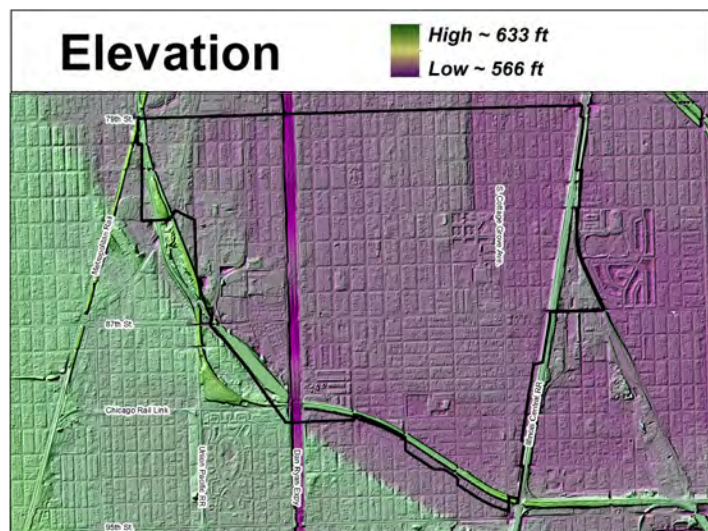
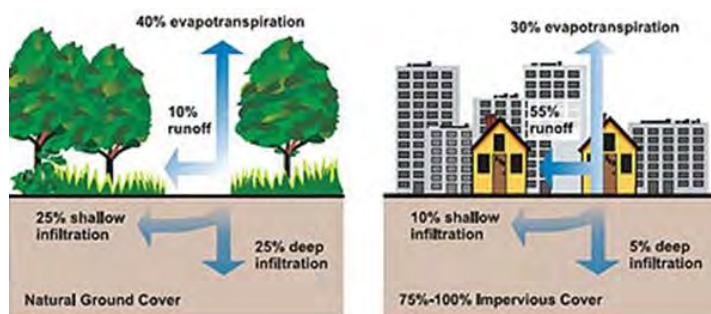


FIGURE 7: ELEVATION
Map courtesy of the U.S. Army Corps of Engineers

INCREASING IMPERVIOUS SURFACES

The loss of permeable surfaces (e.g. soil, grass) in Chatham is a primary factor contributing to flooding in the neighborhood. When development occurs, impervious surfaces (e.g. parking lots, sidewalks) reduces the amount of natural vegetation that absorbs stormwater (Figure 8, below). Water that is not absorbed back into the earth is called runoff, which pools in yards, comes up in basements, overflows streets, and seeps through walls.

FIGURE 8: BEFORE AND AFTER DEVELOPMENT



22. Our Community and Flooding, Illinois Department of Natural Resources 1998

23. University of Vermont Spatial Analysis Laboratory in collaboration with the Chicago Metropolitan Agency for Planning, the Field Museum, and Cook County, IL, <https://datahub.cmap.illinois.gov/dataset/high-resolution-land-cover-cook-county-2010>.

According to land cover data from the Chicago Metropolitan Agency for Planning (CMAP), at least 1.6 square miles (58%) of Chatham includes impervious surfaces, including buildings, roadways, and paved areas²³ (Figure 9, page 18). Annually, approximately 51 million gallons per inch of rainfall falls on the Chatham community, which if not conveyed through Chatham’s sewers overflows into resident’s homes and basements. However, on April 17-18, 2013, Chicago and the Chatham community received a 5.5 inch rainfall. At the time of publication, the amount of water conveyed through Chatham sewers was not publically available. Figure 10 (page 18) illustrates runoff in gallons per acre in the Chatham community.

Pervious surfaces, including trees and grass make up a little less than 1.3 square miles of the Chatham community. This plan recommends that runoff from impervious surfaces be captured through green infrastructure practices (e.g. bioswales, tree plantings, landscaped drainage areas), to provide additional flood protection to the Chatham community. This approach

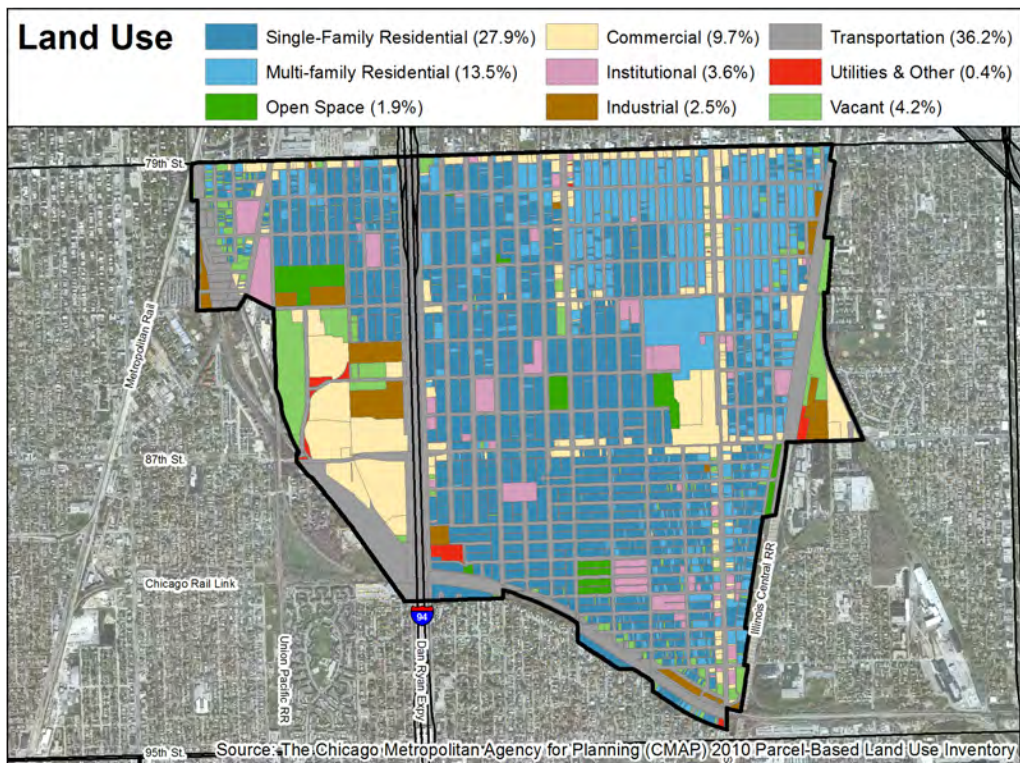
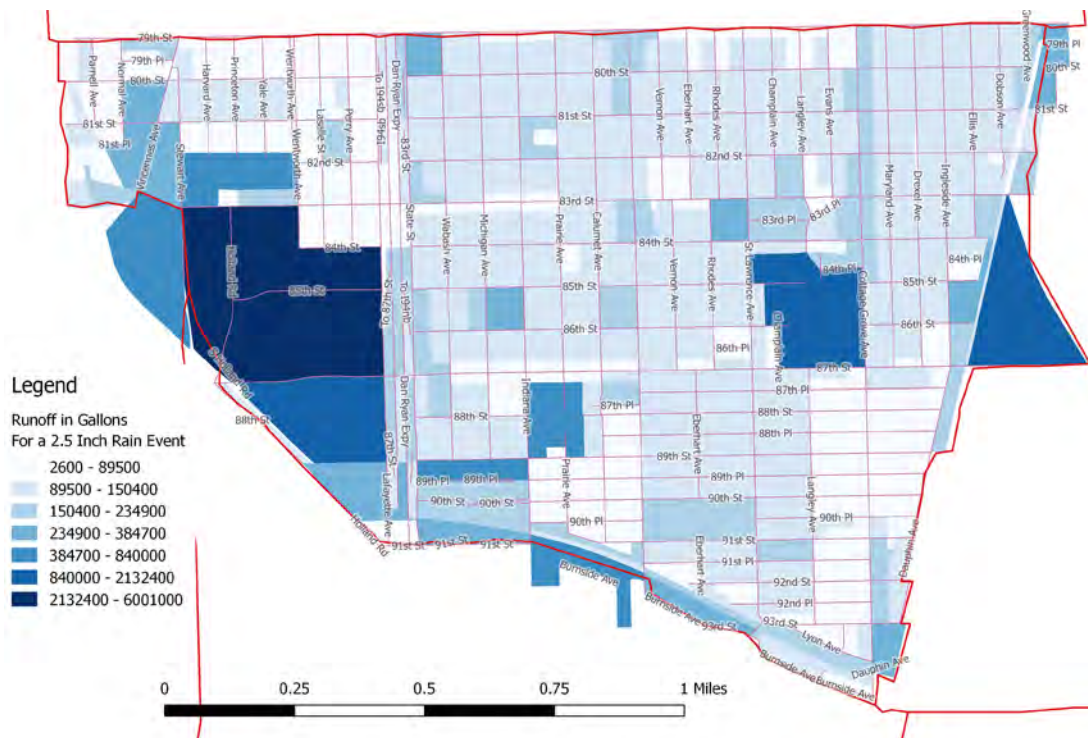


FIGURE 9: LAND USE
Map courtesy of the U.S.
Army Corps of Engineers



**FIGURE 10: RUNOFF
OF IMPERVIOUS LAND
COVER IN CHATHAM**

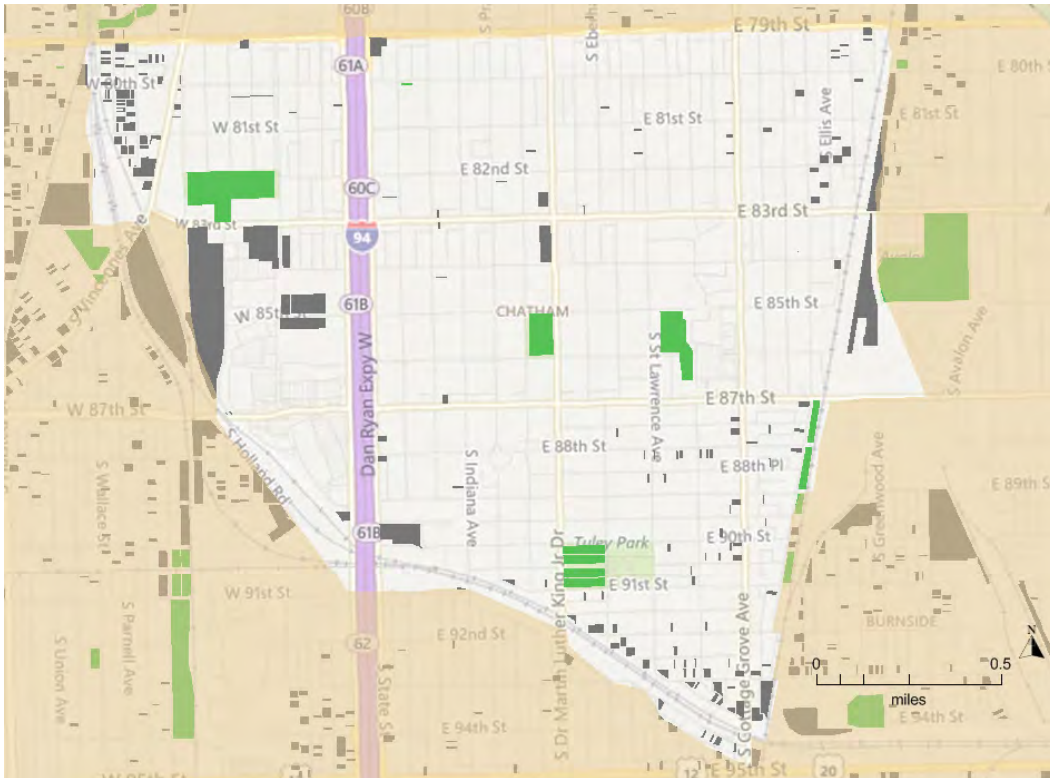


FIGURE 11: VACANT AND
OPENSOURCE LAND

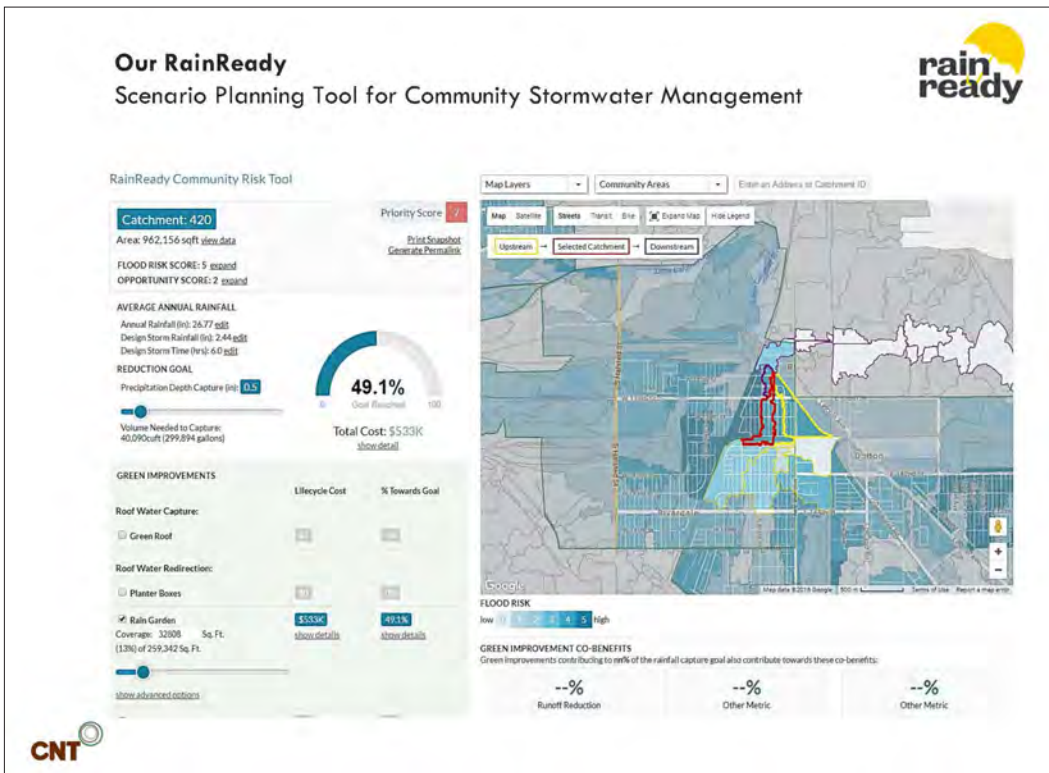


FIGURE 12: COMMUNITY
RISK MAPPING

aims to reduce the volume of water collected and treated through the City’s sewer system. Possible opportunities to implement green infrastructure practices may be applied on vacant land and land identified as open space land typically considered as undeveloped or minimally developed land (see Figure 11, page 19).

As an example, tree plantings provide opportunities for flood protection, increase the ability of the soil infiltrate water, improve community aesthetics and may capture between 292 and 2,162 gallons of rainfall. Studies have also shown that permeable pavement may infiltrate 80-100% of the rainfall. These opportunities, along with implementing other green infrastructure practices should be explored by local leadership. CNT’s community-specific Flooding Risk and Opportunity Mapping Tool could be used as a tool to inform that process. The tool maps flood risk, identifies catchments areas, and provides typical retrofit costs for proposed projects (see Figure 12 for examples of CNT’s flood risk identification maps, page 19).

CHANGING CLIMATE

Recent years have been defined by a marked increase in precipitation, particularly the high-intensity, short-duration storms associated with global climate change. As a result, Chatham residents are experiencing a “new normal” in weather patterns.

According to the 2014 National Climate Assessment, heavy downpours have been increasing across the nation, especially over the last three to five decades. In the Midwest and Northeast in particular, the heaviest rainfall events have become heavier and more frequent. Figure 13, below, shows the percent increase in the amount of precipitation falling during very heavy events in the Midwest from 1958 to 2012. Heavy downpours have become 35% more frequent since the 1980s and evidence suggests this trend will continue.²⁴ The implications are concerning – a 2.5 inch rainfall event in a 24-hour period already causes flooding in much of the Chicago region.²⁵

Average Annual Rainfall in Chicago: 1991-2011
Illinois State Water Survey Cook County Precipitation Network Station 10

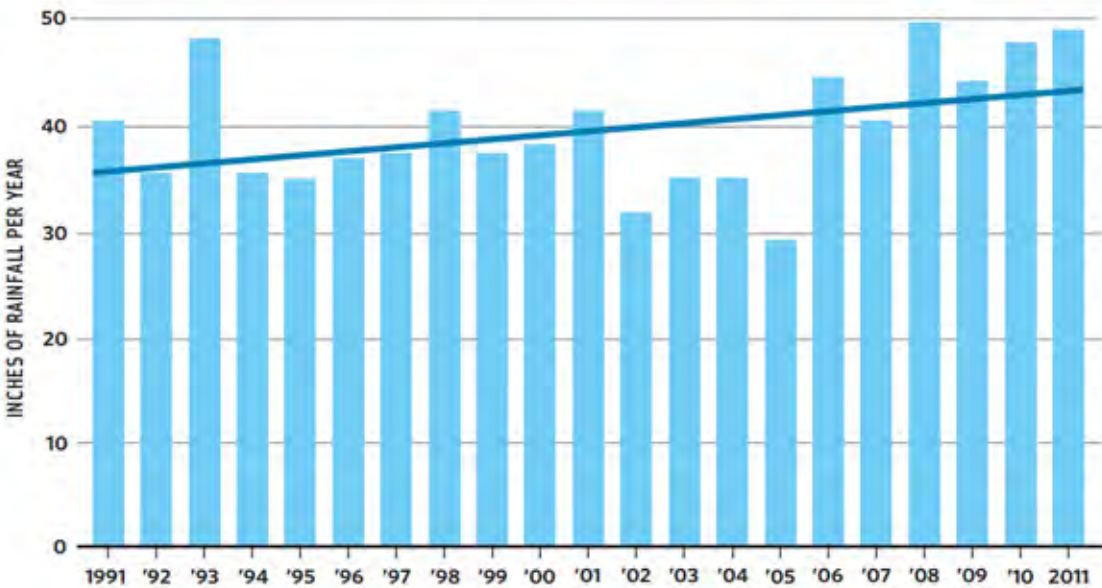


FIGURE 13: AVERAGE ANNUAL RAINFALL IN CHICAGO: 1991-2011
Courtesy of MWRD, Illinois State Water Survey

24. National Climate Assessment, 2014

25. Walsh, J. et al. 2014. Ch. 2: Our Changing Climate. Climate Change Impacts in the United States. Melillo, J.M. et al. Eds., U.S. Global Change Research Program, 19-67

According to the Illinois State Climatologist,²⁶ since 2008, the Chicago region, including the Chatham community, has experienced four storms in six years exceeding rainfall amounts of a “10-year storm.” This type of storm typically includes 4.96 inches of rain in a two-day period and characteristically occurs once every ten years. On July 22-23, 2011, Chicago experienced a “100-year storm” bringing a total of 8.41 inches of rainfall, the largest single day of rainfall since 1871.²⁷ On April 17-18, 2013 Chicago, experienced a “10-year storm,” with 5.5 inches of rainfall. If damages in 2013 were proportional to the ratio of rainfall and damages in the years occurring between 2007-2011, one could predict that payout would be greater in 2013, which is borne out by the 2015 analysis conducted for the State of Illinois under the Urban Flooding Awareness Act.

While the April 2013 storm did not result in an intense storm when compared to the July 2011 storm, damage was widespread and included extensive basement flooding in Chicago’s neighborhoods. These circumstances transpired since rainfall filled MWRD’s TARP, a deep tunnel designed to divert wastewater and stormwater into temporary reservoirs, well in advance of the heaviest rainfall.²⁸ Of the 2,500 3-1-1 calls from Chicago residents reporting basement flooding, Chatham reported 207 calls or 8%. Of these, 184 reported water in the basement and 22 reported street flooding.

While one storm does not attribute single handedly to climate change, the number of storms that have occurred in Chicago over the last six years are consistent with climate change projections.

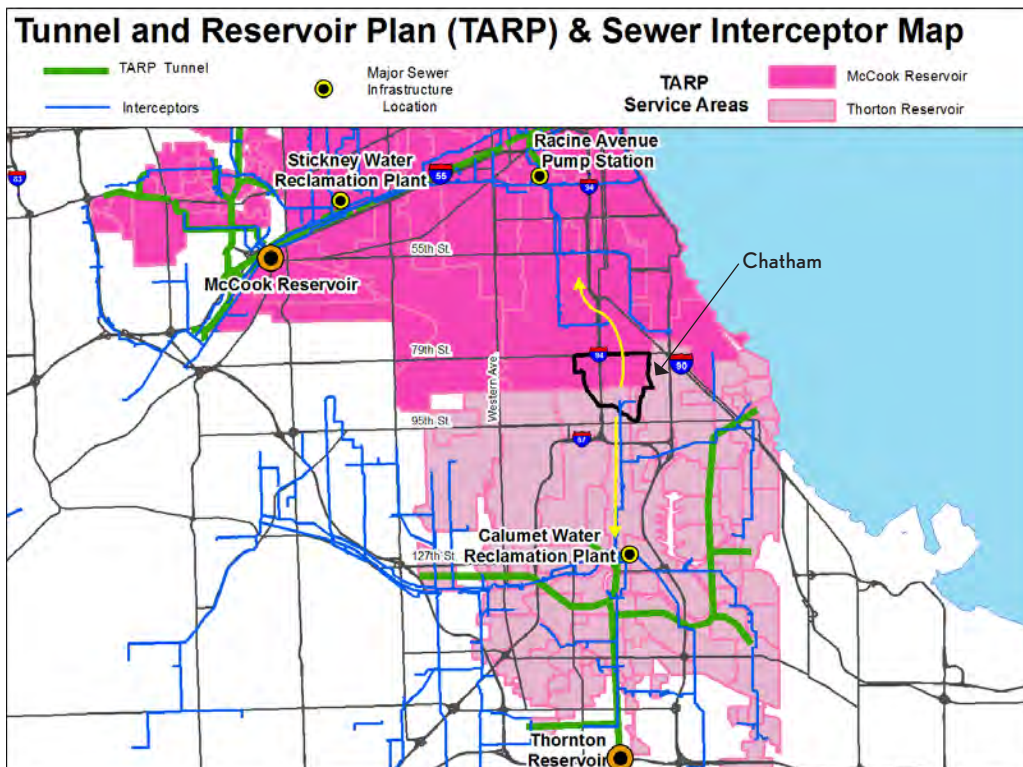


FIGURE 14: TUNNEL AND RESERVOIR PLAN (TARP) AND SEWER INTERCEPTOR MAP
Map courtesy of the U.S. Army Corps of Engineers

26. Illinois State Water Survey, www.sws.uiuc.edu/atmos/statecli/pubs.htm

27. City of Chicago Green Stormwater Infrastructure Strategy, www.cityofchicago.org/content/dam/city/progs/env/ChicagoGreenStormwaterInfrastructureStrategy.pdf

28. IBID

AGING INFRASTRUCTURE

Chatham is served by the City of Chicago's sewer system, which was created in 1856.²⁹ However, many of these sewers were deemed "barely sufficient to drain small areas."³⁰ Chatham, like much of Chicago has a combined sewer system that merges stormwater with household and sanitary waste. The pipes serving Chatham are roughly the same age as its building stock: between 50 and 75 years old. Since then, both the number of households contributing wastewater to the system and the percentage of impervious surfaces in the area have increased substantially.³¹ Paired with the increasing frequency of high-intensity storms, the original network of sewer pipes in Chatham is no longer sufficient to serve demand. A 2002 redevelopment study that focused on the Cottage Grove corridor in Chatham and Greater Grand Crossing determined that 93% of buildings are serviced by inadequate utilities (e.g. storm sewers and storm drainage, sanitary sewers, water, and gas lines).³²

Sewer system infrastructure in Chatham and the City of Chicago requires regular cleaning and repair and may exacerbate flooding problems if not maintained. The City of Chicago spends \$50 million annually maintaining 4,400 miles of sewer lines and 340,000 related structures.³³

SOURCE OF THE SEWERSHED

Chatham sits at the top of two distinct sewersheds, networks of underground pipes designed to collect and carry stormwater and household water out of the community for treatment. After leaving Chatham, combined sewer water travels through downstream communities before entering the large interceptor sewers that carry water to either the Stickney Water Reclamation Plant in the north or the Calumet Water Reclamation Plant in the south.

During periods of heavy rain, precipitation falling in downstream communities can fill the city sewer network to capacity. Since water in Chatham is the last in line to feed into the sewer system, it can sometimes be blocked from leaving the neighborhood. This causes stormwater runoff and household water from Chatham to back up into basements and public streets.

There is an unusual benefit to Chatham's "sewershed" configuration. Chatham sewers do not convey water from any other community upstream, granting Chatham unusual control over its own flooding. Ideally, if Chatham can reduce the volume of water running off streets, driveways, roofs, and parking lots in the neighborhood, it can have a significant impact on reducing its flooding problems. Through this plan, they can do so in a way that brings a broader range of benefits, including a more resilient housing stock, better pedestrian and bicycle facilities, tree plantings and beautification, and new job training and employment.

29. Combined Sewers, City of Chicago website 2015

30. Journal of Western Society of Engineers, Vol VII, October 1902. No. 5, CLII. *Notes on Designing Chicago Sewers*. By C.D. Hill, M., W.S.E Presented June 4, 1902

31. Combined Sewers, City of Chicago website 2015

32. 87th/Cottage Grove Redevelopment Project Area Tax Increment Financing District Eligibility Study, City of Chicago 2002

33. Combined Sewers, City of Chicago website 2015

EXISTING STORMWATER INITIATIVES

The City of Chicago offers several flooding programs and initiatives that are available to Chatham residents. Many of these are pioneering the use of green infrastructure approaches and have gained national attention. While wide-ranging and often impressive, several of the programs are only partially operational due to funding constraints. In addition, the programs are run by different City departments, to varying schedules or in different parts of the City, making it difficult for residents and aldermen to understand timing and benefits available. We have summarized the programs and initiatives below. If properly resourced and coordinated, they provide a foundation for implementing the RainReady Chatham Plan.

CHICAGO GREEN INFRASTRUCTURE STORMWATER STRATEGY

In 2014, the City of Chicago DWM allocated \$50 million for green infrastructure over the next five years. The funds are being invested in existing and future capital projects, leveraging partnerships with the Department of Transportation (DOT) and Park District, rather than as standalone stormwater infrastructure projects.

The Chicago Green Infrastructure Stormwater Strategy proposes a period of modest experimentation and monitoring to inform new maintenance procedures and design specifications for implementation across the City. The City will complete a green infrastructure study using “Infoworks,” a Wallingford Software hydraulic and hydrology software program used to perform cost-benefit analyses of various green and grey infrastructure scenarios. Specific opportunities include permeable pavement parking lanes, parkway bioswales or landscaped drainage areas, tree plantings, and green alleys.

The first round of projects funded through DWM’s Green Infrastructure Stormwater Strategy included a project in Chatham, the Cottage Grove Avenue Project.



CHICAGO NEIGHBORHOODS NOW

The City of Chicago recently announced that it will develop a “Chicago Neighborhoods Now Action Plan” to include strategies and priority projects to improve Chicago neighborhoods. The Plan will build upon existing neighborhood plans; describe assets and strengths of each Chicago neighborhood, as well as demographic, housing, and land-use data. Residents and leadership in Chatham have the opportunity to implement recommendations from previous plans, including RainReady Chatham, and create new ideas for the future Plan. Residents, community groups and local leadership may use this platform to address flooding concerns and seek solutions for their respective neighborhoods.

SUSTAINABLE CHICAGO 2015

The Sustainable Chicago 2015 Action Agenda³⁴ builds upon the City’s vision to make Chicago neighborhoods more viable and sustainable. Launched in 2012, the Plan offers a roadmap for residents and businesses to achieve sustainability, focusing on seven themes: economic development, energy efficiency, transportation, water and wastewater, parks and open space, waste and recycling, and climate change. The Agenda specifically addresses opportunities to enhance stormwater management, including installation of replacing or relining 320 miles of water mains.³⁵

34. City of Chicago, www.cityofchicago.org/city/en/progs/env/sustainable_chicago2015.html (accessed September 20, 2016).

35. City of Chicago, www.cityofchicago.org/content/dam/city/progs/env/Sustainable_Chicago_2012-2015_Highlights.pdf (accessed September 20, 2016).

COTTAGE GROVE AVENUE PROJECT

CDOT and DWM have partnered to incorporate green infrastructure into the planned transportation improvement project underway on Cottage Grove Avenue between 77th Street and 83rd Street. This project includes \$1.2 million in green infrastructure Best Management Practices (BMPs), including permeable pavers and tree pits. CDOT estimates that the project will divert over 113,000 gallons of stormwater from a typical two-hour five-year storm. At the time of this Plan's publication (November 2016), Phase One of the work is well underway. Phase Two, which would extend from 83rd Street to 87th Street, is also being considered. In partnership with UI Labs, DWM will closely monitor the performance of stormwater BMPs on the Cottage Grove project to inform future investment in green infrastructure throughout the City.



FIGURE 15: COTTAGE GROVE STREET IMPROVEMENTS
Photo courtesy of Chicago Department of Transportation

SOUTHSIDE CHICAGO GREEN

The Metropolitan Water Reclamation District (MWRD) has commissioned a study of urban flooding on Chicago's South Side. This study, which launched in March 2015, updates DWM's Infoworks trunk sewer model to incorporate green infrastructure strategies. The resulting report identified a combination of green and grey infrastructure strategies that can be used to reduce flood risk in a 13-square mile area of the South Side. This study area includes a small portion of Chatham, south of 87th Street.

CDOT'S GREEN ALLEYS PROGRAM

The City of Chicago's "Green Alley" program is celebrated for its stormwater infiltration and storage implementation efforts. It has attracted national attention, with over 200 projects completed City wide. CDOT's Green Alleys Program redesigns the City's alleys for stormwater infiltration and storage using permeable pavement, open catch basins, recycled materials, and other environmental implements to capture stormwater. While no green alleys have been implemented in the Chatham neighborhood, such infrastructure has the capability of capturing stormwater and should be considered.

GREY INFRASTRUCTURE INVESTMENT - CHICAGO WATER MANAGEMENT DEPARTMENT

In 2012, the City of Chicago's Department of Water Management (DWM) announced a goal of rebuilding or relining 750 miles of sewer mains, relining 140,000 sewer structures, and upgrading four pumping stations across Chicago in the next ten years. Approximately \$1.6 billion has been allocated from the City's Capital Improvement Program for 2014-2018 grey infrastructure work.³⁶ Construction costs are typically \$5-6 million per mile for sewer replacement. These improvements will be funded through water and sewer fees, as well as water and sewer revenue bonds.

The City's priority investments were selected based on physical inspection, maintenance and repair records, and

36. 2014-2018 Capital Improvement Program

37. 2014-2018 Capital Improvement Program; Chicago Green Stormwater Infrastructure Strategy 2014

the City's trunk sewer model; however, detailed information on this analysis is not publically available at this time.³⁷ Construction schedules are not available to the public, nor are the plans and priorities that are guiding program implementation.

Figure 16, Chatham Sewer Capital Improvement Project, depicts planned sewer projects in Chatham, including replacement, lining, and cleaning. In August 2016, a sewer main construction project was launched to install 2,600 feet of new 24-inch to 42-inch sewer main in S. Calumet Avenue (E. 89th Street to E. 87th Place) and in S. Eberhard Avenue (E. 89th Place to E. 87th Street) (Figure 17).

Compared to other neighborhoods, relatively few projects are planned for Chatham, however, this neighborhood will benefit from sewer improvement projects located downstream in the sewershed.

FIGURE 16: PLANNED SEWER REPLACEMENT AND MAINTENANCE FROM THE CITY OF CHICAGO CAPITAL IMPROVEMENT PROGRAM, 2014 - 2018

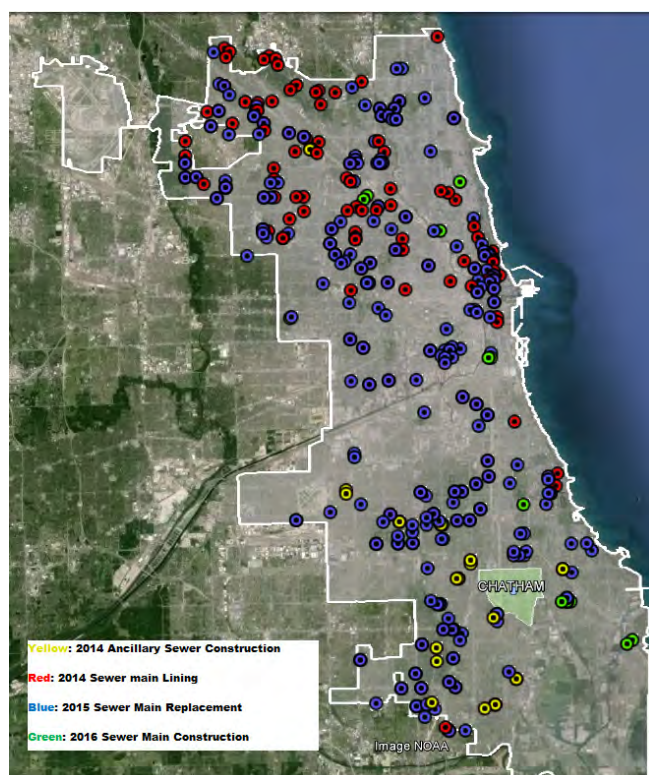


FIGURE 17: 87TH SEWER MAIN PROJECT
Photo courtesy of Lori Burns, Chatham resident

Grey vs. Green Infrastructure

Grey infrastructure includes the network of man-made sewer mains, pipes, and detention ponds that collect and manage stormwater. Proper maintenance is essential for grey infrastructure to operate effectively. **Green infrastructure** mimics the natural hydrologic process, utilizing soils and vegetation to capture rainwater and runoff where it falls. It can also provide more biodiversity, improve air quality, and clean water. Implementing green infrastructure in combination with grey infrastructure helps cost-effectively reduce the burden on grey infrastructure.



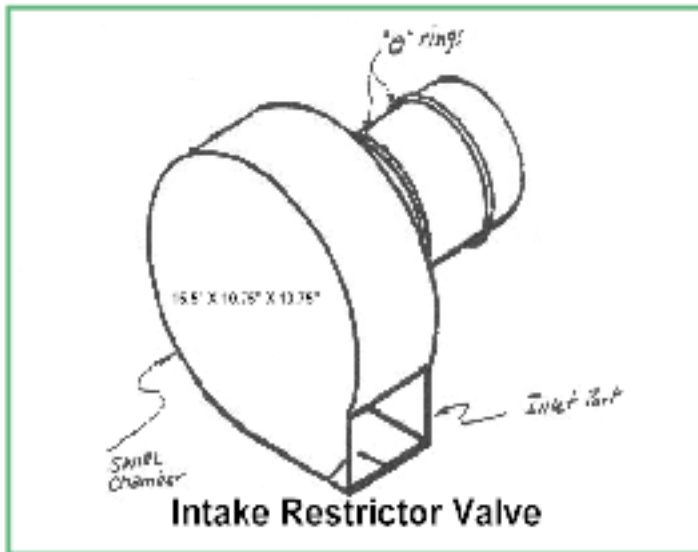


FIGURE 18: INLET RESTRICTOR VALVE

DWM workers installed close to 200,000 inlet restrictor valves into Chicago's street catch basins, at a rate of 90 to 120 per day. Now complete, the "Rainblocker" program has been finished under budget and a year ahead of schedule.

Source: www.cityofchicago.org/city/en/depts/bldgs/supp_info/blocking_rainwaterandpreventingsewerbackup.html

RAINBLOCKER PROGRAM

Inlet restrictor valves, or *rainblockers*, were installed at several catch basins along Chatham streets in the late 1990s. Rainblockers regulate the flow of water from the street into the main sewer line. During a big storm, the rainblocker allows less water through the drain, reducing peak demand on the sewer and temporarily filling the street with water. Water is slowly drained from the street into the sewer system. Rainblockers use streets to temporarily store rainwater, keeping it out of the sewer and decreasing the risk of basement backup.

THE CITY OF CHICAGO'S RESIDENTIAL FLOOD ASSISTANCE PROGRAM

The City of Chicago's Residential Flood Assistance Program (RFAP) is providing assistance to homeowners across Chicago that are still struggling to recover from the April 2013 floods and meet strict eligibility criteria. The program is administered by several nonprofits, including CNT (through its RainReady Home program) and the NHS. Each homeowner receives a free home inspection to identify



opportunities for flood repair and prevention. The service provider will then make tailored recommendations for the building and yard, solicit bids from qualified contractors, and perform construction oversight to ensure that the repairs and upgrades are performed correctly. Three Chatham residents have benefitted from this program.

The City's RFAP program is financed by federal disaster relief funds and will finish in 2016.

CITY OF CHICAGO'S BASEMENT FLOODING PARTNERSHIP AND PRIVATE DRAIN PROGRAM

The City runs two programs to alleviate residential basement backup: the Basement Flooding Partnership Program and the Private Drain Program.

The Basement Flooding Partnership was created to provide technical support to communities challenged by localized flooding. Through this program, the City will inspect and clear catch basins and local sewers and canvas the neighborhood to review problem areas and provide guidance to community members on landscaping solutions. Communities must demonstrate interest from 70% of residents to be considered for this program.³⁸

The City's Private Drain Program provides a free service to homeowners who can prove they have broken drain tiles in the lateral lines between the sidewalk and the mainline sewer. This entails hiring a licensed sewer contractor to rod and/or perform a video inspection of the drain line.³⁹

38. Basement Flooding Partnership, City of Chicago website 2015

39. Private Drain Program, City of Chicago website 2015

GREENCORPS CHICAGO

Launched in 1994, Greencorps Chicago is a City of Chicago green industry job training program for individuals with barriers to employment. Following a rigorous screening process, participants receive classroom and hands-on training experience in areas of horticulture, weatherization, and ecological restoration. Greencorps Chicago has implemented 1,000 green projects throughout the City, has placed 75% of its workforce graduates in green-collar jobs, and has engaged 475 students.

In 2015, the Illinois Department of Natural Resources (IDNR) provided funding for Greencorps Chicago to develop a green infrastructure curriculum to include topics about the role of green infrastructure, types of green infrastructure, and in-home green and grey solutions.

CHICAGO PUBLIC SCHOOLS SPACE TO GROW: GREENING CHICAGO SCHOOLYARDS PROGRAM

The unique Space to Grow program aims to transform Chicago schoolyards into vibrant green spaces while effectively managing stormwater. Led by Openlands and the Healthy Schools Campaign, this program seeks to transform schoolyards into turf fields; permeable surfaces; rain gardens; and more to benefit the students, environment and the community. It brings leadership and funding from multiple partners: Chicago Public Schools; MWRD; Chicago DWM. Westcott Elementary School, in the northwest corner of the Chatham community, is planned to participate in this program. Other schools in Chatham would also benefit from participating in the program.



Regulatory Framework

Development in Chatham is subject to guidelines and regulation under Chapters 11-18 of *Stormwater Management of the Municipal Code of Chicago*, the Department of Water Management's Regulations for Sewer Construction and Stormwater Management, and the MWRD's Watershed Management Ordinance.⁴⁰

CHICAGO'S STORMWATER MANAGEMENT ORDINANCE

The Stormwater Management section of the Municipal Code of Chicago dictates specific maximum permissible water release rates for new development. These release rates vary depending on the size and land-use proposed. For sites between 7,500 and 21,780 square feet, the maximum permitted release rate is 0.15 cubic feet per second. Sites between 43,560 and 76,230 square feet have a maximum release rate of 0.24 cubic feet per second. The requirement for a site between those two sizes shall be interpolated based on a linear relationship between the two standard sizes.

An alternative means to calculating the maximum allowable release rate is available; developers can use the City's outlet sewer capacity map to determine the maximum release rate per acre of development. In Chatham, the outlet sewer capacity is between 0.24 and 0.27 cubic feet per second per acre.

40. City of Chicago, 2014; MWRD, 2014

MWRD'S WATERSHED MANAGEMENT ORDINANCE

MWRD's Watershed Management Ordinance (WMO) was updated in July 2014 to include requirements for stormwater management and reduction of infiltration/inflow. These regulations apply to all tributary municipalities that discharge wastewater into MWRD facilities, including Chatham. WMO Article 5 restricts all development in its tributary communities, including Chatham, from:

1. Increasing flood elevations or decreasing flood conveyance capacity.
2. Causing any increase in flood velocity or impairment of the hydrologic and hydraulic functions of streams.
3. Degrading surface or ground water quality.

A set of development standards accompany this ordinance, including specifications for runoff control, volume control, and storage. These requirements will be phased in over a period of five years. In 2019, the allowable release rate will become 0.15 cubic feet per second per acre for a 100-year storm event. Where on-site detention is not practical, the WMO permits offsite detention within the same subwatershed. Single-family homes and multi-family or subdivision developments sized less than 0.5 acres and 1 acre, respectively, are exempt from the 2015 WMO.⁴¹

Insurance Options

PRIVATE INSURANCE SEWER-RIDER

Some property owners in Chatham have elected to buy a sewer rider to their existing home insurance policy. These policies cover cleanup and repair costs associated with sewer backup or sump pump failure, not including the cost of the failed sump pump. Anecdotally, residents report receiving misinformation about insurance policies and coverage, leaving many flood victims uninsured. Additionally, since these policies are administered by private insurance providers, homeowners with a chronic flooding problem risk loss coverage if they report multiple flood events.

Insurance coverage for foundation seepage is not available.

NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program (NFIP) was created to protect structures that are vulnerable to riverine flooding and does not cover buildings susceptible to urban flooding.⁴² The result is that urban flood victims are only eligible for insurance at reduced rates through the NFIP if their local unit of government chooses to participate. In Illinois, 92% of flooding occurs outside of the floodplain.⁴³ In Chatham, 100% of flooding occurs outside the floodplain, as there are no floodplains in the neighborhood.⁴⁴

41. *Watershed Management Ordinance: Summary*, MWRD 2014.

42. Urban flooding is typically defined as non-riverine flooding, caused by urban drainage issues and runoff from impervious surfaces. In Midlothian, urban flooding includes basement backup, storm sewer backup, and seepage.

43. Illinois Department of Natural Resources. (2015) *Report for the Urban Flooding Awareness Act* www.dnr.illinois.gov/WaterResources/Documents/Final_UFAA_Report.pdf (accessed September 19, 2016).

44. *Center for Neighborhood Technology. (2015). Phase One Report: RainReady Chatham*. Chicago, IL: CNT.

SOLUTIONS FOR A RAINREADY CHATHAM

Create a Dedicated Delivery Team

Objective: To provide cohesive and coordinated services and support to residents and communities.

Some types of flooding, such as foundation seepage, are best addressed at the individual property level. Other forms, such as street flooding, are caused by a failure of public infrastructure. This range of flooding problems calls for a cohesive and coordinated suite of solutions across multiple scales: the individual property, the neighborhood, and the community as a whole. To manage the complexity and provide quality services to residents, we recommend the creation of a dedicated delivery team.

Since the plan builds on several existing City initiatives, we suggest that the delivery team exist within the City of Chicago. Given the urgency of the problems and the mix of solutions needed, we recommend that the measures

prescribed below occur simultaneously and in the form of a multi-partner, coordinated campaign, with designated leadership and funding, and high-visibility public outreach and engagement.

In addition to reduced flooding, this Plan has been designed to bring a broader range of benefits, including a more resilient housing stock, complete streets projects that unite stormwater planning with better pedestrian and bicycle facilities, tree plantings and beautification, and a new job training and employment program.

Since Chatham's flooding issues are similar to those in many of its South Side neighbors, we recommend that the resulting program be subsequently rolled out to these communities via the delivery team, drawing on the same services, partnerships, and funders.



Given the sense of urgency and the mix of solutions needed to address this crisis, we recommend the measures prescribed occur simultaneously and in the form of a multi-partner, coordinated campaign, with designated leadership and high-visibility public outreach and engagement.

Establish a Home Upgrade Initiative

Objective: To protect individual properties at risk of localized flooding, i.e. where property maintenance issues are the primary cause of risk.

Some types of flood risk are most effectively addressed by an individual property owner. Individual property home upgrades are designed to help those properties where the source of the flooding is localized, i.e. within the property boundaries. The flooding might be caused, for example, by a broken downspout causing water to pool around the side of the property.

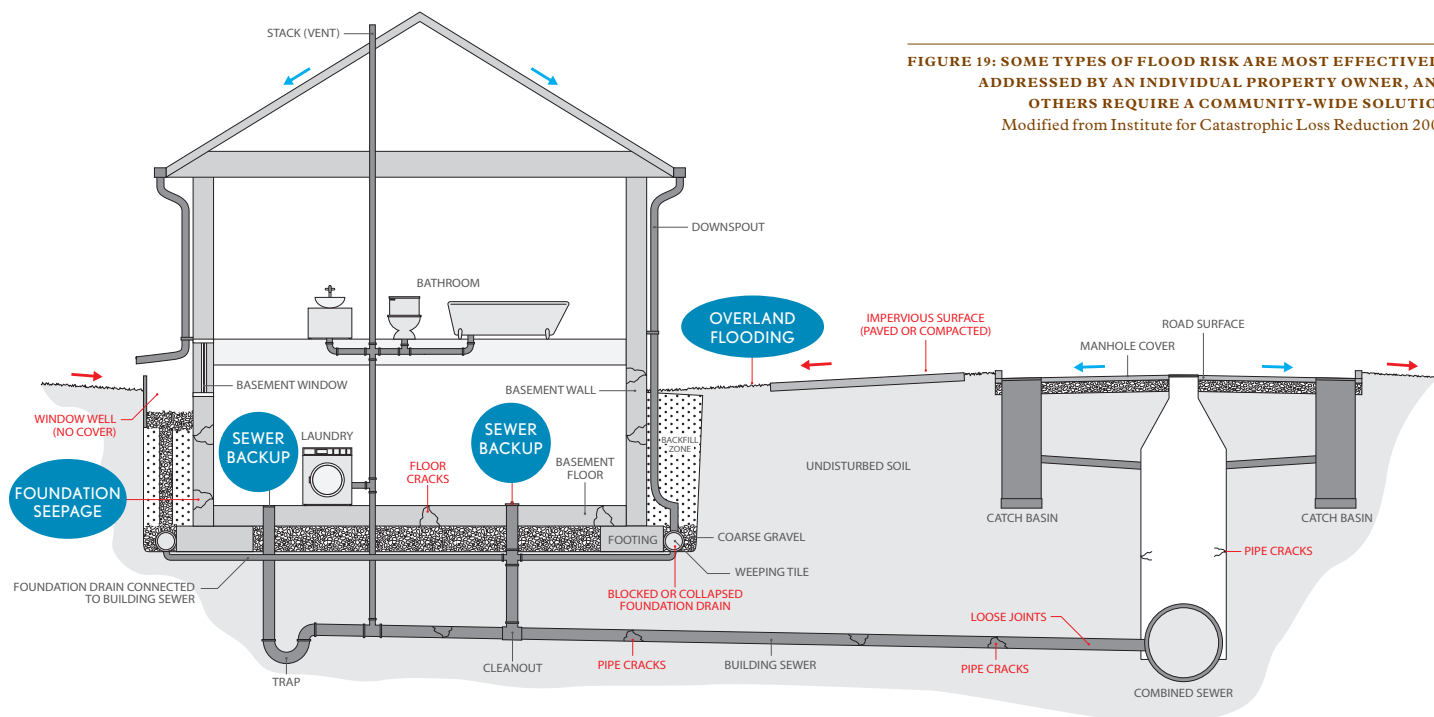


FIGURE 19: SOME TYPES OF FLOOD RISK ARE MOST EFFECTIVELY ADDRESSED BY AN INDIVIDUAL PROPERTY OWNER, AND OTHERS REQUIRE A COMMUNITY-WIDE SOLUTION
Modified from Institute for Catastrophic Loss Reduction 2009

HOME UPGRADES

Led by: The City of Chicago and Greencorps Chicago
Approximate cost: \$700 - \$10,000 per home
Proposed timeline: Near-term

It is our recommendation that the City of Chicago pilot and establish a multi-partner initiative to upgrade homes with a focus on low-cost strategies, such as disconnecting downspouts, raising utilities off basement floors, removing carpets, repairing sewer lateral lines, sealing foundation cracks, regrading the yard to prevent pooling near the foundation, and other plumbing, landscaping and building improvements. Much of the construction work could be done by Greencorps Chicago, a Chicago-based training program for people with barriers to employment. Our research has found that homeowners are somewhat willing to pay for these improvements, but it will be necessary for the City to provide some subsidies.

POTENTIAL FUNDING SOURCES

- City of Chicago Capital Improvement Program
- Metropolitan Water Reclamation District
- Neighborhood Housing Services of Chicago
- EPA State Revolving Loan Funds
- HUD Community Development Block Grants
- Insurance and lending organizations
- Individual Homeowners

IMPLEMENTATION STRATEGY

Screening

Together CNT and the City could work with community groups, aldermen, and local businesses to introduce the initiative to residents in Chatham. Through an initial application process, properties will be screened according to their flood risk. Those that appear to have localized risk, as deemed by the City, such as a history of seepage or a collapsed lateral line, would qualify for

an individual property flood risk assessment. Properties that are located in areas with more widespread risk, like those vulnerable to sewage backup from the mainline sewer or street flooding, would also benefit from broader neighborhood initiatives like Neighborhood Upgrades (read more on page 35). In practice, our experience suggests that the majority of properties in Chatham are affected by both localized risk and broader risks.

Risk Assessment and Construction Oversight

Under the home upgrade initiative, every household with localized risk would be eligible for a property flood risk assessment, including recommendations for critical improvements as well as construction oversight. A cost-sharing program should be available to assist homeowners.

HOME UPGRADES: LESSONS LEARNED

From 2013 through 2015, CNT’s RainReady Home program (www.rainready.org/our-services/rainready-home), brought flooding solutions to individual property owners, provided 23 free home inspections to Chatham flood victims. Through this service, homeowners received detailed written reports of their flood risk along with customized solutions to reduce risk. While homeowners are responsible for construction costs, experienced RainReady staff provides oversight of the construction process ensuring a successful implementation and results. According to our community survey of 208 residents, residents find it challenging to identify the appropriate solutions for their flooding. However, many homeowners are willing to invest in solutions that have been vetted by an independent expert (*Willingness to Invest in Flood Prevention Measures*, page 32).

We observed a mix of vulnerabilities in the Chatham housing stock. Many structures show signs of foundation seepage from yard flooding, whether from poorly draining soils or landscaping that causes water to

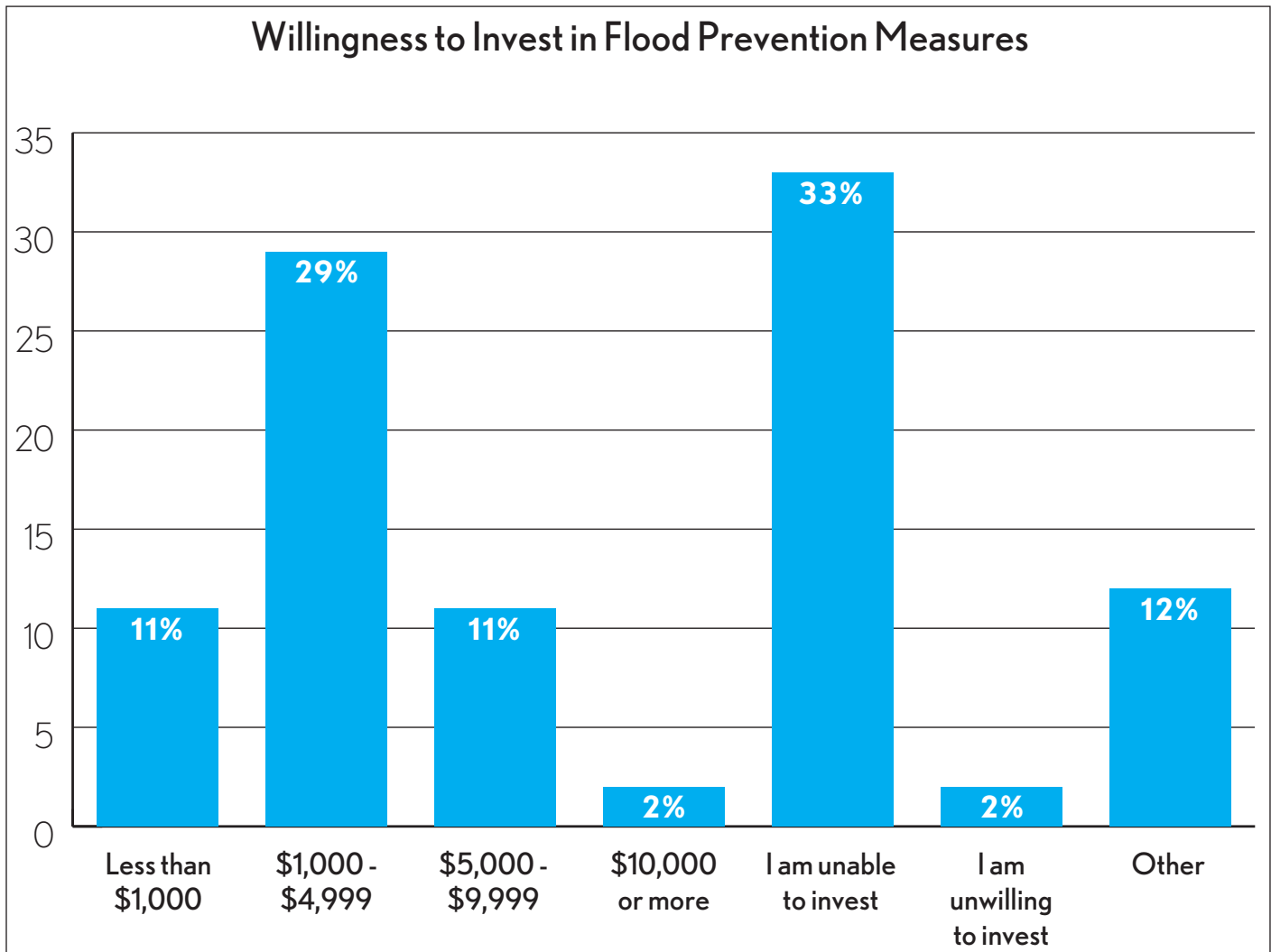


FIGURE 20: WILLINGNESS TO INVEST IN FLOOD PREVENTION MEASURES

pool near the home. In some cases, water enters the property through basement window wells or doors. Overwhelmingly, these basements contain mold damage, foundation cracking, and rot related to flooding. Raw sewage backup was also very common in the basement of these homes. A number of residents mentioned two to four feet of raw sewage entering their home and damaging their belongings.

In many cases, residential flood risk could be reduced through low-cost measures, such as regrading the yard

to direct water away from the house, sealing foundation cracks, and disconnecting roof drain downspouts. A program like CNT's RainReady Home could be scaled across the neighborhood to provide at-risk homeowners with critical information to reduce residential flood risk and improve resilience. With an anticipated City-led cost-sharing component and homeowners willing to invest in flood reduction measures, proactive investments could bring Chatham housing stock back to a resilient standard.

From 2013 to 2015, typical costs for RainReady Home

improvements ranged anywhere between \$4,500 to \$6,500 per home, for a suite of solutions, including overhead sewers and foundation drains. In 2016, the average costs increased, ranging from \$21,000 to \$23,000. This cost increase is a result of the severity of the problems facing the properties we are currently working with and the requirements (e.g. Davis-Bacon

Rule) for the federal grant that is funding this work. We are also providing an expanded suite of solutions, including downspout and gutter repair, rerouting, and extension; backwater valve or overhead sewer installation; regrading; concrete repouring and/or repair; and crack repair (either tuck pointing or joint caulking).

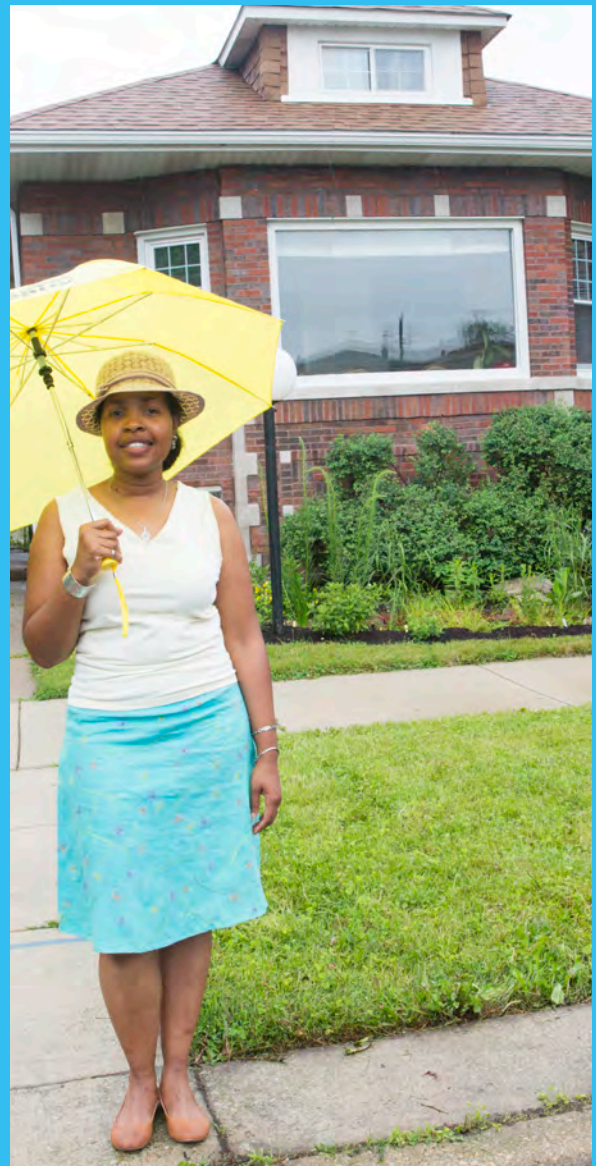
RainReady Home

Homeowner Lori Burns had experienced multiple instances of flooding in the basement of her Chatham bungalow that had been in the family for many years. After sharing her story at an event hosted by CNT, she applied to participate in the RainReady Home program.

The RainReady Home team visited Lori's home and conducted a comprehensive site assessment that included:

- Collection of previous flood information
- Examination of the building foundation, basement, and landscape
- Camera inspection of the home sewer
- Observation of the adjacent properties and stormwater rights of way

The team determined the water was entering the home through floor drains and through porous foundation walls in the basement. The team also decided that the building's downspouts were connected to the home sewer, potentially compounding the water backup problem during heavy rain events. After getting her detailed RainReady report, Lori received assistance to implement a suite of coordinated plumbing and landscape solutions for under \$5,000 to help her reduce her home's future flood risk.



REDEVELOPING FOR RESILIENCE

Led by: The City of Chicago and the Greater Chatham Initiative

Approximate cost: \$700 to \$10,000 per home

Proposed timeline: Near-term

We recommend the City lead an effort to ensure that redevelopment and loan programs maintain a resilient standard in Chatham homes.

There is an ongoing effort to increase the rate of homeownership on Chicago's South Side. Mayor Rahm Emanuel announced the five-year Home Buyer Assistance Program in January 2014 to help low- and middle-income Chicagoans afford a home. The program aims to invest \$1.3 billion dollars in home construction, rehabilitation, and preservation for more than 40,000 housing units. Nearly \$200 million were allocated toward 6,187 affordable housing units during the third quarter of 2015.

The Greater Chatham Initiative also calls for a major housing redevelopment program led by Genesis Housing Corporation to attract home buyers to the greater Chatham community. The initiative recommends that development include coordinated investments and consist of the "right" type of development, including existing home upgrades and new construction. While commendable, without adequate protections, many unsuspecting home buyers will end up with a flood-prone home. The cost to clean up floods, repair damaged plumbing, and mitigate future loss is an unforeseen cost that can push many low- and middle-income residents into financial instability.

POTENTIAL FUNDING SOURCES

-
- Housing developers
-
- Individual homeowners
-
- Insurance and lending industry
-
- EPA State Revolving Loan Funds
-

IMPLEMENTATION STRATEGY

We recommend that the City coordinate with developers to ensure that rehabilitated homes are assessed for risk prior to sale. We recommend each property receive a downspout disconnection and green infrastructure installation to support community-wide stormwater management as well as improved resilience at that particular site.





Establish a Neighborhood Upgrade Initiative

Objective: To protect flood-prone properties at risk of flooding as a result of failed public infrastructure, e.g. those vulnerable to street flooding or sewage backup from the mainline sewer.

The majority of at-risk properties in Chatham are affected by sewer backup. The large upfront cost of retrofitting every household with a backwater valve or overhead sewer, or constructing traditional grey infrastructure to protect the neighborhood, is a major barrier to the timely reduction of community flood risk. A more practical solution involves a block, street, and neighborhood approach to rehabilitate strategic sewer lines and invest in an overall reduction in the volume of stormwater runoff entering the sewer system. Because this approach uses green infrastructure (*Grey vs. Green Infrastructure*, page 25), it has the added benefit of bringing beauty, increased property values, and improved air quality to Chatham.

Building off the City of Chicago's existing Basement Flooding Partnership Program, we recommend an approach that brings together residents, local political leaders, public agencies, and nonprofit partners to invest in integrated green infrastructure solutions like downspout disconnection, bioswales, tree plantings, and green infrastructure.

We recommend taking a sewershed approach when delivering these initiatives, wherein risk and solutions are mapped within a discrete urban drainage network. This approach encourages outreach and engagement of homeowners who may not flood but contribute to flooding downstream in the sewershed. In this way, opportunities to reduce runoff in strategic upstream locations can be valued for their downstream impact. For example, stormwater interventions on vacant lots, City parks, schools, and commercial corridors may be more easily pursued than a network of residential improvements with comparable storage potential.

Early engagement with local land owners – residential, commercial, and public – will help identify low-hanging fruit as well as potential barriers. Some of these land users, like Chicago Public Schools, may also be eligible for outside grant opportunities. Studies including the City of Chicago's Green Healthy Neighborhoods Planning Strategy and MWRD's Phase II Pilot Study (see Southside Chicago Green Section) would be useful resources to inform this process.

NEIGHBORHOOD UPGRADES

Led by: The City of Chicago and Greencorps Chicago

Approximate cost: \$228-278 per downspout⁴⁵

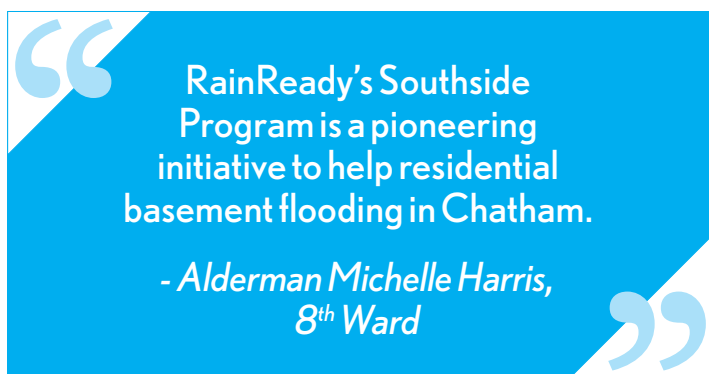
Proposed timeline: Near-term

This initiative would assist all Chatham residents regardless of whether or not they are flooding, to disconnect their downspouts and install cisterns, a tank to hold rainwater, rainbarrels, and rain gardens in yards and parkways. Typical potential short-term runoff capture from implementing these options on a typical bungalow home in Chatham for a 2.5" rain event are outlined in the "Volume Control" table below.

Volume Control	
Required Volume Capture from 0.5" over Impermeable Surface (ft ³)	42
Volume Captured by current BMPs (ft ³)	111
Rain Garden (ft ³)	42
Cisterns / Rain Barrels (ft ³)	7
Permeable Pavement on Sidewalks (ft ³)	63
Percentage of Required Volume Captured by current BMPs (%)	266
Decrease in Impervious Area (%)	27

The Green Stormwater BMP(s) applied in this scenario decrease the site impermeable area by 27.3% and capture 266% of the runoff volume required. Compared to conventional approaches, the green practices in this scenario will change the total life-cycle construction and maintenance costs by 0% (in net present value).

Source: Green Values National Stormwater Management Calculator, Center for Neighborhood Technology



The work could be done by the workforce training program Greencorps Chicago, with the cost of downspout disconnection paid by the City. We recommend that any private property construction improvements, such as residential rain gardens or cisterns be cost-shared by the City and the homeowner with mandatory maintenance requirements. We suggest that the City partner with Greencorps Chicago, CNT, community-based organizations, residents, and Aldermen to carry out this work.

POTENTIAL FUNDING SOURCES

- City of Chicago Capital Improvement Program
- Aldermanic Menu Money
- Metropolitan Water Reclamation District
- Residential property owners
- Grants

IMPLEMENTATION STRATEGY

Prioritization of Risk

Before this program is rolled out across the neighborhood, the City should undertake an inventory of flood-prone properties in Chatham and the condition of the corresponding public sewer to determine the highest-priority areas for intervention. Generally, it is recommended that the initiative begin at the top of each local sewer network, so that upstream runoff does not cause ongoing floods in upgraded homes. This will help to demonstrate the efficacy of the program and generate public support for expansion.

Screening

Through an initial application process, properties will be screened according to the nature of their flood risk. Properties with localized risk, like seepage or a collapsed private property lateral line, would qualify for an individual property flood risk assessment from the home upgrade initiative (read more on page 30).

45. City of Portland Oregon Downspout Disconnection Program: <http://www.portlandoregon.gov/bes/54651> (accessed July 18, 2016).

Green Infrastructure Maintenance

Maintenance for green infrastructure is unlike typical landscaping care and requires specialized training. Currently, mandatory training is offered to Greencorps Chicago workforce development staff, a program of CDOT (*GreenCorps Chicago Job Training Program*, page 27).

Expanded Service of RainReady

RainReady Neighbor is an expanded service of RainReady Home that engages proximate and multiple properties to improve local water management. The program aims to implement low-cost flood reduction and mitigation on a neighborhood scale using solutions like downspout disconnections, rain gardens, and tree plantings on parkways.

For more information about this program, visit: www.rainready.org/our-services/rainready-neighbor.

Risk Assessment and Partnering

Every City block deemed vulnerable through a City or MWRD hydraulic analysis to basement backup from the mainline sewer or street flooding would be eligible. Targeted outreach will be conducted at priority sites within the drainage network, e.g. along overland flow paths, in depression areas, or at an intersection known to experience problematic flooding. This approach could include soil testing and monitoring the groundwater table to ensure that runoff will drain properly through the vegetation. Where local leaders commit to maintenance of the site, a network of strategically placed rain gardens, native plants, swales, and trees should be installed throughout the neighborhood into city alley's, public rights-of-ways, and private lands to mitigate flooding and beautify the neighborhood. Where possible, these installations should be augmented by adjacent cuts in the curb to direct runoff and street flooding into the vegetation and out of the public right-of-way.

In the summer of 2017, CNT will partner with the City of Chicago and MWRD to launch a pilot program of the neighborhood upgrade initiative in Chatham. Through this pilot program, we will obtain refined data on its costs, outreach needs, and technical feasibility.

WHAT WE HAVE LEARNED FROM PORTLAND AND DETROIT

We can learn from successful initiatives in other cities. For example in Portland, a voluntary disconnection program was successful in disconnecting 56,000 downspouts in eight years at an average downspout cost of \$228.

In Detroit, a voluntary pilot program disconnected 577 downspouts in one year at an average cost of \$270 per downspout. Detroit first attempted a low-touch engagement strategy relying on program literature, public meetings, surveys, and a toll-free information line. After receiving very little resident participation, they launched a door-to-door campaign, complete with several mailers and financial rewards for participation. They were able to secure a 61% participation in their target area.

Both programs benefited from robust public engagement campaigns. Portland employed a three-touch system: each household received an initial visit to introduce the program, a second scheduled visit to disconnect the downspout, and a third visit to inspect the disconnection. They also created a fundraiser program, through which school groups, led by a trained team leader, could receive funds for every downspout they disconnected. Every disconnection

was inspected by a City staff member, and difficult disconnections were left to an experienced contractor.

Each program was voluntary and guaranteed residents that the cities would reconnect downspouts at any time and for any reason. When we followed up with program managers they recommended geographic targeting to limit the redundancy of door-to-door outreach. They also stressed the importance of cultural sensitivity during the outreach program, recognizing that door knocking and evening visits can be perceived differently among different groups. In each community, a culturally representative outreach team helped overcome many of these barriers.

In each City, a downspout would only be disconnected if it met certain standards, including:

- Basement walls must be free from external cracks
- A specified amount of lawn must be available for a downspout to extend a minimum of three feet perpendicular from the home's foundation
- Each resident's yard should be properly graded
- The downspout cannot discharge directly into impervious areas or to ground that slopes toward the house.
- Flow must be directed to the lawn (flow may be discharged to shrub areas at the owner's discretion).
- A splash block must be used to protect the ground from erosion

Neither city actively incorporated green infrastructure installations into the downspout program. Downspouts were disconnected into lawns. Given the prevalence of clay and compacted soils in Chicago, additional infrastructure may be needed to ensure roof runoff is properly infiltrated.

STREETSCAPE REDESIGN

Led by: The City of Chicago
Proposed timeline: Mid-term

To improve stormwater management, generate private

investment, and create beautiful public spaces, we recommend the City invest in green infrastructure amenities along commercial corridors and public parking areas in Chatham. These solutions should complement economic development activity along Cottage Grove, State Street, and 75th Street, as well as in the commercial areas in West Chatham.⁴⁶ The Chicago Department of Transportation (CDOT) has piloted innovative drainage strategies that could be scaled across Chatham, which include permeable pavers, bioswales, tree trenches, rain gardens, and temporary storage areas, like rainblockers and below-grade parking lots. Investments should be beautiful and interactive, inspiring recreation and community pride.

POTENTIAL FUNDING SOURCES

- City of Chicago Capital Improvement Program
- City of Chicago Tax Increment Financing
- City of Chicago Special Service Area
- Aldermanic Menu Money
- Commercial property owners
- Grants

IMPLEMENTATION STRATEGY

The Cottage Grove retrofit (*Cottage Grove Avenue Project*, page 24) is piloting new strategies to store and retain stormwater in the public right-of-way. DWM's close monitoring of these investments, completed in partnership with UI Labs, a Chicago-based research organization, will inform a systematic approach to green infrastructure investment across the community. This approach will include soil testing and monitoring the groundwater table to ensure that runoff will drain properly through the vegetation.

We propose that the City pursue retrofits on commercial corridors and parking lots throughout Chatham. This will require dedicated financial and local leadership to pursue Special Service Area (SSA) designation or Tax

46. Greater Chatham Initiative 2015

Increment Financing (TIF). At the start, investment can be prioritized in high-visibility commercial zones, but we recommend that dedicated funds are also made available to empower Chatham’s block club leaders to install and maintain green infrastructure in parkways and corner plots of residential streets. These actions will be integrated with the RainReady home and block upgrades.

Across the neighborhood, we recommend that this work be guided by a steering committee of community leaders to ensure integration with local programs and aesthetic preferences. We also recommend that CNT’s community-specific Flooding Risk and Opportunity Mapping Tool be used to inform this process (example in Figure 12, page 19).

RAINBLOCKERS PROGRAM REVISITED

- Led by:** The City of Chicago
- Approximate cost:** Moderate
- Proposed timeline:** Near-term

Flooding in Chatham presents a complex and severe challenge. We recommend the City, MWRD and other potential funders invest aggressively in green infrastructure across the neighborhood, rehabilitating and upsizing the grey infrastructure network, and embracing property-level risk reduction measures. In the near-term, this former swampland must find a way to temporarily store large volumes of runoff when City sewers are at capacity after major storms.

We recommend the City revisit the Rainblocker program (*Rainblocker Program*, page 26), with the aim of replacing blockers that have been removed by residents and adding additional blockers. Together CNT and the City can work together to improve community engagement, create an alert system to notify residents of flooding streets, alert residents to emergency parking facilities, and build an integrated network of rain gardens to drain street flooding via curb cuts (*Streetscape Redesign*, page 38).

POTENTIAL FUNDING SOURCES

- City of Chicago
- Volunteer support from community groups

IMPLEMENTATION STRATEGY

The City, in partnership with CNT should develop a robust outreach strategy to reintroduce rainblockers in the neighborhood. To generate an improved understanding of community concerns, we recommend holding a series of public events, canvassing impacted neighborhoods with program literature, partnering with aldermen, and presenting ideas/a program to community groups, block clubs, and business associations. Residents’ concerns can be addressed systematically in partnership with the community.

One concern that has been clearly voiced by the neighborhood is that rainblockers cause damage to vehicles parked on flooded streets. This concern could be addressed through a simple alert system, through a placed sign in affected areas and which residents on streets with rainblockers would receive electronic notification in advance of every flood on their street. This notification would include information on alternative parking areas protected from flooding and it would serve as a platform to communicate with flood victims during emergency events.

Rainblockers create an opportunity to redirect water headed for the sewer system through breaks in the curb (“curb cuts”) into permeable green infrastructure, and include new infiltration areas installed through the streetscape redesign (*Streetscape Redesign*, page 38). These programs will be designed to work in tandem, so that curb cuts and rain gardens can capture runoff that is blocked from entering the sewer with a rainblocker. When possible, rainblockers will not be installed without adjacent green infrastructure to minimize street flooding.

Make Broader Community Improvements

Objective: Improve local stormwater management through better data sharing, protective ordinances, and workforce development.

In addition to neighborhood-scale improvements, the City should consider committing to a fundamental shift in the patterns of urban development that have contributed to flood risk across the neighborhood. This includes:

- Setting new development standards to protect homeowners and businesses
- Investing in workforce development programs that put residents to work building green and grey infrastructure
- Advancing data-sharing and public education to help residents understand the opportunities available to homeowners looking to make their properties resilient

IMPROVED DATA-SHARING

Led by: The City of Chicago Department of Water Management (DWM)

Approximate cost: High

Proposed timeline: Mid-term

Investment in grey infrastructure in Chatham will be among the most visible, costly, and critical elements of the overall strategy for flood mitigation. The DWM has committed \$1.6 billion to begin upgrading the City sewer infrastructure by 2020.⁴⁷ According to our research and public documents, the City approximates a \$250 million annual budget to expand and modernize the sewer network.⁴⁸ However, the relevance or impact of these upgrades to residents in Chatham is difficult to determine because communities (and CNT) are unable to access timely information on sewer cleaning, lining, replacing, and upsizing the network.

Providing this information through the City's data portal is encouraged and critical to showcase success of the various City programs. This funding will be most effective when coordinated with investments in streetscapes and on private property. Increased coordination can improve efficiencies by ensuring green infrastructure is installed in a synchronized fashion thereby motivating residents to support these efforts.

FUNDING SOURCES

- City of Chicago Capital Improvement Program

LOCAL ORDINANCES

As the City works to upgrade sewers in Chatham, decrease runoff, and rehabilitate structures, it must also establish policies to guide the type of urban development that occurs within the community.

UNIVERSAL DOWNSPOUT DISCONNECTION

An ordinance should be passed in each of Chatham's wards mandating future universal downspout disconnection, preventing rooftop runoff from overwhelming the City sewer system. To increase effectiveness, we suggest this directive be accompanied by a robust public outreach campaign and financial support from the City to cover the costs of safe downspout disconnection on every neighborhood property. The work can be led by CDOT's Greencorps Chicago program and executed in tandem with the City's program to help homeowners retrofit their residences. The ordinance should include retrofits of vacant and rehabilitated properties prior to resale, as discussed in more detail in the *Redeveloping for Resilience* section (page 34).

⁴⁷ City of Chicago Capital Improvement Program 2014 - 2018

⁴⁸ City of Chicago Resilient Revitalization Phase 2 Draft Application National Disaster Resilience Competition, October 2015

ON-SITE STORMWATER MANAGEMENT REQUIREMENTS

Resident leaders in Chatham have partnered to reenergize the neighborhood's economic vitality through new commercial development. As new businesses are built, an expanded ordinance requiring on-site stormwater retention that goes beyond the current requirements of the watershed management ordinance (*MWRD's Watershed Management Ordinance*, page 28) would encourage developers in Chatham to create beautiful, resilient public spaces that absorb stormwater where it lands.

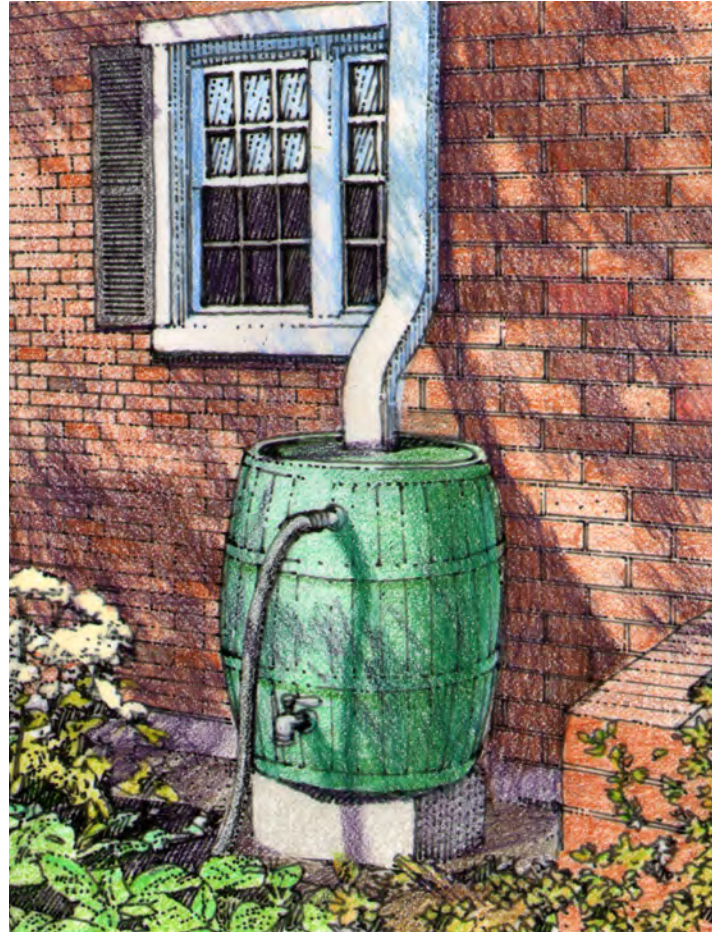
This ordinance could specify the maximum percentage of impervious land cover allowed on each lot, increase the volume of on-site retention, or require planned structures to include a basement deeper than the groundwater table to mitigate displaced groundwater storage volume. Requiring compensatory storage off-site or imposing a fee in lieu of storage should also be considered.

VACANT PROPERTY REHABILITATION

Vacant properties in Chatham are attracting the interest of developers who see an opportunity to attract young families to the neighborhood. With alderman leadership, Chatham could require, through an ordinance that these properties are rehabilitated to reduce flood risk, including disconnecting their downspouts and installing rain gardens on-site. This would ensure that new Chatham residents are able to withstand storms and stay safe in their new homes. The proposed program is discussed in greater detail in the *Redeveloping for Resilience* section (page 34).

WORKFORCE DEVELOPMENT PROGRAM

Greencorps Chicago ("Greencorps"), the City of Chicago's green industry job training program, has developed new curricula on green infrastructure design,



construction, and maintenance to help address the need throughout the City. It is our recommendation that the City leverage Greencorps' expertise to maximize the number of jobs created for Chatham residents through its implementation with appropriate funding.

As the City designs an implementation strategy for each of the programs outlined in this plan, they anticipate coordinating with Greencorps Chicago to ensure opportunities for collaboration are maximized. This expertise will be critical to serving Chatham and many other neighborhoods of Chicago working to improve their resilience to flooding. Additionally, the City understands it may be necessary to invest in expanding Greencorps Chicago to implement green infrastructure construction and maintenance programs.

PUBLIC EDUCATION PROGRAM

This program begins and ends with a public-private partnership. Chatham residents were instrumental in bringing awareness to flooding in the community, but the education effort doesn't end here. Chatham residents, CNT and the City will need to commit to ongoing education and engagement through workshops, public events, collaborative planning, and partnerships with community groups. Similar RainReady efforts are already underway in the Villages of Midlothian and South Suburban Cook County, Illinois <http://rainready.org/SouthSuburbs>.

MONITORING AND EVALUATION

The strategies advocated in this plan reflect an experimental and innovative approach. We recommend that solutions are monitored periodically and that research continues in order to review and improve on this Chatham strategy.



PLAN IMPLEMENTATION SCHEDULE

This section summarizes near-term and mid-term implementation priorities for the City, MWRD, CNT, Chatham leadership and organizations to begin working on following publication of this Plan. In general, near term activities may take one to two years to complete and mid-term projects require three to four years to implement.

Recommendation	Resource and/or Funding Options	Recommended Implementation Timeline	Chatham Plan Description Page
Create a dedicated delivery team to provide cohesive and coordinated services and support to residents and communities.	City of Chicago	Near-term	Page 29
Establish a home upgrade initiative aimed at protecting individual properties and minimizing flood risk. Property upgrades (e.g. sealing foundation cracks, regrading) are recommended.	City of Chicago, Greencorps Chicago Workforce, MWRD, NHS, EPA State Revolving Loans, HUD Community Development Block Grants, insurance agencies, individual homeowners	Near-term	Page 30
Redevelop for resilience to ensure that redevelopment and loan programs maintain a resilient standard in Chatham homes.	Housing developers, individual homeowners, insurance agencies, EPA State Revolving Loans	Near-term	Page 34
Establish a neighborhood upgrade initiative aimed at protecting flood-prone properties at risk for flooding due to failed public infrastructure.	City of Chicago, Greencorps Chicago, City of Chicago Capital Improvement Program, Aldermanic Menu Money, MWRD, individual property owners, grants	Near-term	Page 35
Improve stormwater management through the beautification of public spaces along commercial corridors and public parking areas in Chatham.	City of Chicago Capital Improvement Program, City of Chicago Tax Increment Financing, City of Chicago Special Service Area, Aldermanic menu money, commercial property owners, grants	Mid-term	Page 38
Revisit the rain blocker program with the aim of replacing rain blockers to temporarily store large volumes of stormwater when City sewers are at capacity.	City of Chicago, volunteer support from community groups	Near-term	Page 39
Improved data-sharing through the City's data portal with the aim of gaining community support for proposed projects.	City of Chicago Department of Water Management, City of Chicago Capital Improvement Program	Mid-term	Page 40
Update local ordinances to mandate universal downspout disconnection and require on-site stormwater retention that goes beyond current requirements of existing ordinances.	City of Chicago	Mid-term	Page 40
Rehabilitate vacant properties to reduce flood risk.	Alderman, commercial property owners	Mid-term	Page 41
Invest in Greencorps Chicago, City of Chicago's Workforce Development program to expand capacity to implement green infrastructure construction and maintenance programs.	City of Chicago	Near-term	Page 41
Commit to on-going education and engagement to bring awareness to flooding in the community.	City of Chicago, CNT, Chatham residents	Near-term	Page 42

NEXT STEPS

Many of the challenges facing Chatham generate opportunity for creative collaboration among the City, residents, nonprofits and funders and may be utilized by many neighborhoods. For instance:

- vacant properties can be rehabilitated to improve the resilience of community housing stock to flooding;
- investment in public infrastructure can be leveraged to invite economic investment and recreation; and
- streets and parks can be retrofitted to encourage biking and walking while sinking water where it lands.

Through the RainReady process, Chatham has positioned itself as a leader for collaborative and creative stormwater management planning. The citizens of Chatham are eager to be a part of the solution, but in order for their individual action to be impactful, it must be integrated through community-scale planning and coordinated services funded through public investment.

We are excited to collaborate with the City and MWRD to initiate a pilot study in Chatham that we anticipate by the summer of 2017. The pilot's aim is to reduce basement backups while reducing stormwater runoff into the sewer system. Once the Chatham Pilot is completed and the related research is compiled and analyzed, CNT will provide an update on its website and on behalf of all partners. We look forward to sharing our findings, discussing the positive results and addressing needs and challenges.



APPENDICES

ACRONYM GUIDE

CDOT – Chicago Department of Transportation

CMAP – Chicago Metropolitan Agency for Planning

CNT – Center for Neighborhood Technology

DMW – Department of Water Management

FEMA – Federal Emergency Management Association

HCBA – Historic Chicago Bungalow Association

IDOT – Illinois Department of Transportation

IDNR – Illinois Department of Natural Resources

MWRD – Metropolitan Water Reclamation District

NHS – Neighborhood Housing Services

RFAP – Residential Flood Assistance Program

USACE – United States Army Corps of Engineers

USEPA – United States Environmental Protection Agency

DEFINITIONS

BIOSWALE – Landscaping features designed to collect and filter stormwater

CURB CUTS – A small ramp cut into a street curb of a sidewalk to ease passage to the street for bicycles, wheelchair access, etc.

DAVIS BACON ACT – A Federal law requiring contracts exceeding \$2,000 for repair of public facilities (i.e. buildings, public works) to contain a minimum wage clause for laborers and mechanics completing contract work.

FLOODPLAIN – A low-lying area adjacent to a body of water (e.g. stream, river) subject to flooding

GREENCORPS CHICAGO – The City of Chicago’s green industry job training program

GREEN INFRASTRUCTURE – An approach to water management aimed at mimicking the natural hydrologic process, utilizing soils and vegetation to capture rainwater and runoff where it falls

GREY INFRASTRUCTURE – The network of man-made sewer mains, pipes, and detention ponds that collect and manage stormwater

RAINBLOCKERS – Intake restrictor valves installed in a stormwater catch basin in the street to regulate stormwater to the main sewer line

RAINREADY HOME – A service offered by CNT providing homeowners practical and affordable home improvements such as landscaping that manages stormwater, to help keep their property dry

RAINREADY NEIGHBOR – A service offered by CNT that engages multiple, proximate, or neighboring properties to improve localized water management

STORMWATER MANAGEMENT/PLANNING – The control or mitigation of “runoff” from rain, melting snow and sleet

URBAN FLOODING – Flooding that occurs when rain overwhelms drainage systems and waterways and makes its way into the basements, backyards, and streets of homes, businesses and other properties



Helping homes in Chatham get RainReady.

Homes in Chatham are not only **affected** by flooding, they also inadvertently **contribute** to the problem as rainfall from roofs and yards enters an already full sewer system.

Coordinated property-by-property services can help your community manage the problem.

ASK YOUR ALDERMAN TO TAKE ACTION

Your alderman can:

1. Advocate for funding from the City of Chicago to support home upgrades
2. Apply for grant funding to support home upgrades
3. Work with financial institutions to provide low-interest loan products or rebates for improvements

JOIN US

The RainReady Chatham Steering Committee is made up of volunteers and flood victims advocating for action and championing our efforts.

* * * *

Reach out to learn more about getting involved:

Cheryl Watson
GreenNChatham@gmail.com

Richard Wooten
gatheringpointcommunitycouncil@gmail.com

**IF YOUR BASEMENT FLOODS, TAKE PHOTOS AND
CALL 311 AND YOUR ALDERMAN**



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 @RainReadyPlan

 Rain Ready

TIERED SERVICES

Property-by-property services can operate at several levels. Level C provides the greatest level of protection for your home:

LEVEL A

DOWNSPOUT DISCONNECTION, EXTENSION, AND OPTIONAL RAIN BARRELS: ESTIMATED PRICE \$500-700 PER PROPERTY

Reduces the water entering the sewer system. However, it brings some risk of this water flooding streets and yards.



LEVEL B

DOWNSPOUT DISCONNECTIONS + DRYWELL AND/OR RAIN GARDEN: ESTIMATED PRICE \$1,200-3,000

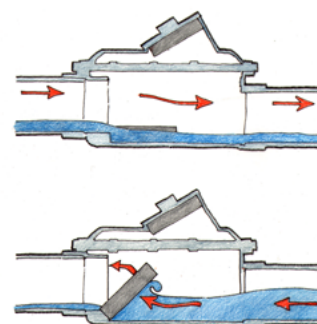
Reduces the water entering the sewer system and contains it onsite so that it won't flood streets or yards. However, it does not prevent water from entering your property in other ways.



LEVEL C

FULL RAINREADY HOME SERVICE: ESTIMATED PRICE \$10,000-15,000

Includes onsite property assessments, construction oversight, and installation of tailor-made measures for your flooding problems. Improvements may include downspout disconnections, a drywell and/or rain garden, foundation repair, and backwater valves.



SPOTLIGHT ON RAINREADY HOME

Chatham resident Lori Burns received a RainReady Home upgrade in 2014. Before 2014, Lori had sustained more than \$17,000 in flood-related damages at her house. With guidance from the RainReady Home team, Lori invested \$4,850 in flood prevention measures, including a backwater valve for her private sewer and a downspout disconnection into a rain garden. Lori hasn't flooded since.

RainReadySM helps neighborhoods fight flooding and keeps homes dry. An initiative of the Center for Neighborhood Technology (CNT), we are working alongside the aldermen's offices and a Resident Steering Committee to help Chatham residents and businesses get RainReady. The RainReady Steering Committee, CNT, the U.S. Army Corps of Engineers, and a host of local and municipal partners are working closely to develop solutions to flooding in Chatham.



Streets and Public Spaces in Chatham



Chatham used to be filled with native grasses and marshy wetlands. Over time, flooding has increased as the neighborhood has been paved over with:

- Streets
- Parking lots
- Sidewalks
- Turf grass

By planting trees, native plants, bioswales, and permeable pavement – known collectively as *green infrastructure* – we can catch rainfall where it lands and reduce the volume of water flowing into the sewer system.



Green infrastructure can bring benefits beyond stormwater management. Planting trees and native plants improves air quality, encourages walking and biking, and invites economic development.

JOIN US

The RainReady Chatham Steering Committee is made up of volunteers and flood victims advocating for action and championing our efforts.

* * * *

Reach out to learn more about getting involved:

Cheryl Watson
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Richard Wooten
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IF YOUR BASEMENT FLOODS, TAKE PHOTOS AND CALL 311 AND YOUR ALDERMAN



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ASK YOUR ALDERMAN TO TAKE ACTION

Working with the City of Chicago Departments of Transportation (CDOT), your alderman can:

1. Apply for existing TIF (Tax Increment Financing) funding from the City for green infrastructure
2. Apply for grant funding for green infrastructure
3. Allocate Menu Money to install green infrastructure

RainReady and several other non-profit programs are available to offer free advice and support.

COTTAGE GROVE COMPLETE STREET PROJECT

The City of Chicago Departments of Transportation (CDOT) and Water Management (DWM) have partnered to retrofit Cottage Grove between 77th St. and 83rd St. The project includes:

- New bike lanes and improved sidewalks
- Green infrastructure measures, including permeable pavers, native plants, and tree plantings



CDOT estimates that the project will divert over 113,000 gallons of stormwater over a typical 2 hour storm (5 year storm).

The Cottage Grove project is a great step toward reducing runoff from the public right of way and improving quality of life in the neighborhood, but we cannot stop there.

PROPOSED PROJECT ON STATE STREET

Alderman Sawyer of the 6th Ward is working with CDOT on a new project to improve transportation options on State Street between 76th St and 79th St. Initial designs include new parking, bike lanes, and improvements for pedestrians.



The State St. project could also address flooding in the neighborhood with stormwater features like bioswales, tree plantings, and permeable pavement.

ADDITIONAL OPPORTUNITIES



RESIDENTIAL STREETS

On residential streets, homeowners can convert turf grass parkways into attractive spaces that will retain stormwater. Native species like Butterfly Milkweed, Black Eyed Susans, Purple Prairie Clover, and Meadowsweet are particularly effective in rain gardens and bioswales. Trees in parkways are also effective at slowing and retaining stormwater runoff. Call 311 to request a tree planting in your parkway.

VACANT LOTS

Vacant lots can be converted from blighted nuisances to beautiful stormwater retention areas. Contact your alderman for more information about vacant lot programs in Chatham.

POCKET PARKS

Constructed wetlands and large-scale rain gardens can be highly effective at sinking and retaining water where it lands. Pocket parks can also be a great way to create habitat for birds and bees and improve quality of life in the neighborhood.

PARKING LOTS

One of the largest sources of runoff – especially in West Chatham – comes from large parking areas, many of which are underutilized. Big box stores such as Home Depot and Target can do their part to manage stormwater on their properties using bioswales, tree plantings, and permeable pavement.



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SHORT-TERM SOLUTIONS FOR A RAINREADY HOME

Stormwater can enter your property and cause flooding in several ways:

- Through cracks or openings in your foundation
- Through window wells or doors
- Through floor drains, shower drains, toilets, or sinks

Some short-term approaches to reducing your flood risk at home are listed on the back of this page. More information can be found at www.RainReady.org.

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DISCONNECT YOUR DOWNSPOUT

The best strategy to reduce basement backup across the neighborhood is quick, cheap, and easy. Reduce strain on the local sewer by disconnecting your roof downspout and sending rainwater into a rain garden, dry well, or rain barrel in your yard. Make sure the water discharges at least 10 feet away from your foundation.

Average cost: \$50-400

MAKE YOUR BASEMENT RAINREADY:

- Elevate or relocate appliances in the basement or in flood-prone areas outside the house. These could include: washers, dryers, water heaters, fuel tanks, generators, and air conditioning units.
 - Use steel bolts to anchor fuel tanks, which can float and possibly break during storms.
- Replace carpets with tile and rugs.
- Create a personal and protected inventory.
 - Make lists and take photos of your valuables for insurance purposes. Move your furniture, photos, jewelry, or anything else that could be destroyed to a higher level.
 - Keep documents of items that have been appraised for their value.
 - Keep the contact information for your flood insurance provider readily available should the event occur unexpectedly.



BEFORE THE RAINY SEASON BEGINS:

- Clear your gutters of leaves and debris.
- Clean your storm drains.
- Properly secure all windows and doors, especially those at ground level.



BEFORE A BIG STORM:

- Move furniture, rugs, and valuables to a higher level.
- Pack vulnerable items in waterproof storage containers.



MANAGE MOLD:

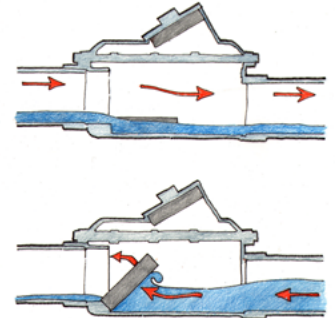
- Left unaddressed, mold can be toxic. Wear a respiratory mask and scrub the mold with a bleach solution (1.5 cups bleach per gallon of water). Let dry completely. Replace with water-resistant materials.

PURCHASE A FLOOD INSURANCE POLICY:

- A typical homeowner's insurance policy will not cover damages related to basement backup or seepage. Consider purchasing a sewer rider policy to protect your home from sewer damage.
-

UPGRADE YOUR INFRASTRUCTURE:

- Install a sump pump (average cost: \$800-1,200)
 - Sump pumps eject water from the basement or foundation drain, typically collected in a sump pit.
- Install a backwater valve, shown at right (average cost: \$3,500-5,000)
 - This one-way flap allows water to flow out of your home but prevents it from flowing back in, even in the event of a major storm. Think of it as a one-way door for wastewater – what goes out cannot come back in.
- Fix leaks in the building foundation (average cost: \$600-830)
 - Foundation cracks can be sealed using an epoxy injection inside your home. External cracks can be sealed using exterior-grade epoxy caulk.
- Use green infrastructure to manage water on your property (average cost: \$200-3,000)
 - Bioswales, site grading, and rain gardens can be used to channel rainwater away from your home and into the ground or the street. Native plants have deep roots to help water infiltrate into the soil and minimize runoff.
 - A bioswale is a narrow, vegetated channel that slows, sinks, and directs stormwater runoff on your property.
 - Site grading changes the slope of your yard to direct water away from your foundation.
 - A rain garden captures stormwater and reduces runoff using deeply rooted native plants and grasses.



More information on each of these solutions can be found at www.RainReady.org

INTERIM REPORT

VIEW THE RAINREADY CHATHAM PHASE ONE REPORT

www.cnt.org/publications/rainready-chatham-phase-one-report

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ABOUT CNT

RainReady 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.

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