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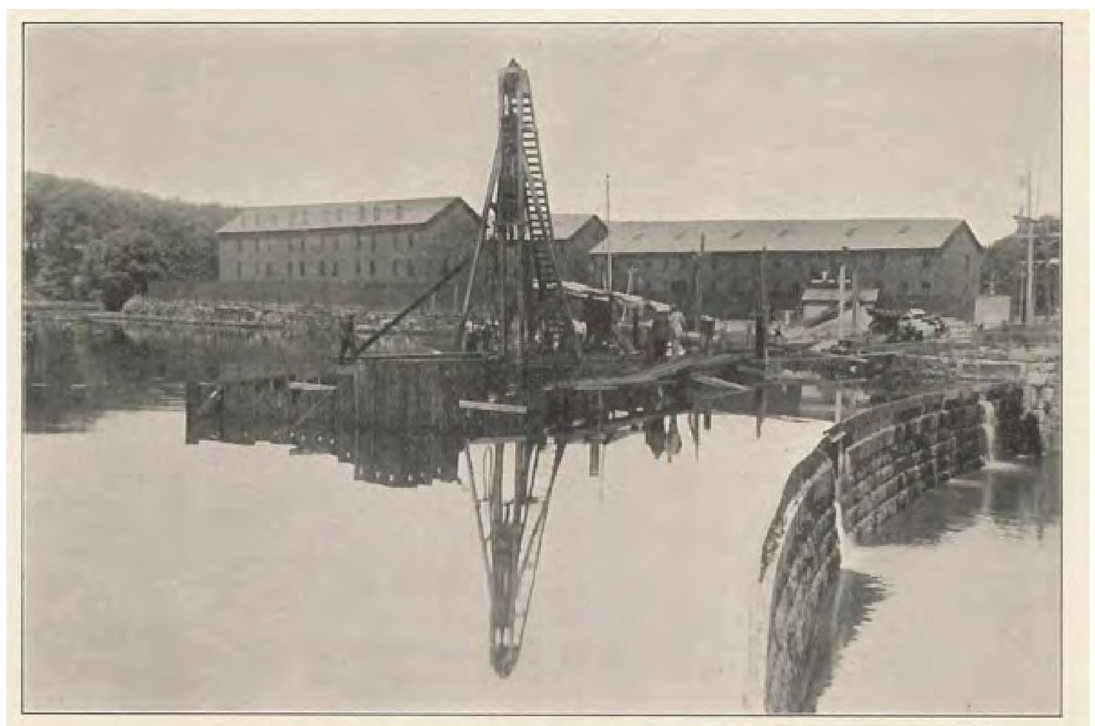
May 16, 2018

CIVIL WAR ERA INFRASTRUCTURE

Worcester's industrialization mainly occurred during a forty-year period after the Civil War. The population more than doubled over this timeframe and to keep up with the industry, the City built the first water and sewer systems starting in the downtown area. Most of these pipes and manholes are still in use today!

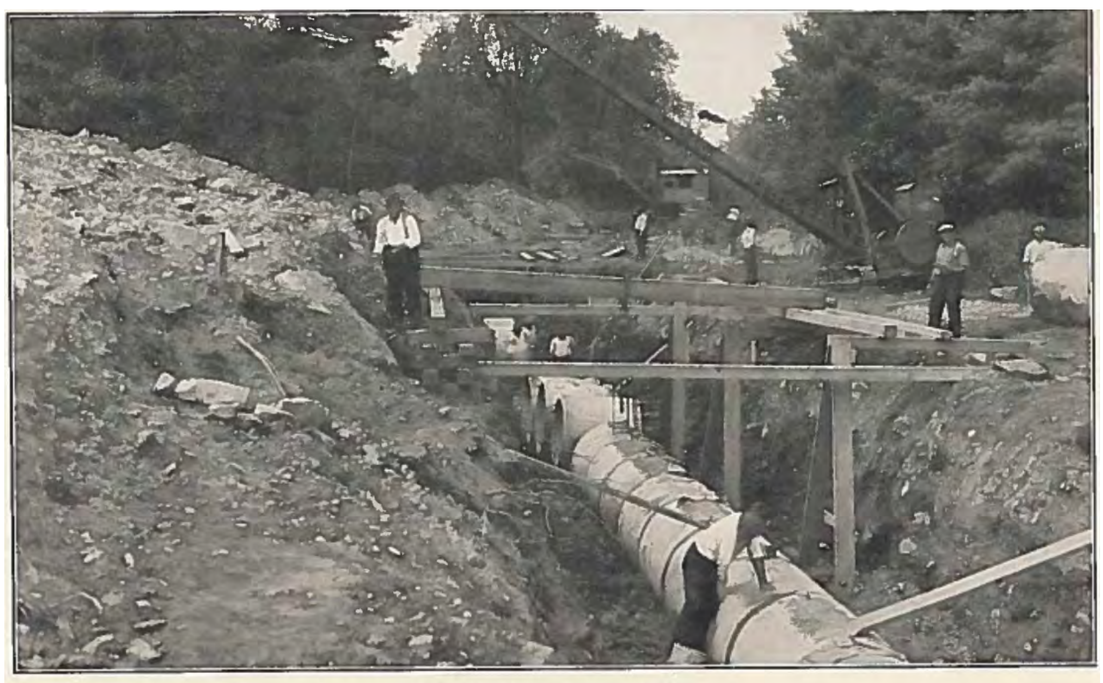
OUTFALL SEWER—FIRST SECTION OF COMPLETED COFFERDAM

Outfall Sewer - First section of completed cofferdam (Middle River at Quinsigamond Village)



OUTFALL SEWER—DRIVING STEEL PILES FOR COFFERDAM

Outfall Sewer - Driving steel piles for cofferdam (Middle River at Quinsigamond Village)



SOUTH FLAGG ST. TRUNK SEWER

South Flagg St. trunk sewer

BEAVER BROOK TRUNK SEWER CONSTRUCTION

Beaver Brook trunk sewer construction

Entrance

WATER RESOURCES PRIORITIES

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UNDERSTANDING YOUR PRIORITIES

TO BETTER PLAN FOR THE FUTURE, THE DEPARTMENT OF PUBLIC WORKS & PARKS (DPW&P) IS LOOKING FOR YOUR INPUT ON **10 WATER RESOURCES PRIORITIES**. THIS ALSO HELPS USE LIMITED BUDGET RESOURCES EFFICIENTLY TO KEEP YOUR WATER AND SEWER RATES AS LOW AS POSSIBLE.

THESE WATER RESOURCES PRIORITIES ARE:

STATION 1	1	REDUCE BASEMENT BACK-UPS
	2	REDUCE FLOODING
STATION 2	3	PROTECT ENVIRONMENTAL RESOURCES
	4	REGULATORY COMPLIANCE
STATION 3	5	PUBLIC HEALTH & SAFETY
	6	IMPROVE WATER QUALITY
STATION 4	7	ENVIRONMENTAL JUSTICE
	8	SUPPORT LOCAL ECONOMY
STATION 5	9	REDUCE INFRASTRUCTURE RISK
	10	REDUCE REACTIVE O&M

AFTER THE DPW&P PRESENTATION, VISIT OUR **TABLE STATIONS** TO LEARN MORE ABOUT THESE PRIORITIES. THEN TAKE YOUR **RED BUTTONS** AND PLACE THEM IN THE JARS OF PRIORITIES MOST IMPORTANT TO YOU. REMEMBER...

DON'T FORGET TO VOTE FOR YOUR TOP PRIORITIES!

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Entrance
Historical Information

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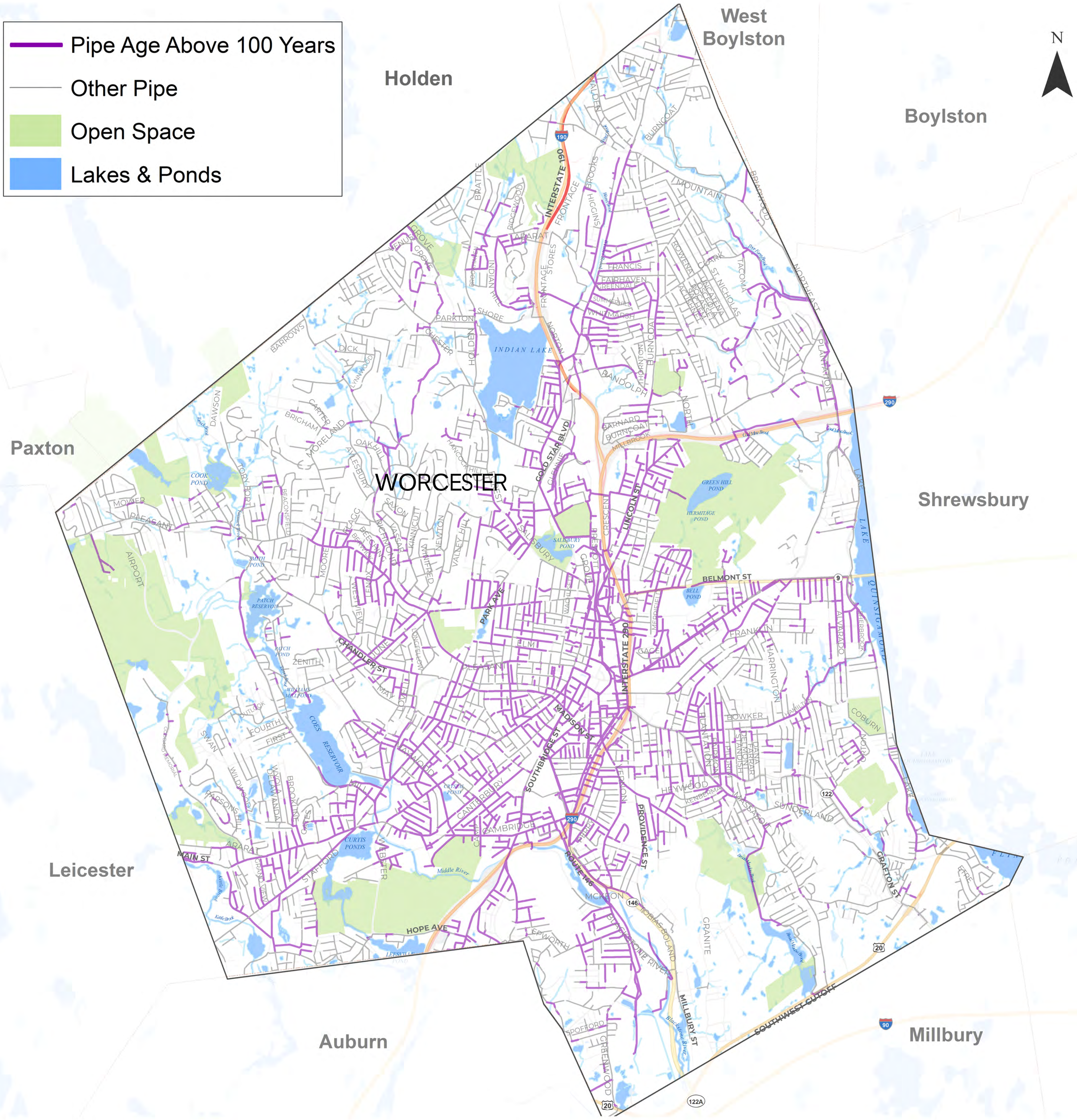
PIPE AGE GREATER THAN 100 YEARS

Worcester's sewer system was built incrementally over the last 150 years. Approximately 1/3 of the system is over **100 years old**.



Station 1

Reduce Basement Back-Ups/Reduce Flooding

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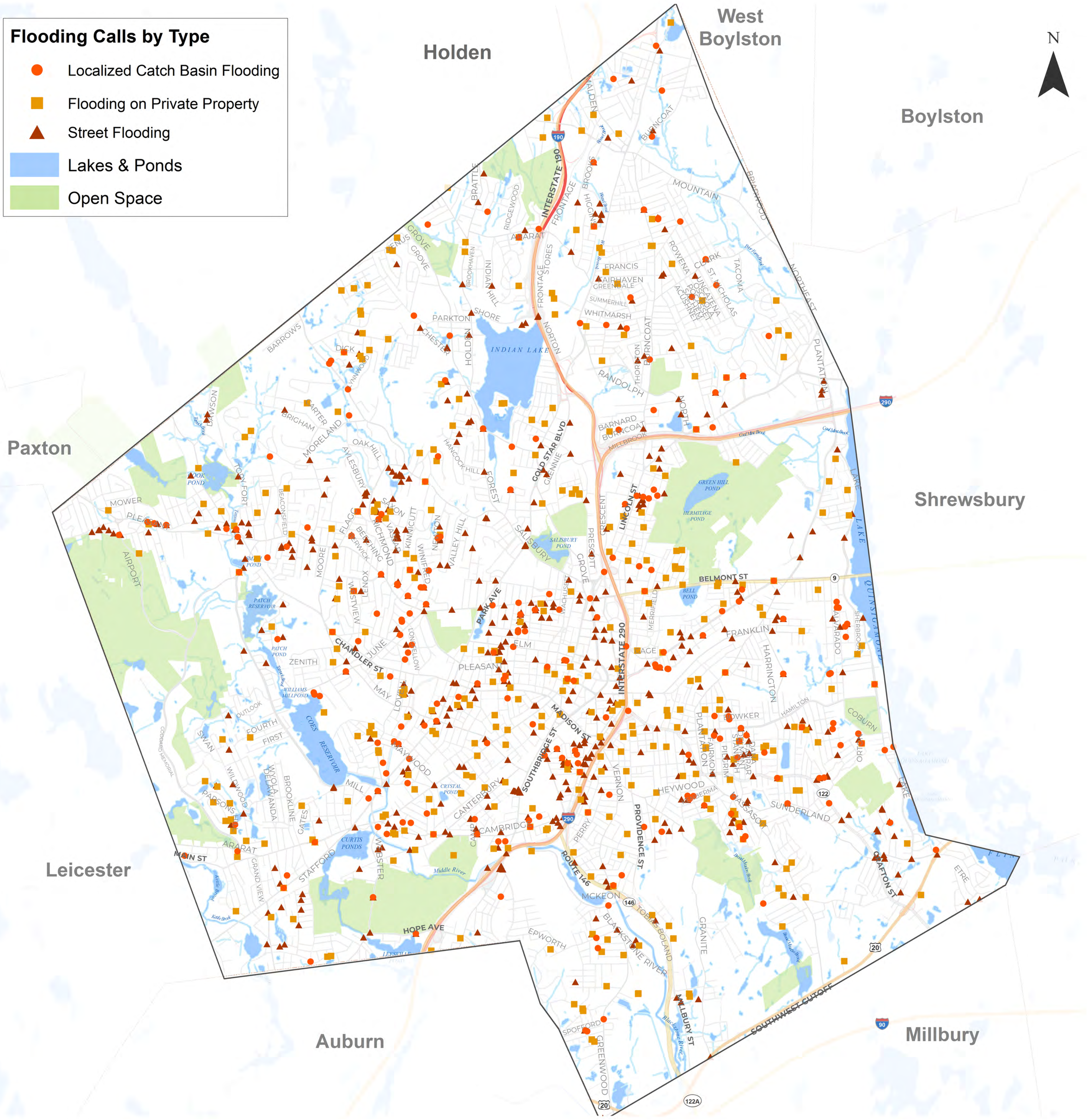
FLOODING RELATED CALLS MAP

Each year, the DPW&P responds to hundreds of calls related to flooding reported by Worcester residents and businesses. This map illustrates the areas of Worcester with the most flooding events logged by the DPW&P.



www.worcesterwaters.com

Station 1

Reduce Basement Back-Ups/Reduce Flooding

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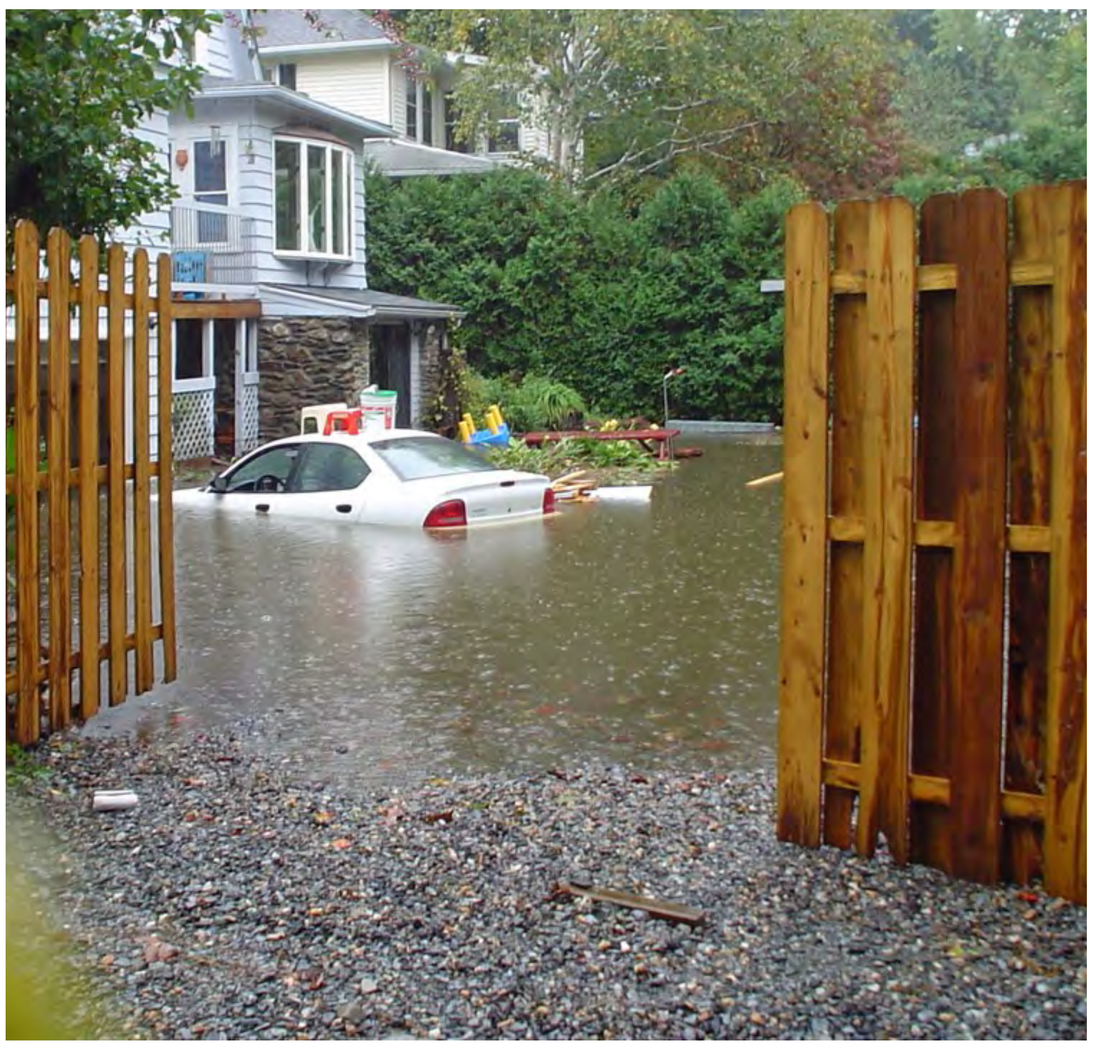
WHERE DOES FLOODING OCCUR?

Large impervious surfaces contribute to greater surface flooding, which can threaten public health, public safety and the environment.

Road closure on Southgate Street at Railroad overpass.

Flooding along Quinsigamond Avenue at Crompton Park.

Flooding at Liberty Central Industrial Park.



Flooding after a rain event in the Richmond Avenue area.

Station 2

Protect Environmental Resources/ Regulatory Compliance

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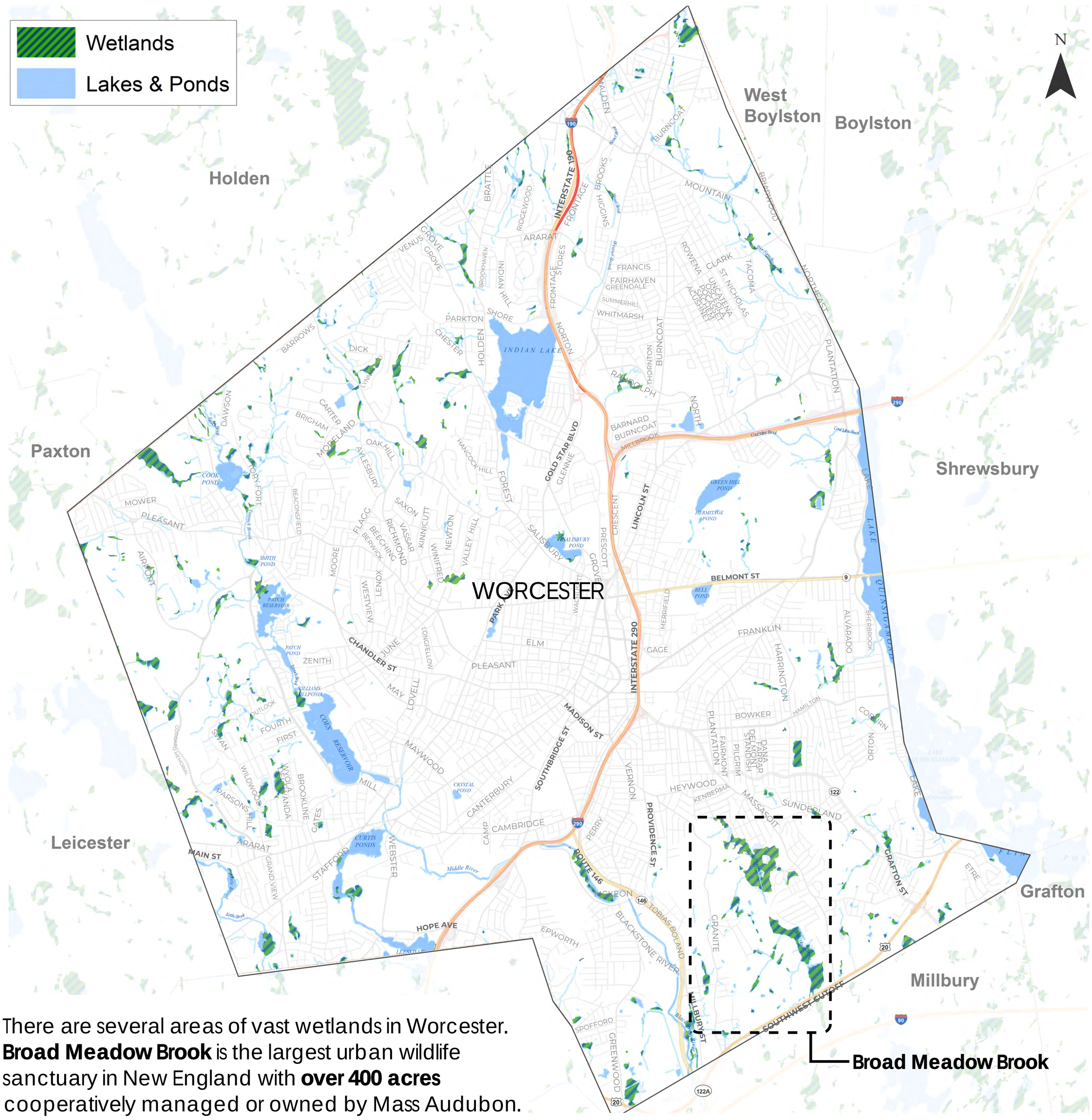
WETLANDS AND WATERBODIES

In Worcester, there are **20 lakes and ponds** that support a variety of recreational activities, including bird watching, walking, swimming, fishing and boating. The City recognizes these **"blue spaces"** as valuable resources, and strives to improve the quality of these waters for recreational use and the promotion of economic development. The DPW&P works with the Commonwealth, watershed groups and other local organizations to identify and remediate threats to the quality of our lakes and ponds.



There are several areas of vast wetlands in Worcester. **Broad Meadow Brook** is the largest urban wildlife sanctuary in New England with **over 400 acres** cooperatively managed or owned by Mass Audubon.

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Protect Environmental Resources/ Regulatory Compliance

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CAN YOU TELL WHICH IS TREATMENT PLANT DISCHARGE?

The Upper Blackstone Treatment Plant discharges clean water to the Blackstone River.

Left: Treated plant discharge

Right: Blackstone River Water

Wastewater being treated

Upper Blackstone Treatment Plant

Station 2

Protect Environmental Resources/ Regulatory Compliance

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PROTECTING CRITICAL HABITAT

The DPW&P maintains the City's water resources systems and conducts projects to address systems that are in need of improvement. These actions also protect wildlife habitat.

The DPW&P's operation, maintenance, and upgrade of the City's systems protects surface waters and wetlands that serve as habitat to all kinds of wildlife. (Bell Pond).

In Worcester, there are wetlands and wildlife of all types, including beavers.

Installing stormwater wetlands and rain gardens improves water quality from street and parking lot runoff while providing new wildlife habitat. (Beaver Brook).

Some birds rely on wetlands for habitat. For some species, survival is dependent on the availability of healthy wetlands and water resources. (Quinapoxet River).

Station 2

Protect Environmental Resources/ Regulatory Compliance

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PROTECTING THE ENVIRONMENT

Worcester DPW&P protects environmental resources by maintaining the City's water resources systems and supporting local cleanup activities.

The DPW&P sponsors Regional Environmental Council (REC) Annual Earth Day Cleanups.

The DPW&P maintains an annual inspection and maintenance program for its 349 stormwater outfalls.

Numerous types of litter are harmful to wildlife and vegetation, such as "styrofoam."

In 2016, the REC Earth Day cleanup collected and removed 100 tons of trash from 68 sites across Worcester!

Station 3

Public Health & Safety/ Improve Water Quality

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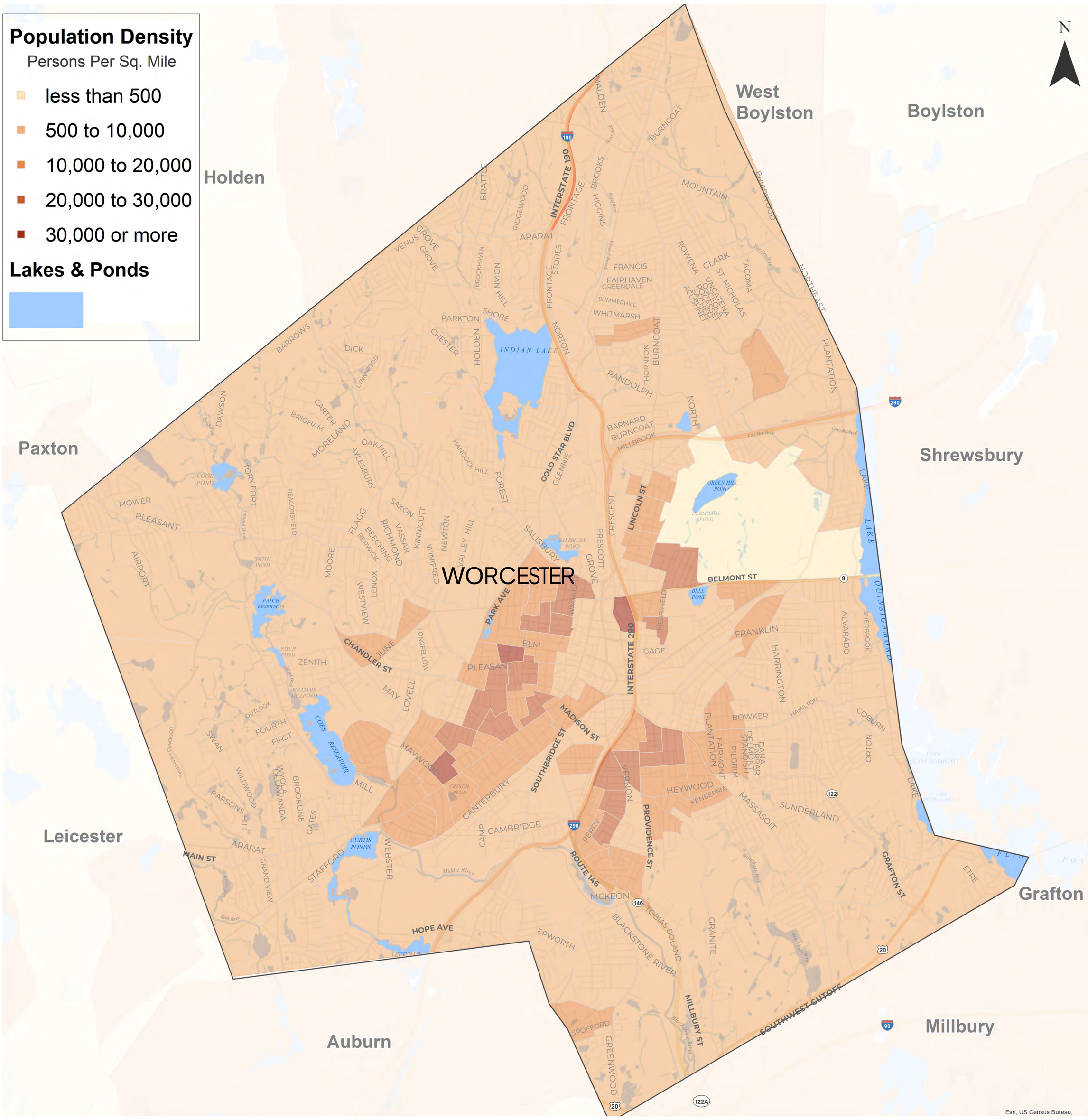
POPULATION DENSITY

With184,000 residents, Worcester is the second largest city in New England. Worcester's wastewater collection system originated as a combined sewer and stormwater system to serve the older, downtown commercial and industrial areas which are the most densely populated.



www.worcesterwaters.com

Public Health & Safety/ Improve Water Quality

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MINIMIZING BEACH CLOSURES

Beach closures and other use restrictions occur at Worcester's water bodies when pathogens, contaminants, invasive plants, or algae growth affect water quality. Nutrient loading and sewer system failures are threats to water quality.

Indian Lake beach closure due to high levels of cyanobacteria (blue-green algae).

Indian Lake beach and swimming area

Lake Quinsigamond beach

Water chestnut infestation in the northern portion of Coes Reservoir.

Station 3

Public Health & Safety/ Improve Water Quality

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SURFACE WATER QUALITY: WHAT DOES DPW&P TEST FOR ?

There are over **20 lakes and ponds** in Worcester that support a variety of recreational activities, including bird watching, swimming, fishing, and boating. Worcester recognizes these "**blue spaces**" as valuable resources, and strives to maintain the quality of these waters for public use.

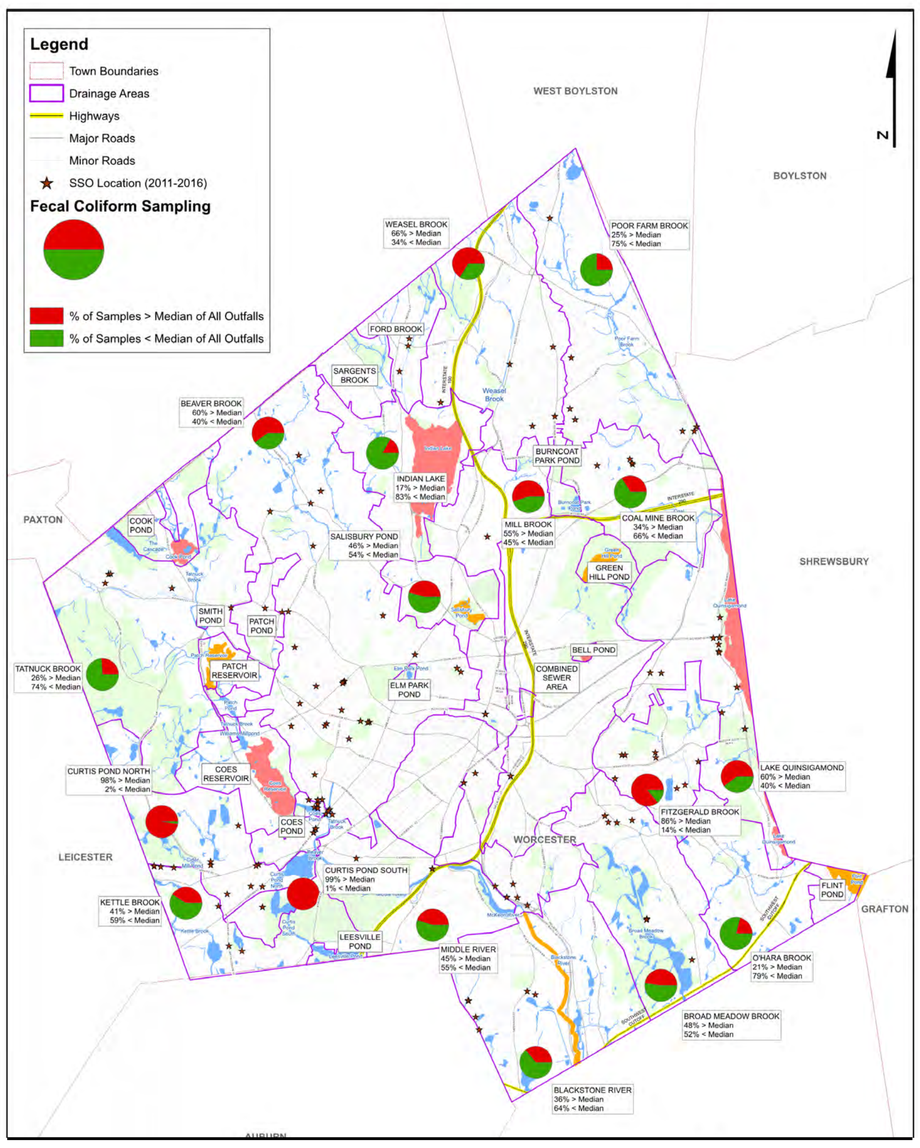
Lakes are important resources to residents for recreational activities.

DPW&P monitors water quality in 4 of our largest lakes, including:

- Bell Pond
- Coes Reservoir
- Indian Lake
- Lake Quinsigamond

Water samples are taken for:

- Transparency
- Temperature
- Dissolved Oxygen
- pH
- Suspended Solids
- Ammonia
- Nitrogen
- Phosphorus
- Phycocyanin
- Bacteria



The DPW&P's historical sampling data reveals important findings, like which surface waters are most impacted by contaminants.

The DPW&P works with local scientists and universities to understand the data, create management plans, and host educational workshops to help residents better understand the threats to our water quality and how to improve it.

Station 4

Environmental Justice / Support Local Economy

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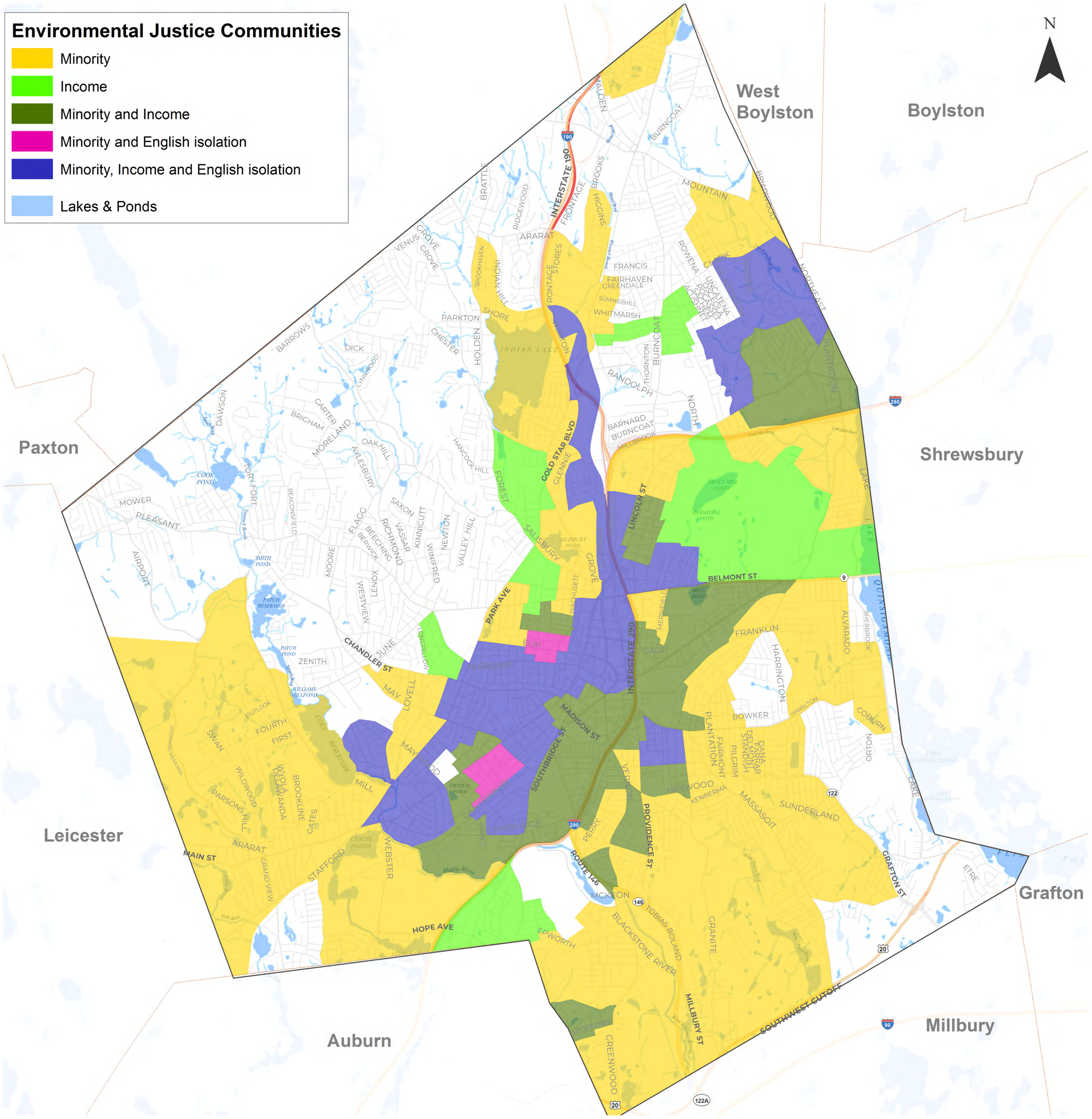
ENVIRONMENTAL JUSTICE COMMUNITIES

Worcester is home to many environmental justice communities. These populations can be disproportionately affected by water resource issues and rising water and sewer rates.



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Station 4
Environmental Justice/ Support Local Economy

May 16, 2018

UNDERSTANDING COMMUNITY

What is your primary language?

ما هي لغتك الرئيسية؟

Cila është gjuha juaj kryesore?

Qual é o seu idioma principal?

На каком языке Вы предпочитаете общаться?

Lorem ipsum

¿Cuál es su idioma principal?

Ngôn ngữ chính của quý vị là gì?

Shqip

العربية

Português

English

Русский

Español

Tiếng Việt

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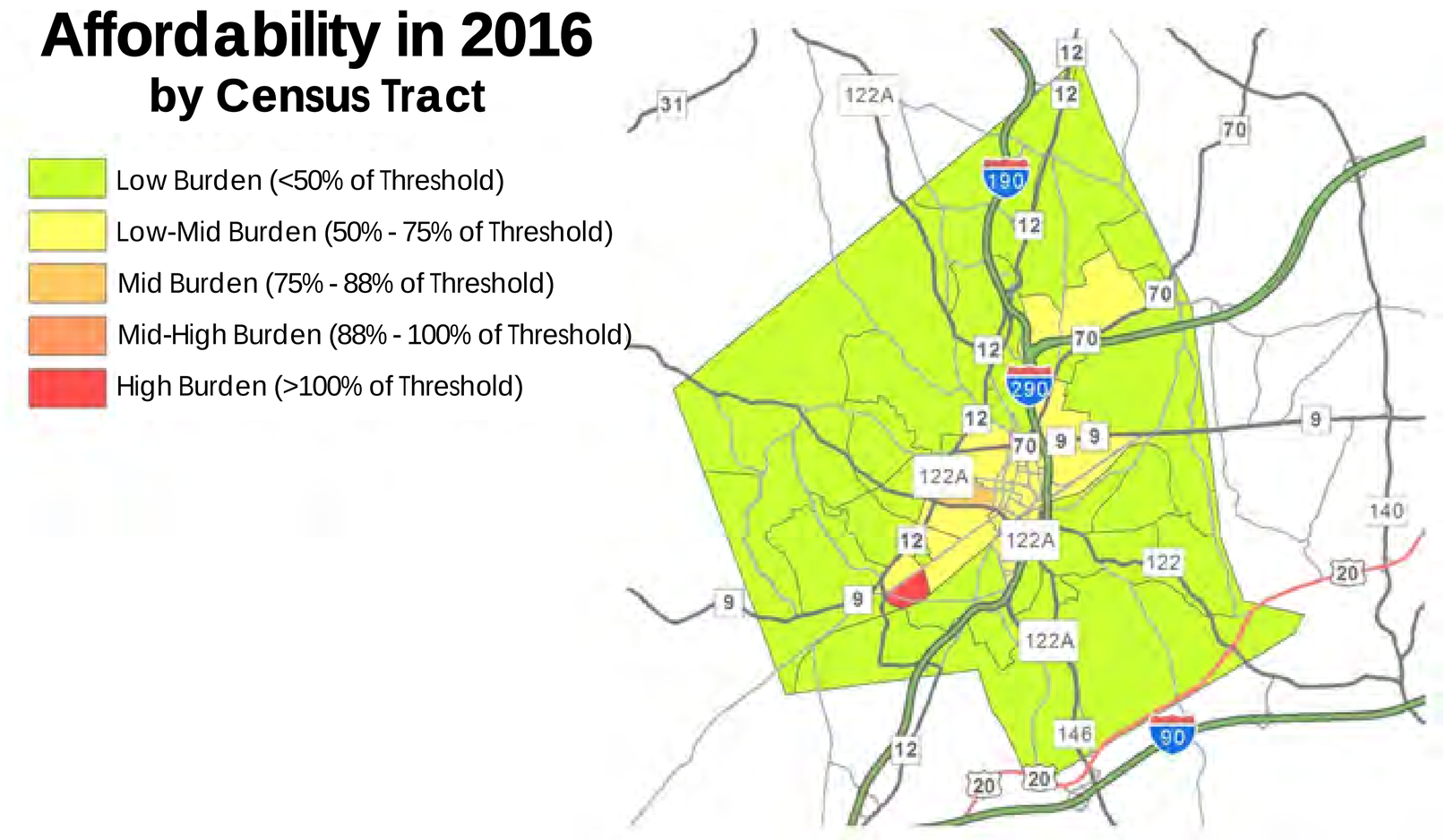
Station 4
Environmental Justice / Support Local Economy

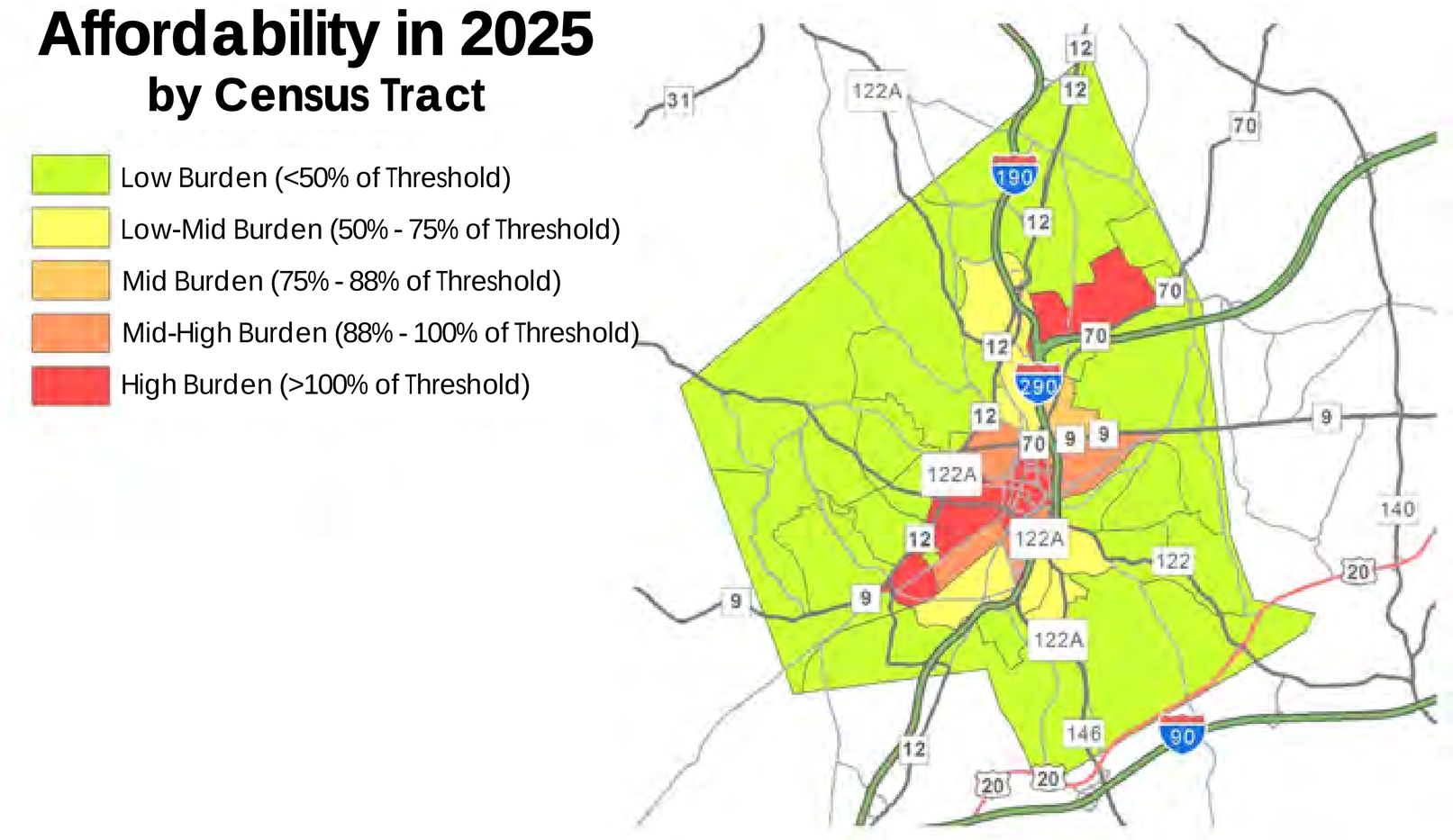
May 16, 2018

WHAT IS THE IMPACT OF SEWER RATES IN WORCESTER?

The following maps summarize key findings from a recent study of financial impacts to the City of Worcester sewer rate payers from costly capital investments in further nutrient control at the Upper Blackstone Treatment Plant. This study was titled *Integrated Planning Report for Wet Weather management in the Upper Blackstone Water Pollution Abatement District and the City of Worcester* (February 1, 2016).



Sewer rate affordability within the City's census tracts under current conditions in 2016.



Projected sewer rate affordability within the City's census tracts following EPA-mandated construction of additional nutrient controls at the Upper Blackstone Treatment Plant by the year 2025.

Station 4

Environmental Justice/ Support Local Economy

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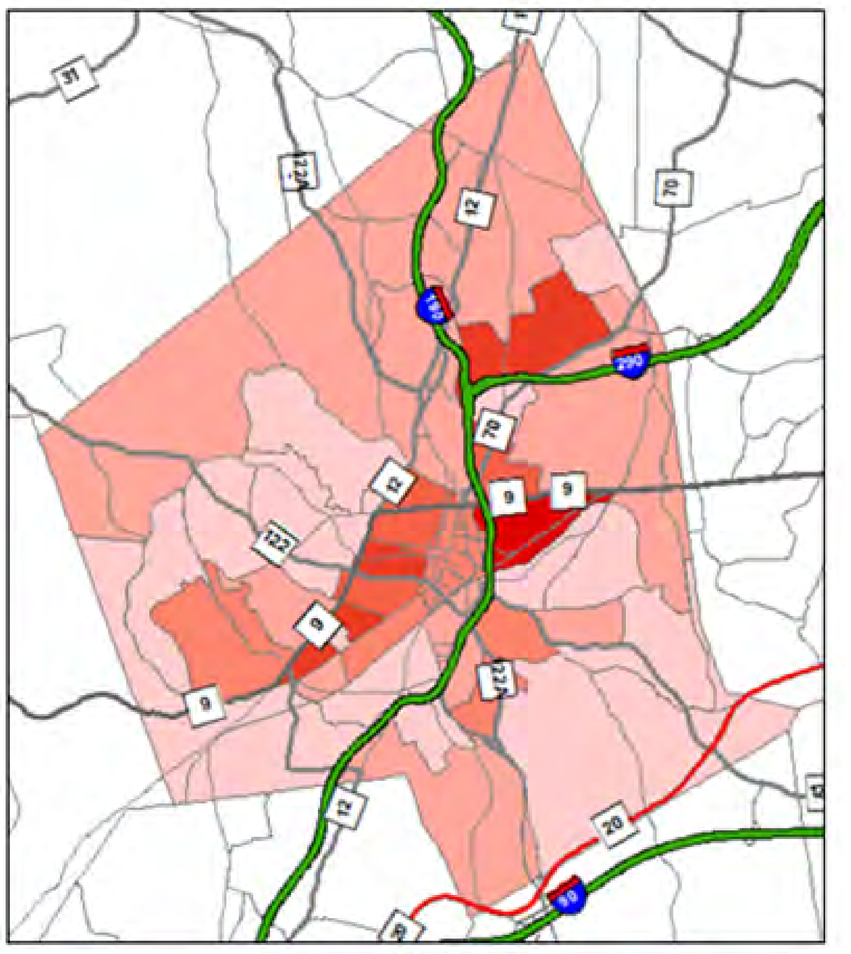
WHAT IS THE IMPACT OF SEWER RATES IN WORCESTER?

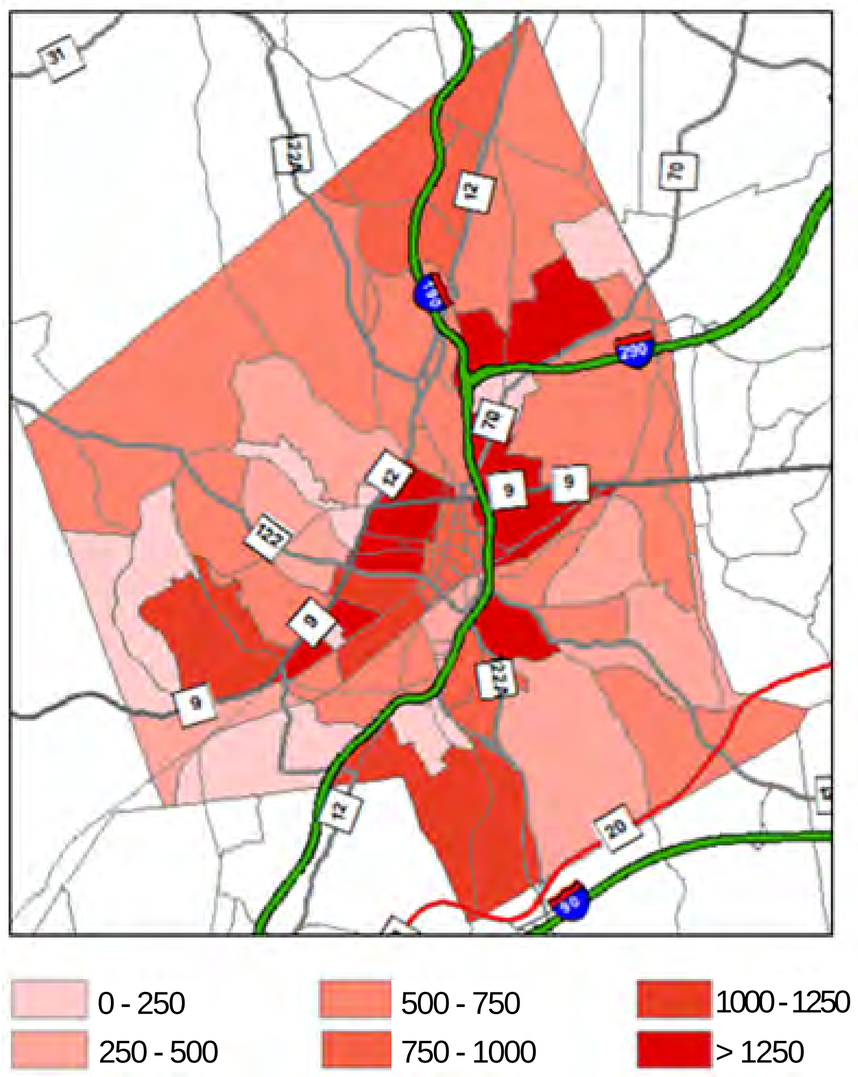
Unaffordable Number of Households (without Stormwater)



Projected number of Worcester households with unaffordable sewer rates within the City's census tracts following EPA mandated construction of additional nutrient controls at the Upper Blackstone Treatment Plant by the year 2025. **Nearly 26% of all households in Worcester are projected to have bills exceeding the high burden threshold.** This analysis does not include increased stormwater management costs.

Unaffordable Number of Households (with Stormwater)

Projected number of Worcester households with unaffordable sewer rates within the City's census tracts following EPA mandated construction of additional nutrient controls at the Upper Blackstone Treatment Plant by the year 2025. This analysis includes increased stormwater management costs. **Nearly 46% of all households in Worcester are projected to have bills exceeding the high burden threshold.**



These 2016 projections verified that the current situation was fiscally unsustainable and was a key reason the City decided to negotiate with EPA on an Integrated Water Resources Management Plan!

SUPPORTING THE LOCAL ECONOMY

RATE IMPACTS:

Certain businesses are more likely to be impacted by rates. Some of theses businesses include:

- Hotels
- Restaurants
- Medical Institutions
- Laundromats
- Universities

9 hotels and 1,000 food service establishments are major sewer contributors.

SYSTEM RELIABILITY:

Businesses need reliable services to thrive. The Integrated Plan is working to improve system performance to reduce these impacts:

- Localized Flooding
- Loss of Service

Flooding directly impacts local businesses.

GROWING ECONOMY:

Planning for responsible growth within the City is critical to supporting the local economy. The Integrated Plan will allow us to expand the systems to accommodate job growth through new development and businesses.

Growth in City Square is made possible by responsible management of our infrastructure.

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SIGNIFICANT WATER QUALITY IMPROVEMENT EFFORTS

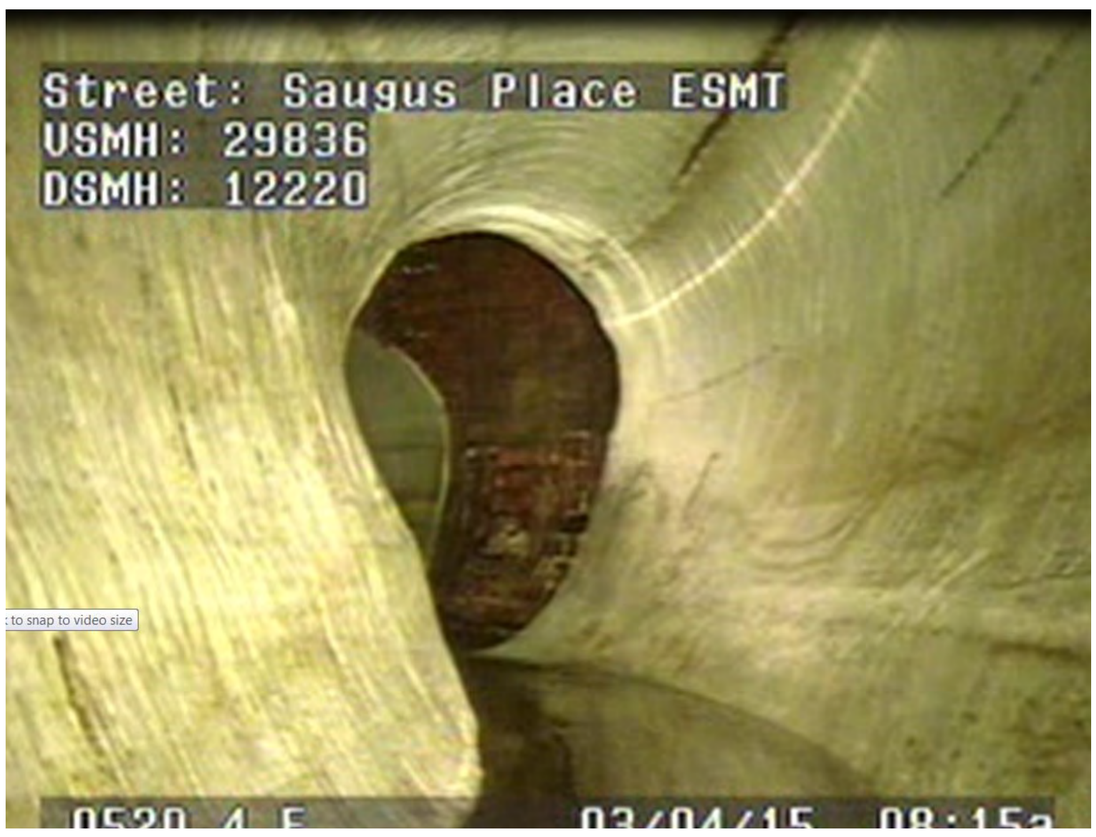
The DPW&P has many ongoing projects that ensure Worcester has high quality water, adequate capacity, and opportunities for economic expansion.

Recent projects include:

Cambridge Street Sewer Rehabilitation (1888 pipe)

Upper Blackstone Treatment Plant

Ongoing water main repairs



Lining of large, brick sewer

Station 5

Reduce Infrastructure Risk/ Reduce Reactive O&M

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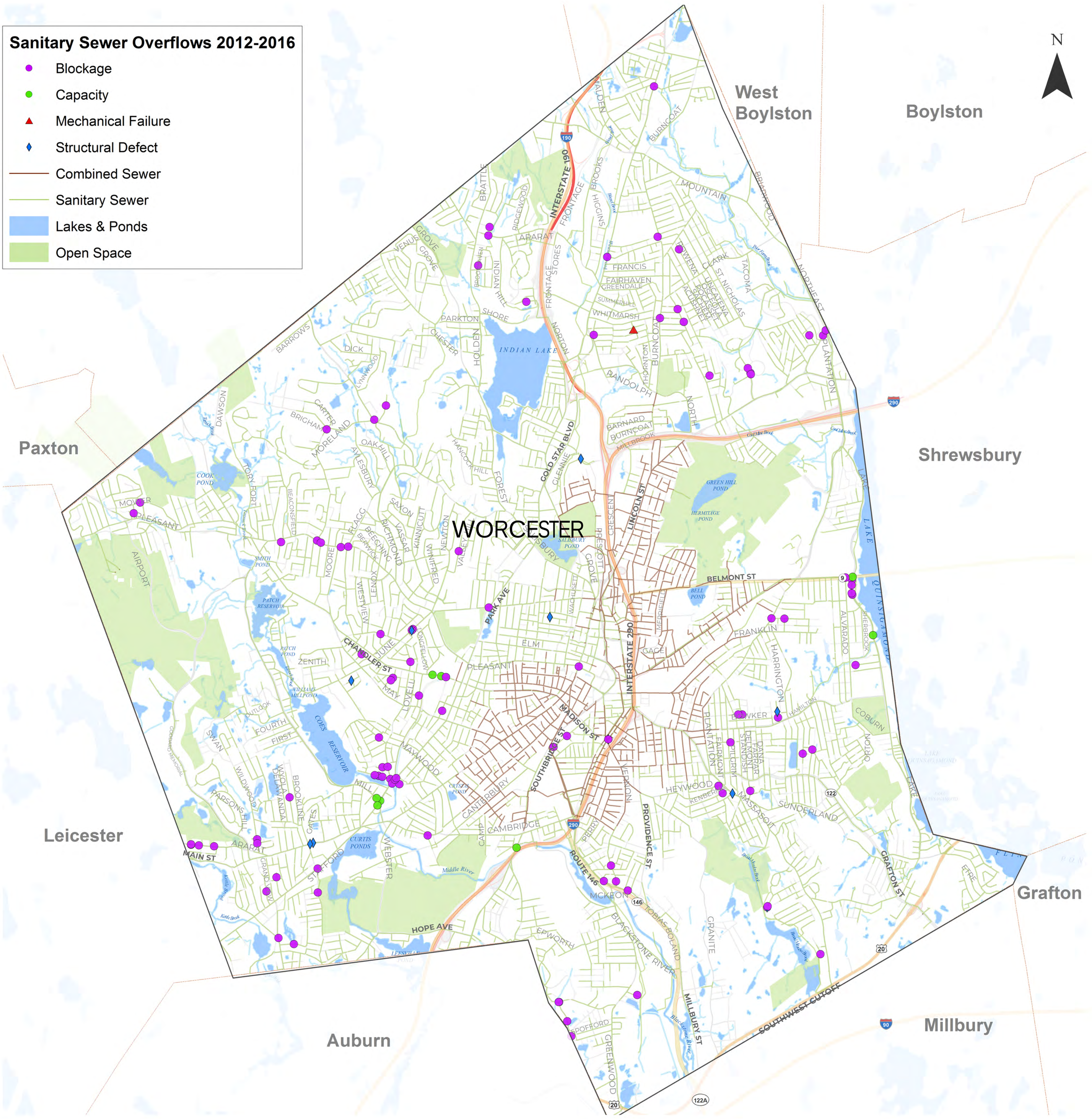
SANITARY SEWER OVERFLOW LOCATIONS

Sanitary Sewer Overflows (SSO) occur when a pipe is undersized or becomes blocked. SSOs release sewage into streets and receiving waters and threaten public health. SSOs require immediate response by DPW&P.



Station 5

Reduce Infrastructure Risk/ Reduce Reactive O&M

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OLD INFRASTRUCTURE = CHALLENGES

Aging infrastructure is at a greater risk of failure and requires costly emergency repairs by DPW&P.

Water main break repair - 24-inch diameter pipe installed in 1898.

Shrewsbury Street at Belmont Street sewer collapse.

Drain overflow at Wigwam Street.

Shrewsbury Street at Belmont Street sewer collapse.

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COST OF FAILING INFRASTRUCTURE

As infrastructure ages, the frequency of failure and cost of reactive repairs grows. Below is a list of impacts and costs incurred by DPW&P for reactive maintenance on a regular basis.

Impacts:

- Environmental Damage
- Loss of Service
- Public Health
- Property Damage
- Business Interruption

Repair Costs:

- Repair Costs:
  - Labor
  - Equipment
  - Street Repairs
  - Other Utility Damage

DPW&P is proactively planning to address failing infrastructure through the City's Integrated Plan.