Lynn Watershed Flood Relief Case Study

Municipality: Lynn, MA
Project Title: Strawberry Brook Watershed Flood Relief
Grant Award: $112,500
Match: $37,500

Community Overview:
The City of Lynn, situated several miles north of Boston, is a coastal city with a population of 89,050 hard-working people. Lynn is designated by the state as Gateway City, Economic Target Area, Economically Distressed Area, and a Community Development Block Grant Entitlement Community maintaining a significant portion of affordable housing in the region. Lynn is already experiencing the impacts of climate change and is dedicated to reducing the impacts of climate change to the City's buildings and infrastructure, environment, and vulnerable populations.

Description of Climate Impact:
Currently, Lynn has several significant Climate Impact concerns that are anticipated to increase in the future. These concerns include inland flooding from rainstorm events, coastal flooding along the harbor and Saugus River cause by storm surges, future sea level rise, increasingly extreme temperatures, and warmer average temperatures. The areas in Lynn most exposed to these increasing risks of flooding, heat, and drought, namely Downtown Lynn, the Waterfront, commercial zones along Boston St, and West Lynn, are also the location of Lynn's most vulnerable populations (Minority, Low-Income, and non-English/English Second Language Spoken Isolation). Additionally, these areas are comprised by economic drivers in the community like commercial businesses, retail, industries, and critical infrastructure. Intersecting many of these areas, Strawberry Brook conduit is a significant source of flooding and risk that can be reduced through adaptation projects throughout its watershed. Nature-based solutions and green infrastructure in concert with existing gray infrastructure can ameliorate the effects of climate impacts in Lynn.

Project Goals:
The goals of this project were to:

- Develop a hydraulic model to better understand the stream and urban stormwater flows during current and future climate conditions;
- Assess the complete drainage system to identify deficiencies due to repair conditions or undersized stormwater conveyance;
- Evaluate the climate factors that will impact Lynn today and in the future;
- Look for opportunities to design Low Impact Development stormwater controls to better manage storm flows and reduce heat island effects;
- Explore channel cleaning, culvert improvements and dredging needed to improve flows during extreme rainfall events and prevent localized flooding; and

- Package the materials into a Strawberry Brook Stormwater Climate Resilience and Implementation Plan including priorities of projects identified.

Approach and Result:

The project was broken into 7 Tasks:

1. Project Background and Kick-off
2. Field Investigation
3. Climate Resilience Assessment
4. Public Engagement
5. Action Identification
6. Action Prioritization
7. Summary Report

Collection of data and first-hand experiences of climate risks in Lynn were instrumental in establishing a baseline for the investigation into the Strawberry Brook Watershed. We evaluated and validated existing data, while developing additional data of the connections, functions, and conditions of the drainage system along Strawberry Brook. The combination of field investigation and desk review of Lynn's physical and infrastructural conditions allowed for a thorough assessment of the City's climate risks. The assessment included the establishment of present and future design storm scenarios, identification of green infrastructure tools appropriate for Lynn, hydraulic and hydrological modeling of existing and proposed conditions, culvert and outlet design options, and urban heat index modeling. Public engagement due to the COVID-19 pandemic was limited to community and online informational packages, surveys, and videos describing the climate vulnerabilities in Lynn and, but verification of known flooding risks and concerns by survey respondents assisted in evaluating opportunities moving forward. From this input, we were able to identify over 230 projects, a mix of gray and predominantly green infrastructure projects, that were grouped into 23 larger, actionable projects throughout the watershed. We evaluated these larger projects with several criteria, including impact to reducing flood risks, heat index, improvements to the urban environment, maintenance, and costs, and based on the matrix results prioritized 10 projects that create the greatest impact for the City. The entire process, data, and projects are included in the final Summary Report outlining strategic steps and projects where climate adaptation and nature-based solutions can be best implemented.

Lessons Learned:

Some of the most significant lessons learned during the process were:

1. Small size and low-cost projects can be equally effective at reducing flooding risks. For example, the redesign of Cedar Brook's outlet structure reduces downstream flooding impacts more significantly than large scale projects.

2. Space is a luxury, but healthier, safer urban design must be prioritized. In dense urban areas like Lynn, Green streets create access to open space, green areas, and increase tree canopy/shade providing immense community benefits ranging from lower temperatures and associated air quality improvements to adequate outdoor/pedestrian spaces where people can remain socially distanced.

Partners and Other Support:

- William Bochnak, Lynn EDIC, was the Project Coordinator and MVP Project Manager – Facilitated data, information coordination between project team, Lynn Water & Sewer Commission and other City Agencies/community groups.
- Aaron Clausen, AICP, Principal Planner for the City of Lynn – Assisted the project team by providing data and information, engagement liaison between project team and community groups.
- Weston & Sampson Climate Resilience Team – conducted the full scope of work from investigation, analysis, and summary report.