Municipal Vulnerability Preparedness Program Action Grant Case Study

Municipality: Lynn, MA
Project Title: Strawberry Brook Green Infrastructure (GI) Implementation
Award Year (FY): 2021
Grant Award: $ 199,090
Match: $ 83,224
Match Source: Cash & In-Kind
One or Two Year Project: One Year; extended to two year by request
Municipal Department Leading Project: Planning Department
Project Website URL: Municipal Vulnerability Planning | Lynn In Common

Community Overview:

- *What is the population size of your community and where is it located?* 93,700; north of Boston, in Essex County.
- *Do you have any Environmental Justice or other Climate Vulnerable communities?* Lynn is a Gateway City and an environmental justice community, with over 80% of residents living in Environmental Justice Census Blocks because of household income, race, or lack of English speaking.
- *Other unique traits of your municipality like who the top employers are, geography, history, etc.*
    - Lynn was settled by early colonists in 1629 and relied primarily on farming and fishing. When Lynn developed its major industrial center, much like other municipalities in the late 18th and early 19th centuries, summer estates also began to line the ocean shore by the middle of the 19th century. This gave way to the city being deemed a 'fashionable Boston resort area'. High rises soon took over the shore to take advantage of the views of Nahant Bay after Lynn Shore Drive was developed in 1910.
    - Now, the city is a densely populated urban manufacturing and commercial center. Lynn's largest employer is GE Aviation. In fact, the first jet airplane engine in the U.S. was built in Lynn in 1942. The City is known as the "City of firsts", in a large part due to innovation exhibited at GE, growth of the shoe industry, and well-known entrepreneurs like Lydia Pinkham. The City is going through a resurgence and building on its reputation for innovation, particularly in the Creative Economy that is settling in and around Lynn's downtown Cultural District.
    - Lynn is just north of the Saugus River and has harbor and scenic coastline views. It is home to many brooks and ponds woven into its dense development. In the northwestern part of the city, one quarter of Lynn is covered by the Lynn Woods Reservation.

Project Description and Goals:

- *Where was the project located?* Two frequently flooding sites in the Strawberry Brook watershed: Boston Street, an area in the city with multiple stormwater pipes converging and surrounding streets contributing surface runoff, and Barry Park and G.E.A.A. Field, City owned park properties encompassing more than 650,000 square feet of mixed recreation spaces and parking located near the outlet of Strawberry Brook into the Little River, a tidal creek that discharges into the Rumney Marsh ACEC.
- *What climate change impacts did the project address?* Flooding from extreme precipitation events was among the five top hazards identified by participants during a February 2019 Community Resilience Building Workshop. Flooding in Lynn occurs as riverine, stormwater, and coastal flooding, which can be caused by various weather events including hurricanes, extreme precipitation, thunderstorms, and nor'easters and winter storms. These pilot projects demonstrate the usefulness of low impact development and green infrastructure to reduce the impacts of flooding.
- *What were the specific goals and tasks of the project as stated in your application?*
    - Goals:
        - Deploy Nature Based Solutions and Environmental Co-Benefits
        - Support Environmental Justice and Public/Regional Benefits
        - Provide Opportunities for Public Involvement and Community Engagement
    - Objectives:
        - Design and construct six (6) green infrastructure pilot projects along Boston Street to reduce peak flows, improve pedestrian safety, and address heat island effects.
        - Develop a conceptual use and stormwater management plan for Barry Park and G.E.A.A. Field to reduce peak flows, improve water quality, and convey stormwater runoff from neighboring streets into underground storage systems in the park.
        - Coordinate the Barry Park/G.E.A. A Field project with community input and in coordination with other ongoing efforts in this area to ensure efficient implementation and community co-benefits.
- *Did your project meet the goals set forth in your application in terms of:*
    - *Employing nature-based solutions* - The designs for Boston/Grove Street and Barry Park/G.E.A.A. Field incorporated green infrastructure solutions such as bioretention, water quality swales, impervious cover removal, tree box planters and underground storage to provide urban heat island mitigation, promote natural flow, improve water quality, and support groundwater recharge.

- *Improving equitable outcomes for and fostering strong partnerships with EJ and other Climate Vulnerable Populations* – The green infrastructure projects installed along Boston Street and designed for Barry Park will improve health and safety for EJ populations in those neighborhoods, through reduced flooding, better air quality, improved urban landscape, a reduction of urban heat island, and better water quality. The engagement strategy included financial incentives, Spanish translation, and quick, low-barrier feedback channels (e.g. a 3-minute video and short online survey) to help reach EJ and climate vulnerable populations. We hope to build on the new relationships developed during this phase as future projects from the Strawberry Brook plan are implemented.
- *Providing regional benefits* – In this phase, implementation of Pilot Green Infrastructure projects on Boston Street addresses stormwater flows, improving stormwater quality and reducing damage from flooding to the area including the Saugus River and the Rumney Marsh Area of Critical Environmental Concern (ACEC), as well as improving air quality and mitigating urban heat island effects in the region. Design and future implementation of conceptual stormwater management plans for Barry Park will result in significant flooding controls, management of future climate impacts and also protecting and improving the water quality of the inputs to Rumney Marsh.
- *Implementing the public involvement and community engagement plan set forth in your application* - We received community feedback on the vision and design for the GI projects at both sites through the range of engagement strategies proposed, including online public meetings and a video and survey. The input collected informed the design team's choices and priorities in the final designs.
- *Finishing the project on time* – All deliverables were completed as scheduled with the exception of construction of the GI projects on Boston Street, which were delayed due to contractor availability.

Results and Deliverables:

- *Describe, and quantify (where possible) project results (e.g. square footage of habitat restored or created, increase in tree canopy coverage, etc.). Report out on the metrics outlined in your application.*
- *Boston Green Infrastructure Pilot Project*
    - Designs and construction documents were created for six green infrastructure installations on Boston Street and Grove Street, featuring underground storage, low-lying vegetation, rain guardian turrets, and infiltration system. These six sites will treat stormwater runoff from 5.4 acres surrounding them, and many of them are designed to provide water quality treatment through biofiltration. Excess water that cannot be stored or filtered by the site will be directed into nearby catch basins.

- A public bid for construction of the Boston Street GI project on June 16, 2021 with no bids coming in under the project budget. A second bid was issued September 15, 2021. The approach for the second round was to require minimum bid for locations #1 & #2 as developed in the design process with additional optional scope for locations 3 – 6 if budget allowed. SumCo was the contractor selected as the low bid and allowed for only the base bid. Note that locations #1 & #2 provided more water storage & infiltration capacity than all six locations as proposed in the original MVP application. City Staff with support from consulting engineer reviewed and requested approval from MVP staff prior to issuing notice to proceed.
- Construction began May 2022, and concluded June 30, 2022.

- The green infrastructure strategies identified for the Barry Park/G.E.A.A. Field sites include:
  - **Stormwater Collection in Streets**
    - *Biofiltration along sidewalks*
    - *Conveyance toward other GI features*
    - *Street trees*
  - **Floodable Parks**
    - *Temporary surface storage of runoff water allows infiltration into soil or into underground infiltration chambers*
  - **Underground Infiltration Chamber**
    - *Treatment below playing fields and/or parking lots*
  - **Rain Harvesting**
    - *Collection of rainwater from large factory/warehouse roof for storage and reuse*
  - **Reduction of Pervious Surfaces**
    - *Reduces excess rainwater runoff*
    - *Porous pavement used in parking spaces*
    - *Allows for infiltration into underground storage*
  - These strategies will benefit the community because they mitigate flood risks, improve water quality, reduce urban heat, improve public spaces, connect to community path, and increase planting and vegetation.

  - 72 people participated in Lynn's Green Infrastructure Pilot Project Survey. Most individuals who took the survey identify as white and are between the ages of

36-45, with 17 identifying as people of color and 11 identifying as of Hispanic origin. The majority of people who took this survey were either people who commuted through the area (45), shopped in the area (30), or lived in the neighborhood (32).

- 11 people including the project team attended the virtual meeting in April. In both the survey and virtual meeting, community members expressed support and excitement about installation of green infrastructure projects in the project area. Survey responses and other input from community members raised other important topics. These findings were shared in project team meetings and incorporated into the design process.
- During this phase, we also gathered information from the community that can inform future green infrastructure projects. Respondents shared clear preferences for more lighting, better signage, bike paths, and play structures in the project area. They also expressed broader concerns about pedestrian and bike safety, accessibility, and parking along roadways in the City. These preferences should be considered in designing future green infrastructure projects in Lynn.

- Provide a brief summary of project deliverables with web links, if available.
  - For the initial field exploration and data, we provided an existing conditions memo, survey maps of the project areas, and geotechnical maps and reports. For the design, modeling, and construction of Boston Street, we provided detailed design plans and concepts, a modeling results report, construction bid documents, and photo documentation of the six installed projects. For the design and modeling of Barry Park/G.E.A.A. Field, we provided visualizations of the dry and wet conditions, conceptual designs, and a permitting strategy. For the stakeholder and public engagement of the project, we provided fact sheets, videos, surveys, email blasts, website updates with FAQ, press releases, social media posts, virtual meeting notes, and a summary of the public input.

Lessons Learned:

What lessons were learned as a result of the project? Focus on both the technical matter of the project and process-oriented lessons learned. –

Community Engagement

- Community members have interest in upgrading the streetscape and parks, and they have concerns about traffic, safety, and maintenance.
- The compressed project timeline constrained outreach and limited relationship-building time. For example, a school group was interested in participating in the project, but teachers need more lead time to involve their students than was available in the project timeline.

- The City can be limited in their time available to build relationships or carry out outreach activities, having competing priorities for their engagement channels and their time.
- We learned that on-line/ virtual based engagement opportunities can provide flexibility for the community to engage in the processes at their own timeline. We expect to continue to offer virtual engagement opportunities in the future, however in a post-pandemic environment we will seek to include in-person and on-line engagement strategies.
- MVP scoring means that multiple engagement activities are rewarded instead of rewarding activities with higher quality relationship building and reach. This leads to a quantity over quality tradeoff.
- A different approach is needed for community engagement for projects like the Boston Street Green Infrastructure in that it is primarily a construction driven project and opportunity for public feedback is limited. We believe engagement strategies for implementation should focus on education and information sharing on environmental outcomes and co-benefits of the project.
- We discovered a certain amount of public engagement fatigue by the community. There are several planning processes carried out parallel to our MVP projects and residents are not able to consistently participate in every engagement opportunity available. It requires a thoughtful approach to provide transparency and access to these projects without asking too much of the community.
- We built processes to offer Spanish translation in materials and meetings, and we received some comments in Spanish. We did not have anyone request translation services for meetings, so we may not be effectively reaching people or lowering barriers to participation for those. That said, many Spanish speakers are multilingual and may be participating in English.
- Asking for demographics and asking where people heard about our project helps to ensure participants are representative and test effectiveness of various outreach methods.

Boston Street Green Infrastructure Project

- The Boston/Mall Street intersection was identified as a good site for pilot projects, but the hydrological investigation showed that other sites around that block were better suited for stormwater capture. Hence, the sites were installed on Boston Street east of Mall Street and on Grove Street.
- Construction cost increases were fairly significant for the project and requires the ability to build in a construction contingency of at least 10%, however there may be a need to build in a larger design contingency depending on the type of project, timing of construction post design, or context.

- The project team discovered a number of incongruities with underground infrastructure that either did not align with existing plans, weren't shown on existing plans or surveys, or were picked up by dig safe. For instance, the location of the Strawberry Brook conduit was not located as shown on plans provided by Lynn Water & Sewer, a small portion of the conduit was compromised and needed repair, and an unknown old abandoned gas line was uncovered. This necessitated design changes and cost increases that the City was able to absorb in this case, but in other projects could have either prevented the project from advancing or further delay the project. Two immediate solutions come to mind, first ensuring adequate construction contingencies need to be built into the budget, particularly for project located in old, densely populated neighborhoods where there are likely to be challenging unknowns, and second, conduct more exploratory borings to identify as much as possible what is going on under ground in the design phase. For this project, two borings were conducted during the design phase and were not able to unearth and identify any anomalies.
- The project design for the Boston Street project included underground storage and infiltration in addition to the bioswales. This significantly increased water storage capacity and infiltration. This is beneficial in urban contexts where there is less land to work with.

What is the best way for other communities to learn from your project/process?

- When introducing new concepts like green infrastructure, communities should use pilot projects to build the coordination channels and awareness within the community. Generating public input into a broader vision throughout implementation can help demonstrate the need for future funding. All materials are available online as examples of methods for community engagement, including the project video and a recording of the public meeting.

Partners and Other Support:

- Steering Committee members: Aaron Clausen, Lauren Drago, City of Lynn; Bill Bochnak (EDIC), Ibrahim López-Hernàndez (Climate Justice organizer), John Moberger (Lynn CD)
- Meeting attendees:
    - The following members of the general public provided feedback at the virtual meeting on the design for the green infrastructure projects: Ed Calnan, Joy Campbell Fine Gardening, Thomas McGee, Heather MacLeod, Brian Falter, Audrey Cutelis, and Jared Nicholson.

Project Photos:

- In your electronic submission of this report, please attach (as .jpg or .png) a few high-resolution (at least 300 pixels per inch) representative photos of the project. Photos should not show persons who can be easily identified, and avoid inclusion of any copyrighted, trademarked, or branded logos in the images. MVP may use these images on its website or other promotional purposes, so please also let us know if there is someone who should receive credit for taking the photo.