Norfolk Community Resilience

A collaborative project with the City of Norfolk

Mitigating the Effects of Parcel Level Heavy Rainfall That Causes Street Flooding in Norfolk

What Is Porous City?

The AIA Virginia's 2015 ELA class has created Porous City (www.PorousCity.com). Porous City is an online public collaboration of architects, engineers, developers, inventors, and investors to share their ideas about the built environment and how it can be resilient in the face of sea-level rise. From this collaboration platform, knowledge can be shared about implementations, best practices, as well as financial feasibility. The platform will draw expert opinion from around the globe. It will function as a resource to policy makers and private businesses seeking council on building and infrastructure issues related to sea-level rise and resiliency, along with assisting homeowners in learning how they can do their part to help in the effort of mitigating the effects.

Hampton Roads Innovation Collaborative has agreed to act as the Project Host and Program Management Office for the Porous City activity.

Initial Project Scope

Porous City has selected "*Mitigating the Effects of Parcel Level Heavy Rainfall That Causes Street Flooding in Norfolk*" as a pilot project. There are several factors involved in street flooding—sea level rise, subsidence, rainfall, drainage infrastructure, and the tides. The effects of rainfall are dramatically affected by the amount of rainfall over a given time period, along with the outdated and under capacity infrastructure currently in Norfolk. Heavy rain events overwhelm many Norfolk neighborhoods due to the high volume of rain in a condensed time period. Draining from properties blends—overwhelming the street drainage and causing flooding conditions.

The Porous City pilot project is scoped to assist neighborhoods in living with water conditions. It is not intended to address the matters of infrastructure, elevations and large-scale resiliency efforts. The purpose of the project is to empower the citizen homeowner so they can contribute to city-wide rain water flood mitigation.

Project Goals

1. Use design support to mitigate rain water runoff from houses in tributaries to flood prone area. Captured rainfall can contained and then either:
    a. Released at a later time under controlled conditions (post rain and drainage caught up); or
    b. Re-used for other purposes (i.e. gardening).
2. Create business within Hampton Roads to apply these solutions in several cities and neighborhoods around the region and across the country.
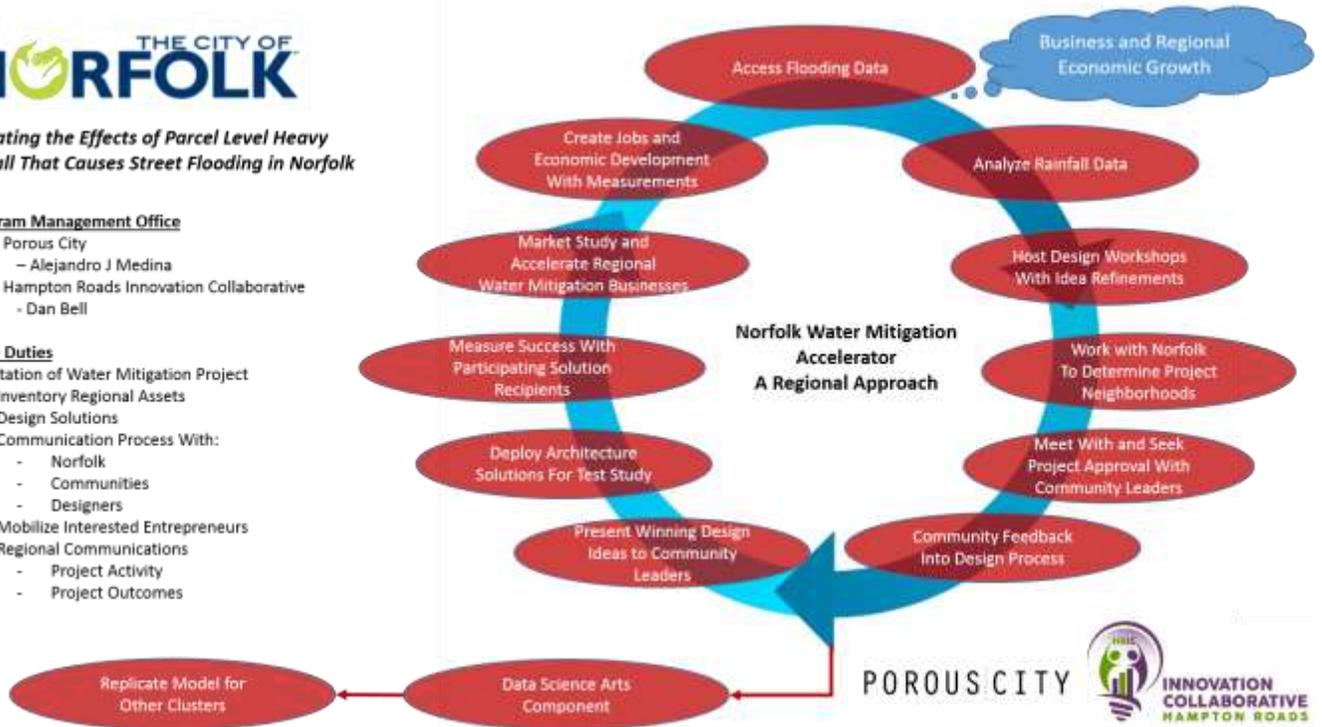
Process Flow Visual

THE CITY OF NORFOLK

Mitigating the Effects of Parcel Level Heavy Rainfall That Causes Street Flooding in Norfolk

Program Management Office
1. Porous City
   – Alejandro J Medina
2. Hampton Roads Innovation Collaborative
   - Dan Bell

PMO Duties
Facilitation of Water Mitigation Project
- Inventory Regional Assets
- Design Solutions
- Communication Process With:
  - Norfolk
  - Communities
  - Designers
- Mobilize Interested Entrepreneurs
- Regional Communications
  - Project Activity
  - Project Outcomes

Process flow diagram labels:
- Access Flooding Data
- Business and Regional Economic Growth
- Create Jobs and Economic Development With Measurements
- Analyze Rainfall Data
- Market Study and Accelerate Regional Water Mitigation Businesses
- Host Design Workshops With Idea Refinements
- Measure Success With Participating Solution Recipients
- Norfolk Water Mitigation Accelerator A Regional Approach
- Work with Norfolk To Determine Project Neighborhoods
- Deploy Architecture Solutions For Test Study
- Meet With and Seek Project Approval With Community Leaders
- Present Winning Design Ideas to Community Leaders
- Community Feedback Into Design Process
- Replicate Model for Other Clusters
- Data Science Arts Component
- POROUS CITY — INNOVATION COLLABORATIVE HAMPTON ROADS

Project Steps
1. Porous City and HRIC will work with the Resilience Office of Norfolk to obtain access to data.
2. Data will be analyzed to determine a target amount of rainfall to mitigate.
3. Porous City will host a design workshop for creating various water storage techniques. This could be local or virtual to incorporate more remote designers from (potentially), around the world.
   a. They will be designed for various parcel and soil conditions.
   b. They will be broad-brush strokes-allowing customization of each technique by the homeowner.
   c. They will be aesthetically acceptable to the community.
   d. They will explore techniques for water release programming.
   e. They will develop ideas for water re-use options leveraging current and new approaches and technologies in the industry.
4. Workshop designers will continue to develop their ideas.
5. Porous City, HRIC and Norfolk will meet to select a neighborhood to test the solutions.
6. Porous City, HRIC and Norfolk will meet with community leaders in impacted neighborhood(s) to discuss pilot project.
7. Porous City to send any feedback to workshop designers.
8. Workshop designers will submit final designs with feasibility studies.
9. Porous City, HRIC and Norfolk to present findings to impacted neighborhoods.
10. Deploy solutions for test study (possible financing options with area banks).
11. Measure success.
12. Determine business market.
13. Support business start/incubate/accelerate in region.
14. Measure success (jobs, economic impact).
15. Explore derivative benefits (arts community, new business opportunities).

On-Going Program
The City of Norfolk will need to review all project outcomes to determine feasibility of creating a city-wide program.

Regional application of program ideas to be discussed in each municipality.

Project Timeline
Pilot project launch in summer of 2016 and expected to run for 12 months (if adequate resources come to the program).