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Weathering the Storm:
Improving Your Town's Resiliency

Presentation to

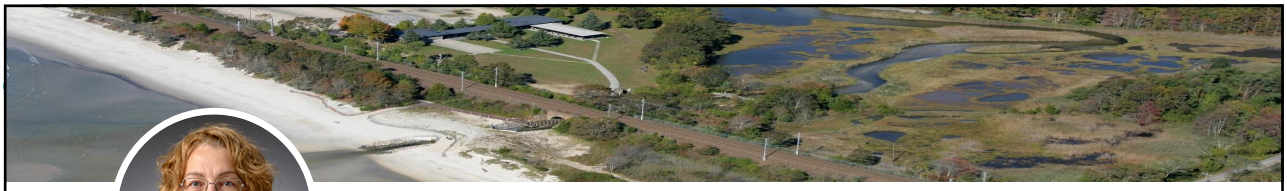
Massachusetts Municipal Association

Association of Town Finance Committees

October 26, 2019

Fuss & O'Neill Overview

- At Fuss & O'Neill, we place great emphasis on collaboration; both within the company and with our clients. We are guided by what is best for the client and the project – in identifying client champions, naming project leaders, building project teams, and providing responsive service and quality deliverables.
- We strive to partner with our clients to understand their businesses and to be stewards of their resources as if they were our own, and aim to develop services and solutions that anticipate evolution of their unique business needs.



Mary Monahan
Associate,
Director of Business Development

- Mary is a municipal public works specialist well-versed in issues related to stormwater management; wastewater collection and treatment; drinking water supply, treatment, and distribution; solid waste management; and sustainable operations. Mary serves as a liaison between the public works project owner and the design team.

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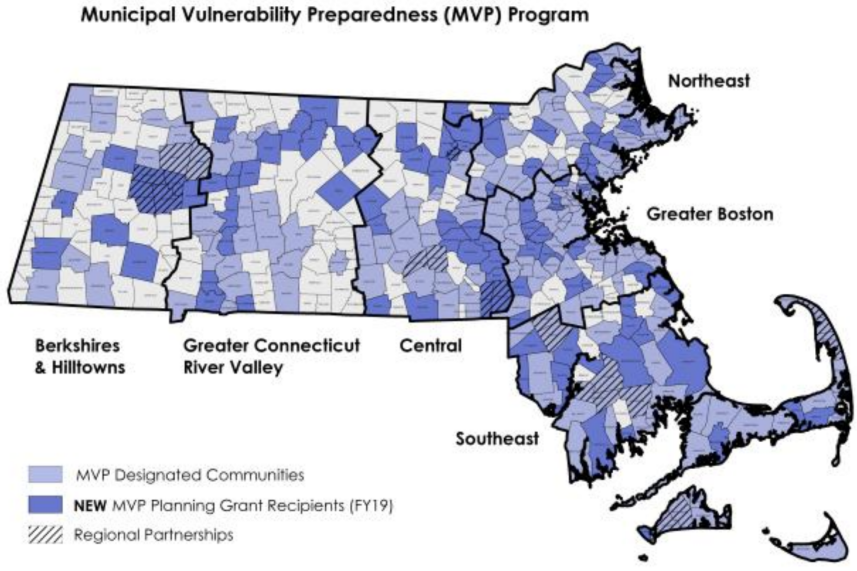
Are You an MVP Community?



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MVP – What's It all About?

Brockton MVP Program - $47,000

- Grant supports Climate Change Vulnerability Assessments and Resiliency Planning
  - Comprehensive Approach
    - *Infrastructure*
    - *Society*
    - *Environment*
  - Scope and Process Use Guidance in the Community Resilience Building Workshop Guide
  - Municipalities that complete this process will be designated Municipal Vulnerability Preparedness (MVP) Municipalities

MVP Designation Leads to Enhanced Standing in Future Funding Opportunities

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MVP – What's It all About?

- Rising Temperatures: City of Brockton – Taunton Basin

Taunton	Observed Baseline 1971-2000	Projected Change in 2030s			Projected Change in 2050s			Projected Change in 2070s			Projected Change in 2090s		
Average Annual Temperature (°F)	49.85	2.03	to	3.77	2.68	to	5.94	3.12	to	8.62	3.43	to	10.49
Annual Days with Maximum Temperature over 90°F (Days)	7.43	5.38	to	14.58	7.20	to	29.31	9.27	to	49.91	11.88	to	65.46
Annual Days with Minimum Temperature below 32°F (Days)	129.76	-13.27	to	-27.89	-18.99	to	-43.59	-23.07	to	-57.04	-24.79	to	-67.94

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MVP – What's It all About?

- Changing Precipitation: City of Brockton – Taunton Basin

Taunton	Observed Baseline 1971-2000	Projected Change in 2030s			Projected Change in 2050s			Projected Change in 2070s			Projected Change in 2090s		
Total Annual Precipitation (inches)	47.48	-0.05	to	4.11	0.33	to	5.35	0.90	to	6.61	0.38	to	7.34
Annual Consecutive Dry Days (Days)	17.33	-0.23	to	1.29	-0.07	to	2.52	-0.90	to	2.80	-0.34	to	3.65

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MVP – What's It all About? - The Magic of the Matrix

Community Resilience Building Risk Matrix — www.CommunityResilienceBuilding.org

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

H-M-L priority for action over
V = Vulnerability S = Strength

Features	Location	Ownership	V or S	Flooding	Severe Storms	Extreme Temperatures	Drought	Priority H - M - L	Time Short Long
Infrastructural									
Culverts and Bridges	City-Wide	City	S	Brockton is already completing bridge repairs and replacements to improve flooding resilience.				N/A	O
			V	Conduct a field inventory of culverts and bridges; rank and prioritize projects; assess green infrastructure opportunities; design and implement priority re-sizing or replacement projects.				H	S
Dams	City-Wide	City/Private	V	Conduct engineering and hydrology studies on the City's dams to identify and prioritize repair needs.				H	S
			V	Develop an integrated all-waters approach to increase flood resiliency City-wide. Incorporate nature-based solutions, identify projects to reduce stormwater runoff and increase flood storage capacity. Build on the current Fuss & O'Neill dam study to evaluate necessary dam improvements and potential for dam removals. Assess feasibility and cost and develop concept designs. Review and update City regulations as needed. Explore multi-community and public-private partnerships to address interrelated flooding issues.				H	S
Roads	City-Wide, Oak Street and N. Main	City/State	V	Conduct a traffic study in areas where extreme traffic delays could exacerbate hazard impacts or delay emergency services. Identify alternate routes to efficiently evacuate congested areas.				M	S
Water Supply and Water Infrastructure	City-Wide	City	S	Brockton has access to multiple water sources, including Silver Lake and the desalination plant in Dighton.				N/A	O
			V	Conduct a comprehensive assessment of water quality, supply, and infrastructure, including options for an additional back-up water supply; potential for incorporating homes with private wells into the City water supply system and means of mitigating climate-driven impacts on public water supply sources (e.g., HABs, drought, or salt intrusion).				H	S
Stormwater Basins and Conveyances	City-Wide	City/Private	V	Increase maintenance of catch basins, conveyances and detention ponds.				H	O
Communications Infrastructure	City-Wide	City/Private	V	Conduct an assessment of communications vulnerabilities, especially related to Crown Castle's high-capacity fiber line.				M	S
Emergency Operations Center	156 W. Elm Street	City	S	The War Memorial houses the Emergency Operations Center and a portable generator.				N/A	O
Underground Storage Tanks	City-Wide	City/Private	V	No specific priority action identified.				N/A	N/A
Buildings and Facilities	City-Wide	City	S	The City's IT and 911 hubs have back-up generators; the City has a portable generator that can be deployed as needed. All City lights have been converted to LED and two fire stations were converted to natural gas. Brockton is a certified Green Community.				N/A	O
			S	The City's Housing Authority has back-up generators to power emergency lighting and elevators, and a community room with A/C.				N/A	O
			V	Evaluate opportunities to provide emergency backup power to critical building and facilities, including feasibility of green power and battery storage.				H	S
			V	Inventory and assess school buildings for necessary repairs or upgrades.				M	S
Utilities Infrastructure	City-Wide	Private	S	Brockton's partnership with National Grid includes tree work to increase the resiliency of utility lines.				N/A	O
			V	Partner with electric and gas utility providers to identify and address vulnerabilities and enhance communication and cooperation.				H	O
			V	Assess redundant power options for the downtown area, including the feasibility of a dual-feed connection or micro grid system.				M	L
Wastewater Infrastructure	City-Wide	City	S	Brockton's wastewater treatment plant is operating below total capacity.				N/A	O
			V	Perform a risk assessment of the wastewater treatment plant and pump stations and establish priority actions, including feasibility of nature-based solutions, green infrastructure, and levees. Establish emergency back-up plans for the plant and pump stations.				H	S
Societal									
Public Transportation	City-Wide	Brockton Area Transit/State	S	Brockton has robust public transportation resources through Brockton Area Transit and the state-owned commuter rail.				N/A	O
			V	Develop a Greenhouse Gas (GHG) Reduction Plan, which includes public transportation systems.				M	L
			V	Coordinate emergency response plans with the bus transit network and commuter rail line.				M	S
			V	Assess drainage and management improvement options for the Campello rail line where it stretches through a floodplain.				L	S
			V	Increase the availability of electric vehicle charging stations.				L	L

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MVP – What's It all About? - The Magic of the Matrix

Massasoit Community College	MCC	State	S	The college is a resource for sustainability training and demonstration practices, has energy and water conservation measures in place, and serves as an area-wide FEMA emergency site.				N/A	O
			V	Establish a gated emergency entrance that connects the college to Shaw's Plaza on Crescent Street.				H	S
Gerry's Farm	810 Pleasant Street	Private	V	Develop an urban agriculture initiative centered around Gerry's Farm to foster local food resiliency.				H	L
Language Barriers	City-Wide	Public	S	Brockton has public information resources available in multiple languages and translation skills available in the Mayor's office.				N/A	O
GIS Maps	City-Wide	Public	V	Pursue funding to update assessors (GIS) maps.				H	S
Residential Property	City-Wide	Private	V	No specific priority action identified.				N/A	N/A
Environmental Justice Communities and Vulnerable Populations	City-Wide	N/A	S	The Mayor has instituted a Quality of Life Taskforce. Several emergency shelters are available during hazard events.				N/A	O
			V	Plan and post neighborhood and regional evacuation routes.				H	S
			V	Continue to support coordinated efforts to provide emergency shelters, including cooling and warming centers.				M	O
Communications Systems	City-Wide	Public/Private	S	The City operates a Code RED Emergency Alert system.				N/A	O
			V	Assess needs and vulnerabilities in the City's emergency communication systems.				H	S
Provisions, Fuel and Medical Care	City-Wide	Private	S		Brockton's hospitals are serviced by dual electric feeds which increase resiliency to power outages.			N/A	O
Stress on Emergency Services	City-Wide	City	S	The City has six Fire Stations and two designated emergency helicopter sites. Coordination between Police and ambulance services is strong. Brockton has a dedicated Emergency Management Agency (BEMA), a regional Hazard Mitigation Plan, and Local Emergency Planning Committee (LEPC) and has mutual aid agreements in place.				N/A	O
			V	Upgrade all traffic lights with Opticom transmitters to aid emergency vehicles at busy intersections.				M	S
Schools	City-Wide	City	S	Brockton's Schools have a strong IT network, situational awareness practice, and outreach programs to parents. The schools practice sustainability measures such as using green cleaning products.				N/A	O
			S	A remediation project at the Raymond School repaired damage from past flooding.				N/A	N/A
			V/S			Implement plans to install air conditioning in all schools.		M	O
Pests and Disease Control	City-Wide	City/Private	V	Assess additional mosquito/pest control options, including establishment of buffers, determination of future risks, and development of an education and outreach program.				H	L
Environmental									
Wetlands	City-Wide	City/Private	V	Develop and adopt a wetlands ordinance and stormwater ordinance.				H	S
Environmental Contaminants	City-Wide	City/Private	V	Assess levels and sources of stream contaminants; develop and enforce measures to detect and eliminate illicit discharges.				M	O
			V	Investigate potential contamination from waste transfer stations and assess vulnerability to flooding and other hazards.				L	L
Trees and Forests	City-Wide	City/Private	V	Develop a comprehensive tree and forests management program.				L	L
Open Space	City-Wide	City	S	City has established new parks, transforming former industrial and commercial sites into valuable open space.				N/A	O
Flood Storage	City-Wide	City/Private	V	Develop an integrated all-waters approach to increase flood resiliency City-wide. Incorporate nature-based solutions, identify projects to reduce stormwater runoff and increase flood storage capacity. Build on the current Fuss & O'Neill dam study to evaluate necessary dam improvements and potential for dam removals. Assess feasibility and cost and develop concept designs. Review and update City regulations as needed. Explore multi-community and public-private partnerships to address interrelated flooding issues.				H	S
Invasive Species	City-Wide	City/Private	V	No specific priority action identified.				N/A	N/A
Water Quality	City-Wide	City	V	Conduct a comprehensive assessment of water quality, supply, and infrastructure (see above).				H	S
Stormwater Runoff	City-Wide	City/Private	V	Develop a City-wide Business Improvement and Economic Development Plan to support local businesses and increase resiliency. Identify areas where climate hazards can be avoided/mitigated and targeted improvements, such as a microgrid, could be employed. Simultaneously identify areas from which businesses would be encouraged to divest to avoid hazards. Include a plan for attracting climate-friendly businesses.				H	L
			V	Develop a regional approach to stormwater management that accounts for Brockton's position in the larger watershed.				M	L
Environmental Regulations	City-Wide	City	V	Review and update City regulations to improve stormwater management and mitigate flooding risk. Work in tandem with the MA MS4 Permit to promote infrastructure improvements and increase infiltration of stormwater.				H	S

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You Can Influence the Project!

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Funding – Where the Money Comes From

- MVP Action Grant
- GreenWorks
- Senate Bill 10
- FEMA
- Other State Grants
  - TIP, MassWorks, Chapter 90, Municipal Small Bridge Program, MassDEP 604b and 319

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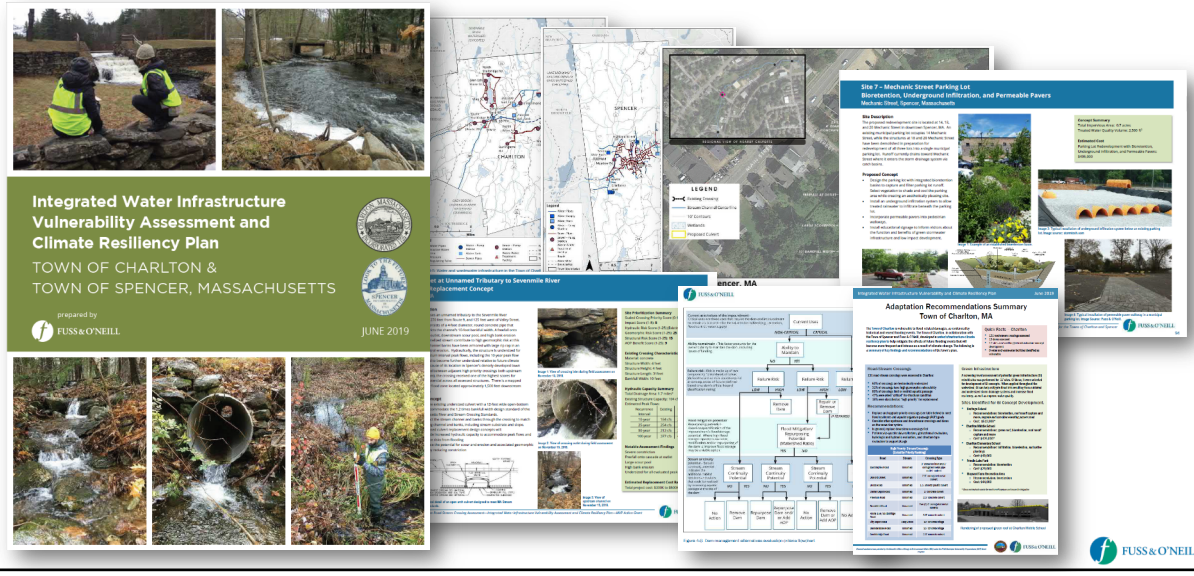
Infrastructure Improvements to Reduce Effects of Climate Change

Integrated Water Infrastructure Vulnerability Assessment:



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Infrastructure Improvements to Reduce Effects of Climate Change

Culverts:

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Infrastructure Improvements to Reduce Effects of Climate Change

Bridges:

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Infrastructure Improvements to Reduce Effects of Climate Change

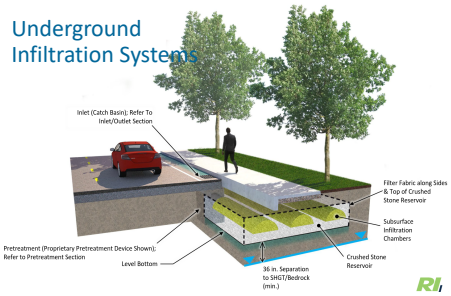
Infiltration BMPs:

Permeable/Porous Pavement

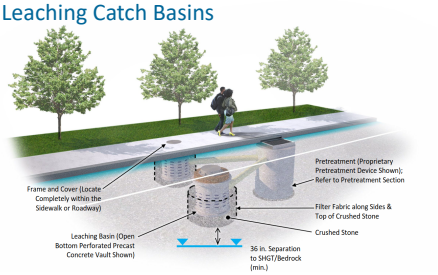
Bioretention/Rain Gardens

Subsurface Infiltration Systems

Underground Infiltration Systems



Leaching Catch Basins



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Infrastructure Improvements to Reduce Effects of Climate Change

Microgrids:

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Discussion