

City of Framingham Water & Wastewater Systems

- Emergency Preparedness
- Risk Management
- Business Continuity Planning



Gradient
Planning

Kate Novick

Gradient Planning LLC



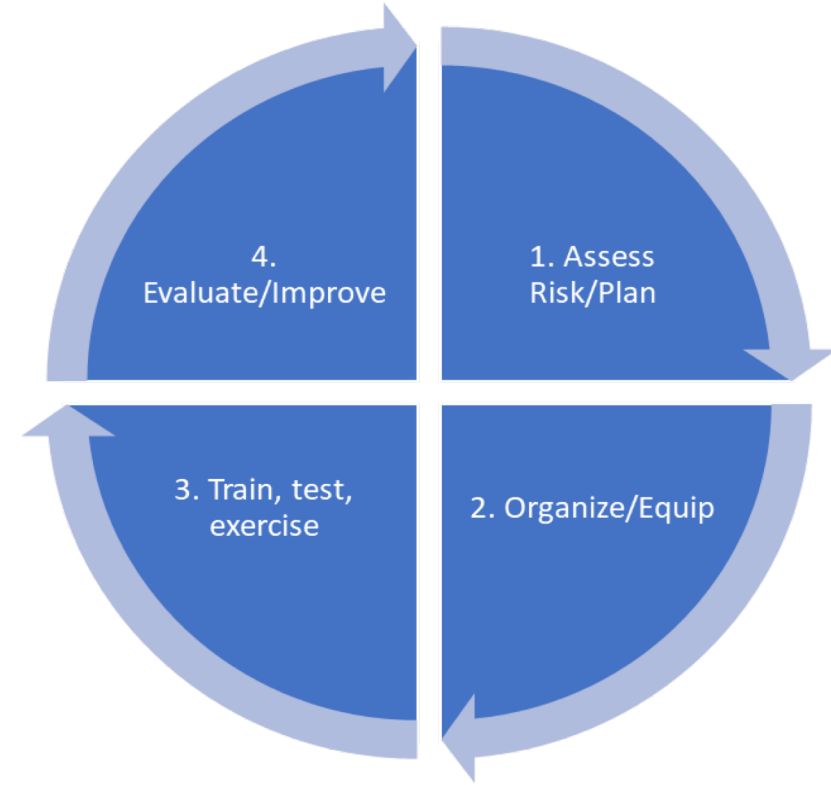
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City of Framingham
Department of Public Works

NEWEA Annual Conference 2019

Emergency Preparedness Program at Framingham DPW

- Business Continuity Plan and Emergency Response Plan
- Risk Assessment (RAMCAP)
- Tabletop Emergency Exercise
- Continual Improvement
- Questions and Discussion



Business Continuity Plan and Emergency Response Plan



Business Continuity and Emergency Response Plan

For Framingham DPW Water and Wastewater

- The list of “what emergencies can strike a water or wastewater utility” is in flux
- Drafted initial Business Continuity Plan in 2018 to understand the types of business interruptions that can happen and develop response procedure to protect Framingham Water and Wastewater’s assets and capabilities.
 - Water Research Foundation’s Business Continuity Guidance Document
 - NFPA 1600
- Currently updating Framingham’s Water Emergency Response Plan to comply with regulatory requirements and to increase readiness to potential emergencies. Update includes new standard practices and the Framingham Wastewater System.
 - Massachusetts DEP *Guidelines and Policies for Public Water System, Appendix O, Handbook for Water Supply Emergencies*
 - AWWA M19, *Emergency Planning for Water and Wastewater Utilities*
 - EPA’s *Capacity, Management, Operations & Maintenance Guidance*
 - EPA’s *Planning for an Emergency Drinking Water Supply*
 - *New England Interstate Water Pollution Control Commission’s Guide for Optimizing O&M, and Rehabilitation of Sanitary Sewer Collection Systems*

“Do what you can,
with what you have,
where you are.”

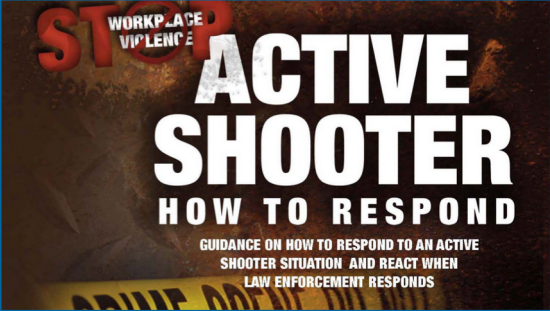
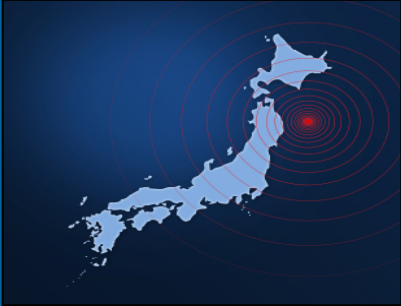
- Theodore Roosevelt



RAMCAP Risk Assessment

*Required for water utilities to submit to EPA as soon as March 2020.
Valuable process for wastewater utilities also.*

As you begin, focus your motivation on your utility's mission and recognize that emergencies can threaten it.



RAMCAP[®]

Risk Assessment Methodology for Critical Asset Protection

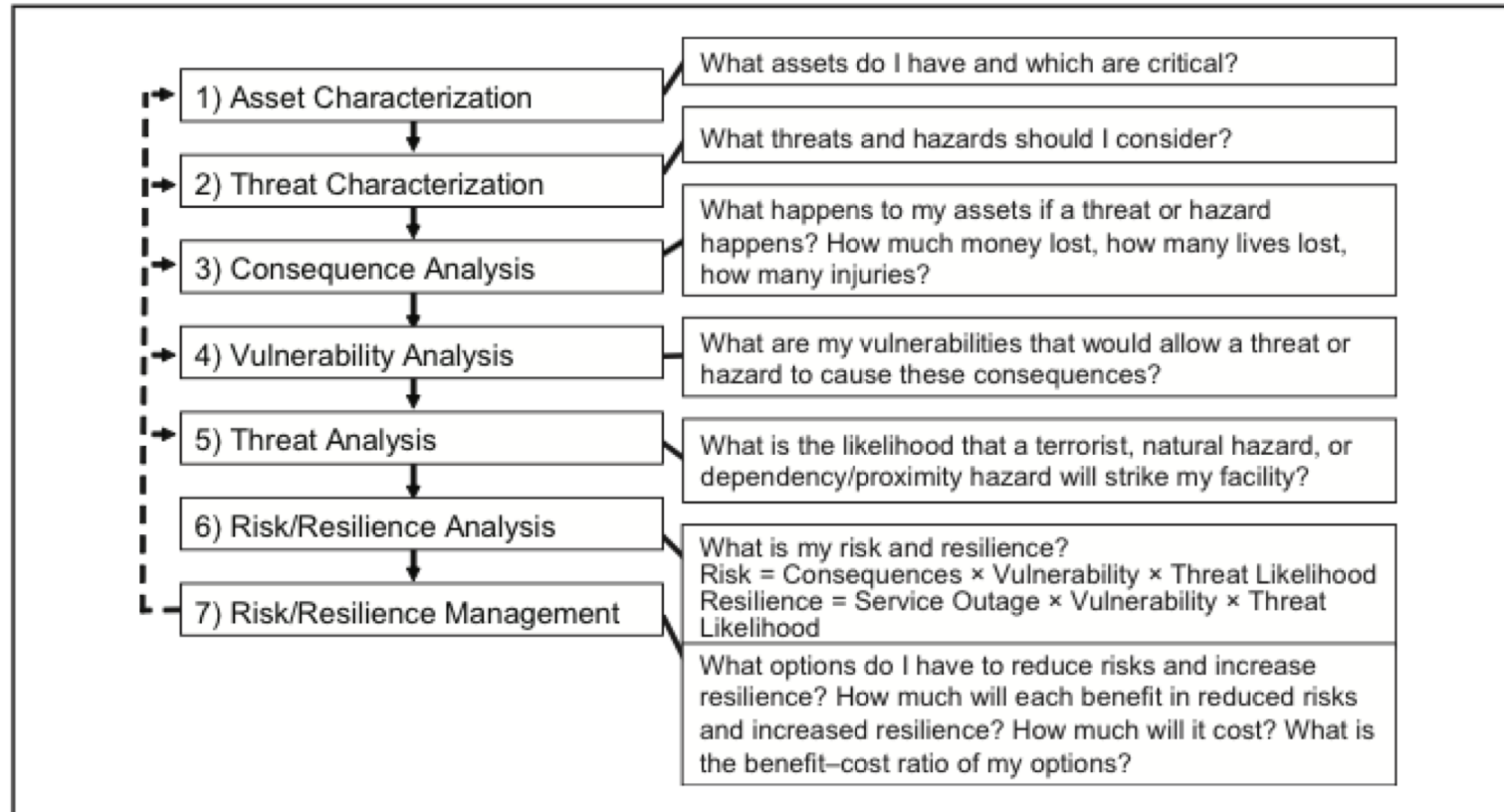


Figure 1 The Seven-Step RAMCAP Process

RAMCAP® is a process for analyzing and managing the risks associated with malevolent attacks and naturally occurring hazards against critical infrastructure

$$\begin{aligned} \text{RISK} &= \\ &\text{CONSEQUENCE} \times \\ &\text{LIKELIHOOD} \times \\ &\text{VULNERABILITY} \end{aligned}$$

PARRE™

- Owned by AEM Corp.
- Buy annual license
- Web-based
- May* be user-friendly, except results require additional analysis and expertise



- Owned by EPA
- Free
- Web-based
- Online tutorial videos available
- Used more often than PARRE

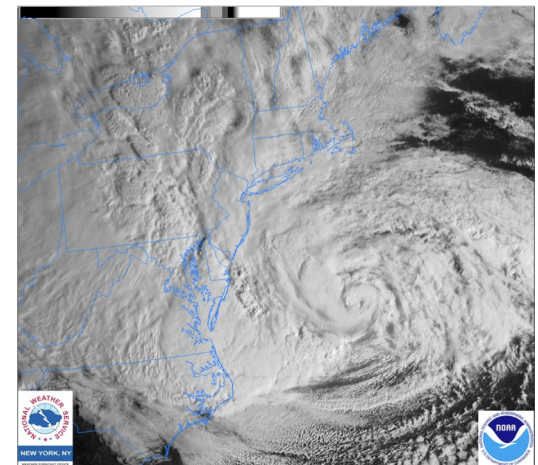
Asset Characterization for Framingham Water and Wastewater

- Identified 32 assets based on 2003 Vulnerability Assessment and on 2017 discussions
- Utilized PARRE for Risk and Resilience Analysis

DPW Headquarters at 100 and 110 Western Avenue- ops, fleet, engineering, administration	Elm Street PS	Gates Road Pump Station
Town Hall- DPW Administrative (billing, metering)	Goodnow Lane BS	Oak Crest Pump Station
SCADA System	Doeskin Hill BS	Collection System
Communications Tower at HQ	William J. Heights BS	Residents
Beebe Tank (2)	Distribution System	Metrowest Hospital and Downtown
Indian Head Tank	A Street Wastewater Management Facility	Public and private schools
Merriam Hill Tank	Worcester Road Pump Station	Route 9/Route 30 Business Corridor
Goodnow Tank	Hemenway Pump Station	Tech. Park
Doeskin Tank	Fenwick Pump Station	
Grove Street PS	New York Avenue Pump Station	
Edgell Road PS	Woodland Pump Station	
Pleasant Street PS	Pleasant Street Pump Station	

RAMCAP – Threat Characterization for Framingham DPW Water and Wastewater

- Threats
 - Earthquake
 - Hurricane/Tornado
 - Flood /Dam Breach
 - Ice/Winter Storm
 - Proximity- Railroad, Highway, Hazardous Matl. Facilities
 - Dependency- Electrical Utilities
 - Pandemic
 - Contamination- Radionuclide, Chemical, Biotoxin, Pathogenic
 - Theft/Diversion/Sabotage - Physical and Cyber
 - Active Shooter
- Threats paired with critical assets
- Threat/Asset screened and then prioritized by project team
- RAMCAP Analysis Generates Information that Provides for Improved Risk Management Decisions



RAMCAP Results

- Identifies and prioritizes critical asset-threat pairs by monetizing risk of each pair
- Identifies worst case consequences of threat-asset pairs
 - Fatalities and injuries
 - Service denial
 - Utility economic losses
 - Community economic losses
- Identifies and prioritizes potential risk reduction countermeasures
 - Estimates reduction of monetized risk for each countermeasure if installed/implemented



Fujita Scale	
F-0	40–72 mph winds
F-1	73–112 mph
F-2	113–157 mph
F-3	158–206 mph
F-4	207–260 mph
F-5	261–318 mph

Tabletop exercise



Tabletop Exercise- Extreme Flooding Event

- *“Flooding is the most prevalent serious natural hazard identified by local officials in Framingham.”* - DRAFT Multiple Hazard Mitigation Plan Update, 2017
- RAMCAP Recommendation – Conduct Table Top Exercise to Simulate Event and Response
- Exercise Assumed the Event was Regional in Nature



Flooding at Gregory Road at northern Hop Brook crossing after July 2009 storm



Sudbury River at Concord Street bridge during March 2010 storm

Tabletop Exercise Resources

Environmental Protection Agency

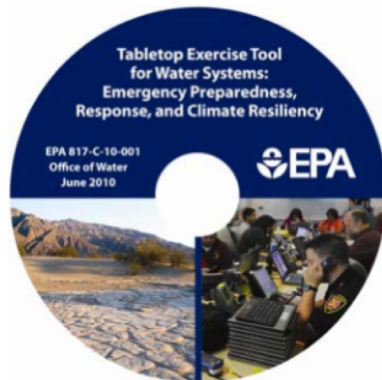
- Helps water and wastewater utilities to plan, conduct, and evaluate tabletop exercises
- 15 scenarios including hurricane, extreme flood (climate change), tornado, radiological dispersion device detonation, vandalism, water contamination and others
- Last updated June 2010

Homeland Security Exercise and Evaluation Protocol

- Common approach to exercise program management, design and development, conduct, evaluation, and improvement planning

American Water Works Association

- AWWA G440-11, *Emergency Preparedness Practices*
- 2018 or 2019 version of AWWA Manual 19, *Emergency Planning for Water Utilities*



Extreme Flood Table Top Exercise Objectives

- **Follows methodology** of exercise resources.
- **Refine participants' understanding of roles and responsibilities** in regards to managing the consequences of an emergency event including public communications.
- **Identify needed enhancements** (e.g., procedures, training, systems, etc.) for the DPW water and wastewater emergency preparedness program.
- **Practice incident command system** and evaluate and develop the following core capabilities:
 - Planning an incident response
 - Information sharing
 - Emergency and public communications
- **Debrief, evaluate, and develop actions**



Exercise Roles and Responsibilities

Players - Directors, Operations Managers, and Engineers

Respond to the situation presented based on their knowledge of response procedures, current plans and procedures, and insights derived from training and experience.

Controller/ Evaluator – Gradient Planning LLC

Lead the exercise by presenting the scenario narrative and facilitating the discussion period and hot wash (i.e., review session).

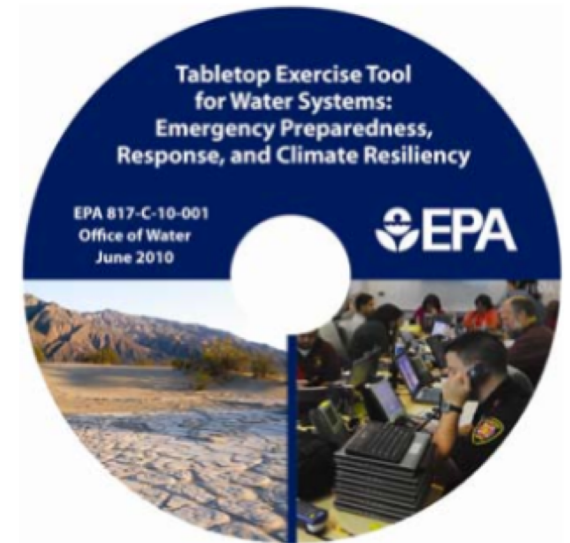
Observer(s) – DPW Asst. Director of Highway/Sanitation and Deputy Emergency Manager for City’s Emergency Preparedness Team

Observe and comment on the exercise, but did not participate in the facilitated discussion period.



Exercise Rules and Assumptions

- Intended to **test the system and the emergency plan, and not individuals**
- There is **no single solution**
- **Varying viewpoints**, even disagreements, are expected
- **Dialogue encouraged** within a safe, open environment
- **Respond based on the individual's knowledge**
 - Basis for discussion consists of the scenario, your experience, your understanding, your intuition, your uncertainty, and questions
- **Challenge your organization's positions** or policies as appropriate
- **Make your best decision** based on the circumstances presented
- **Assume cooperation and support** from other responders and agencies
- **Assumptions are specific to the particular exercise**



Summary of Extreme Flooding Scenario Details

- May-June Seasonal Precipitation has Exceeded 200% of Normal Followed by Single Precipitation Event of 6 to 10 inches regionally
- Rivers at or Above Crest Elevation
- Inundation of Neighborhoods, Roadways, and Rail Systems
- A portion of MWRA Water Supply System Impacted and Boil Water Order Issued to Framingham
- Colored Water Reports
- Power Losses
- Wastewater System Backups



Determine Operating Picture – Preparation is Key

Coordinate Staff to Respond to the Event and Assess Impacts

- Initiate Incident Command – Assign Roles and Responsibilities Ahead of Time
- Continue water and wastewater operations to the extent possible and assess status continually
- Continuous customer calls

Identify Resources

- Power and fuel status
- Vehicles, equipment, spare parts
- As part of pre-storm preparedness activities, put critical equipment on standby at staging areas

Initiate Response Objectives

- Provisions for backup water to customers
- Connect with critical customers; find out what are their needs, do they need special arrangements?
- IMAs with water and wastewater customers in abutting towns

Coordinate Internal and External Communication

- Reputation in the community, credibility, updating government officials (need to provide clear and timely communications)
- Communicating hazards (stationary and hand-held radios in vehicles and work in pairs)
- Communicating situation and status, regular check-ins with directors and government officials
- Utilize communication platforms: social, public safety, print, electronic and broadcast media outlets
- BE FIRST, BE RIGHT, BE CREDIBLE



Incident Management Discussion Points By Participants

- Social media and customer questions would become a full-time job. The DPW would need to determine to what extent staff will keep up with social media communications.
- The capability to receive customer calls could be increased by adding other DPW administrative staff members to support, if they are available.
- Essential staff consideration would be to assure that their families are prepared for the emergency at home.
- Dispensing water to residents may be aided through city-led points of dispensing; also support from business community is a possibility but arranged ahead of time as part of preparedness planning activities
- MWRA would provide the sampling plan to Framingham and when it can be initiated
- Ongoing monitoring of status of water and wastewater systems
- Water and wastewater conservation strategies – essential use only



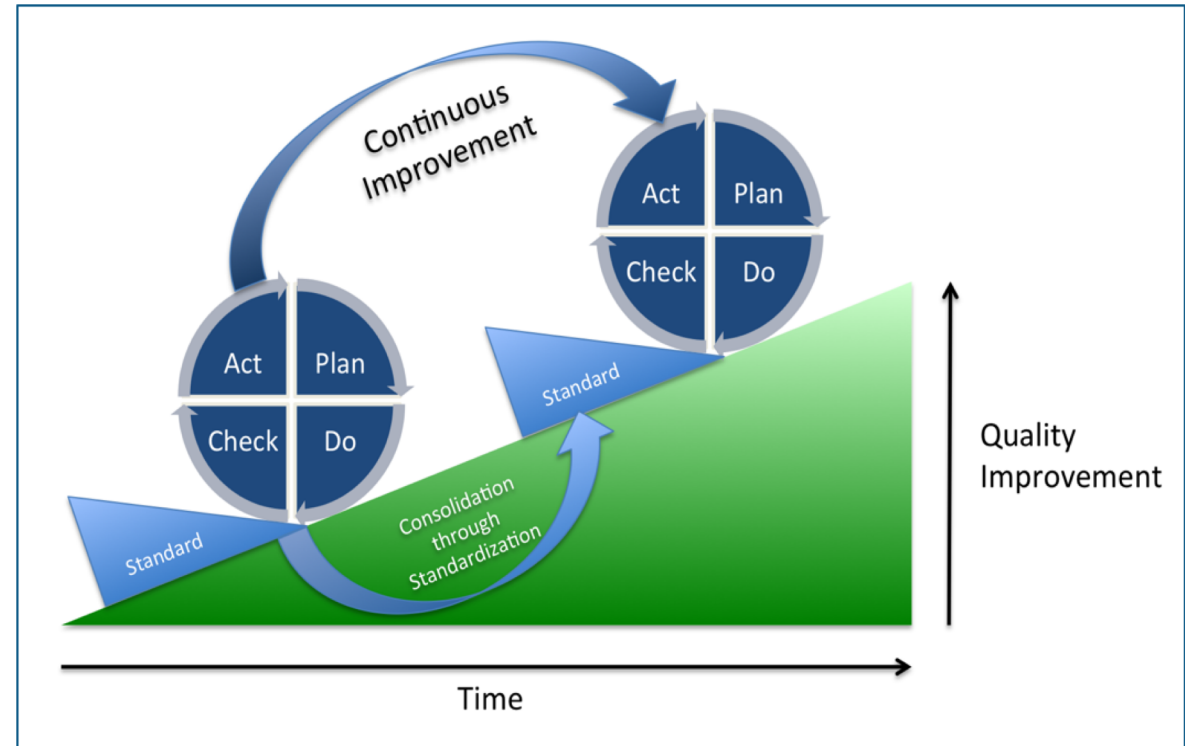
Challenges Identified from The Exercise

- Public will have questions and need information in an ongoing basis
- Availability of staff and supplies and prioritizing, tracking, allocating resources
- Overcoming physical obstacles to address system situations, deliver resources, or assist residents
- Managing personnel, having enough staff, tracking, checking-in
- Advanced preparedness planning with MWRA, DEP, and critical customers
- The unknown, for example, how a water or wastewater service interruption affects priority users in ways that we currently are not aware of
- The speed of recovery in this scenario



Identify Steps for Improvement – “Hot Wash”

- What could be our biggest challenges in this event?
- What are our strengths?
- What changes could we make to improve our preparedness, if any, given this scenario?
 - Discussions, plans, procedures
 - Response capabilities
 - Testing and training
 - Personal action steps



Water and Wastewater Division Strengths

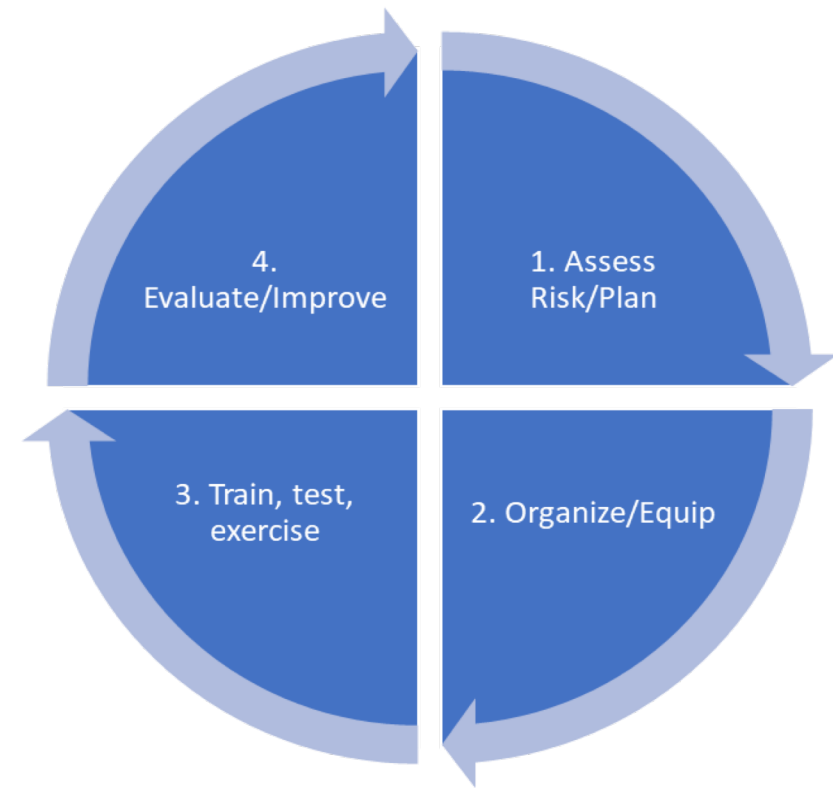
- Staff are dedicated, knowledgeable, and well-coordinated
- Resources available in-house and through NERAC membership and MWRA
- Framingham DPW water and wastewater values and invests in emergency preparedness planning
 - Emergency Response Plan
 - Business Continuity Plan currently in process
 - RAMCAP Risk Assessment completed in 2017
 - ICS training for staff
 - Safety training for staff
- DPW has a dedicated Deputy Emergency Manager who reports to the City Emergency Manager



Areas for Continual Improvement

- Identify Critical Users – Meet and discuss their emergency response plans, consider joint tabletop exercise
- Staff Cross Training – Pump Stations and Storage Tanks
- Develop Backup Plans for Emergency Water Beyond State Contract
- Public Communication – Develop or refine notification templates for ERP
- Perform tabletop exercise for Framingham Boil Water Scenario
- Conduct ERP training with staff – New and Ongoing
- Routinely Update Emergency Contacts List
- Partner with MWRA on Tabletop Exercise

Emergency preparedness planning guides emergency response activities and its result is your actual performance during real events.





Acknowledgements

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and Water Storage Tanks Operations Manager



“No one accomplishes anything in this life on his or her own”

Dr. Allan Hamilton, M.D.