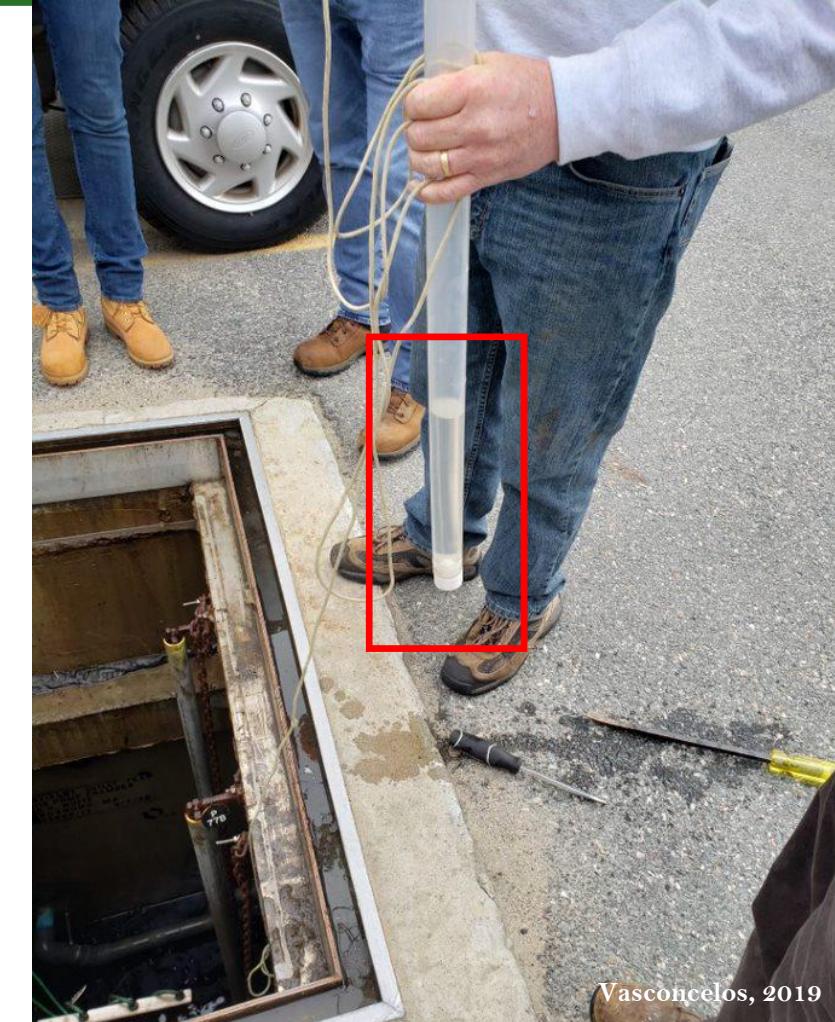




Malmstrom Airforce Base, 2019



Collaborative Options to Improve Drinking Water Quality in Western Boxborough, MA

Mike McGoff, Katie Vasconcelos, Spencer Vinson, and Jake Wisniewski









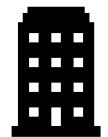


RTE 111 BOXBORO

The 18 Businesses



Apartments and Condos (4)



Hotels (1)



Daycare/Pre-schools (1)



Business Centers (6)



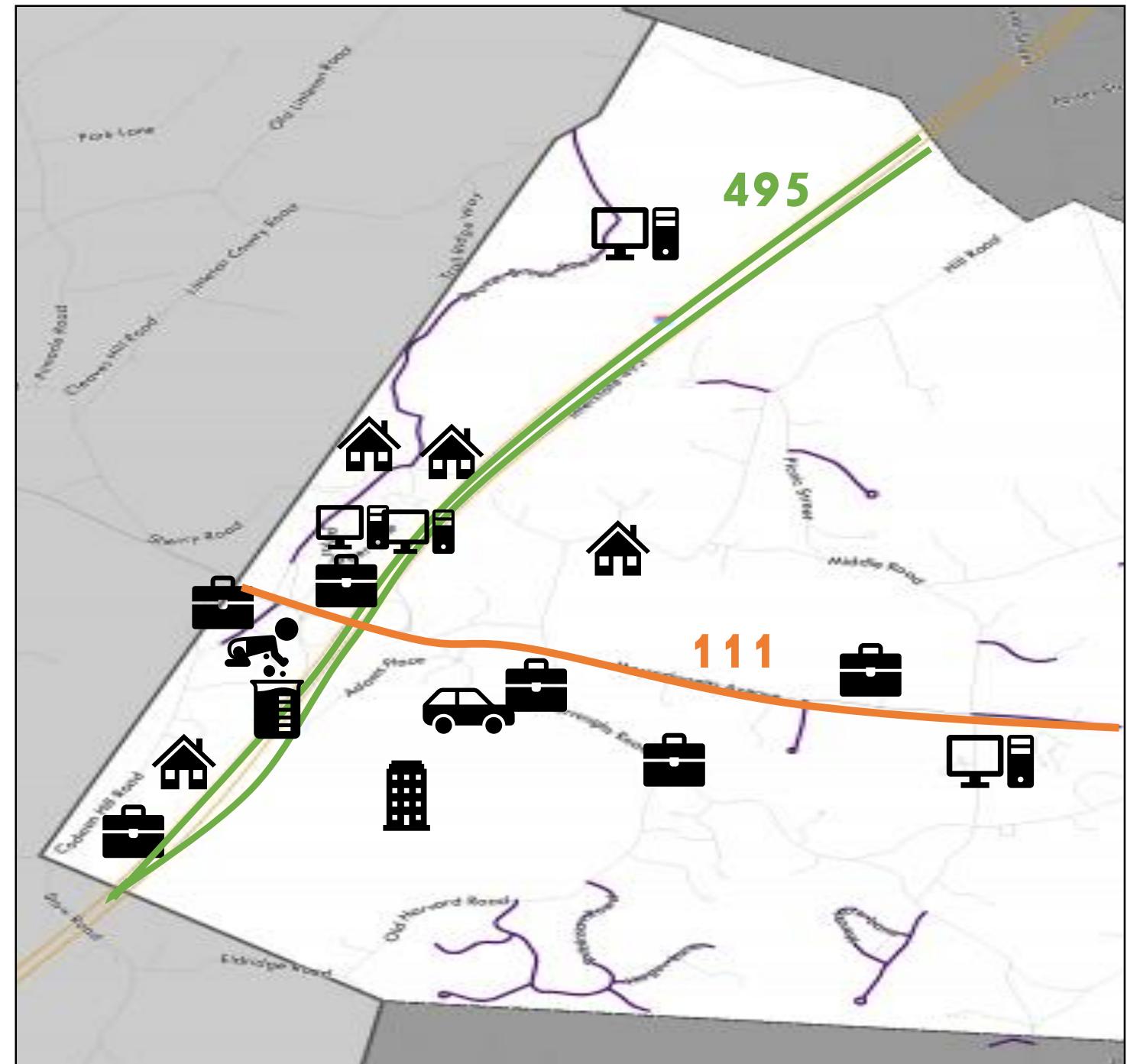
Technology (4)



Laboratories (1)



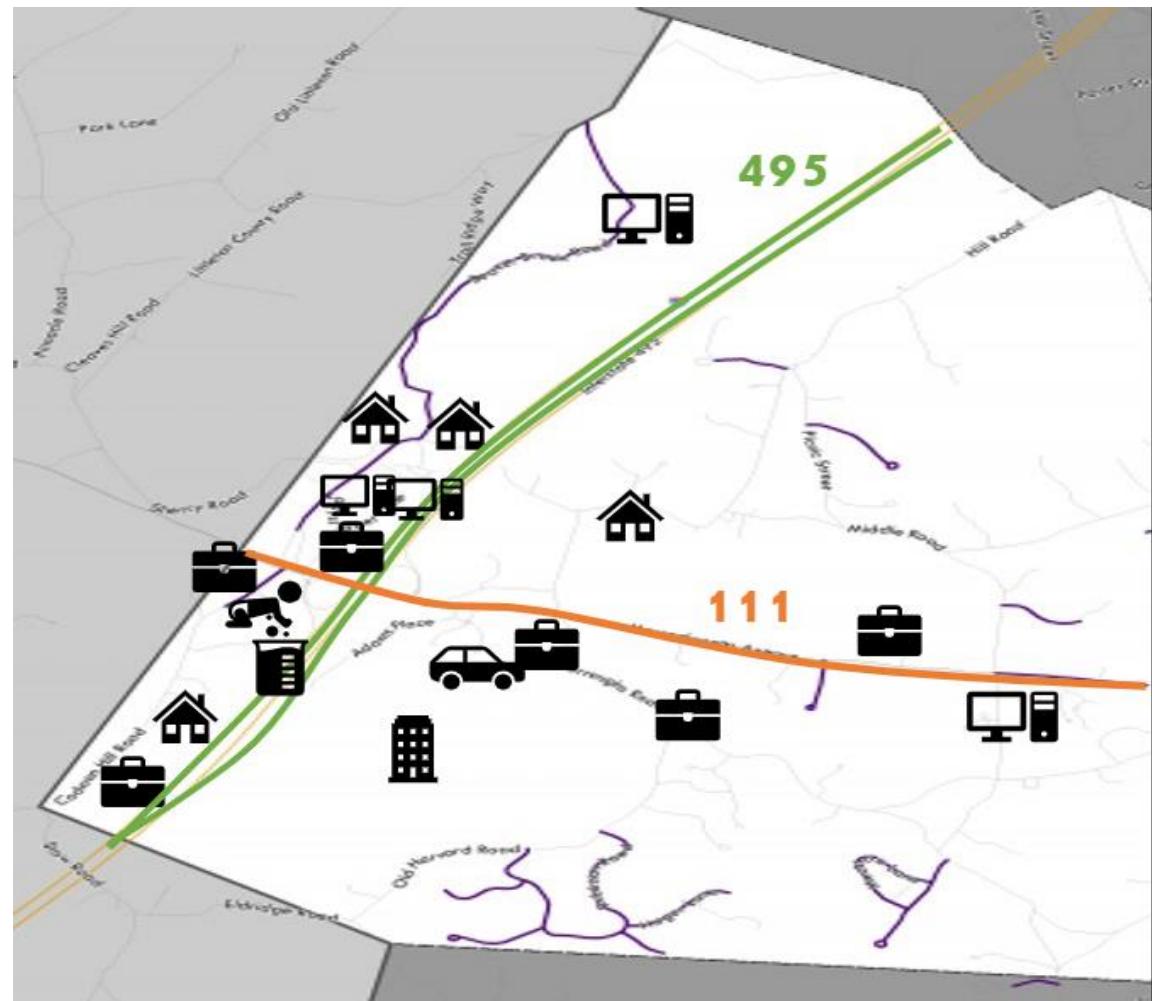
Gas Station (1)



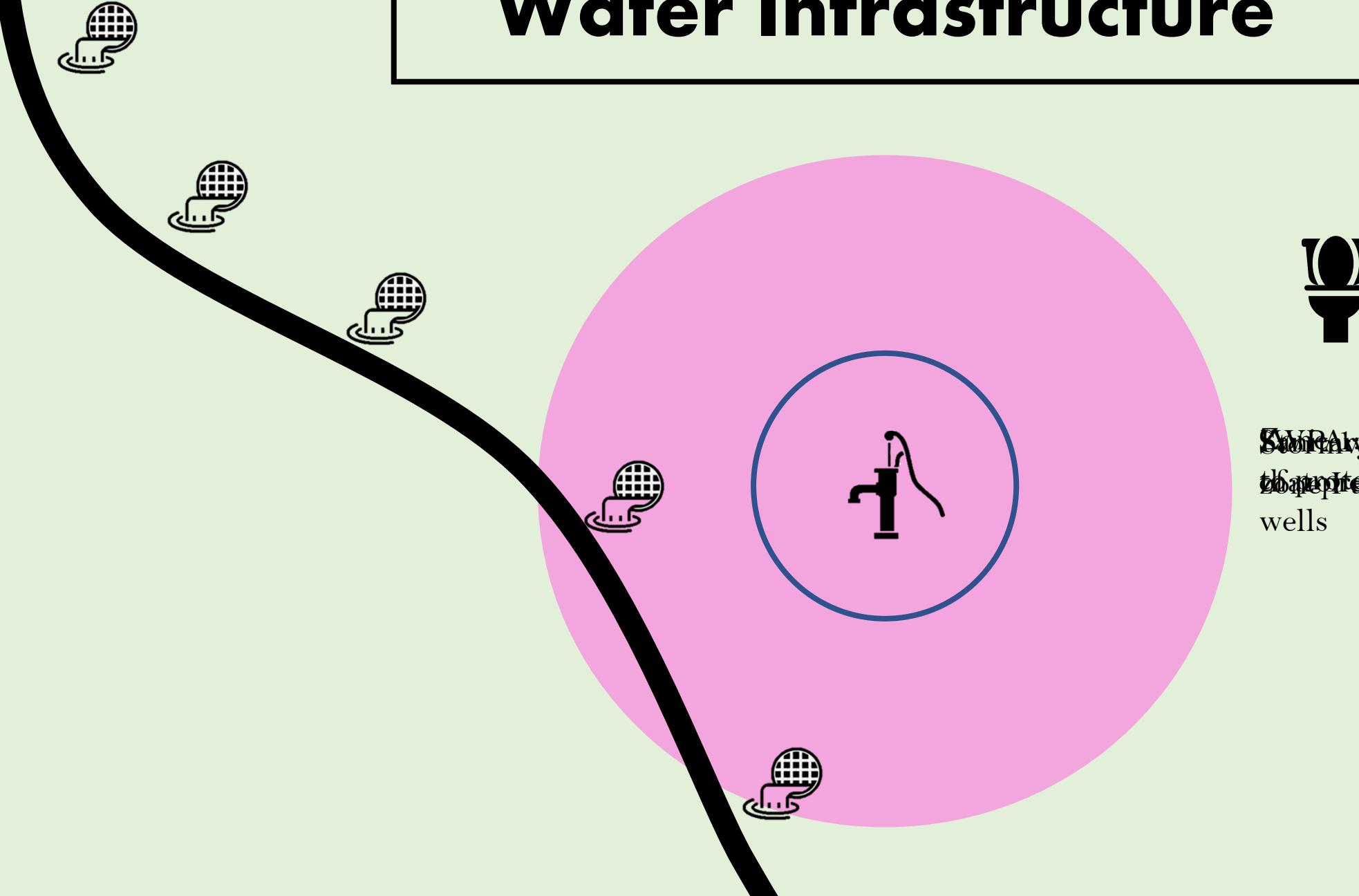
Our understanding of the water challenges

- Currently in compliance with regulations, but have similar drinking water quality issues due to high sodium levels and other contaminants
- Infrastructure may be starting to age and updates can come at a high price
- MassDEP is always evaluating drinking water for new contaminants

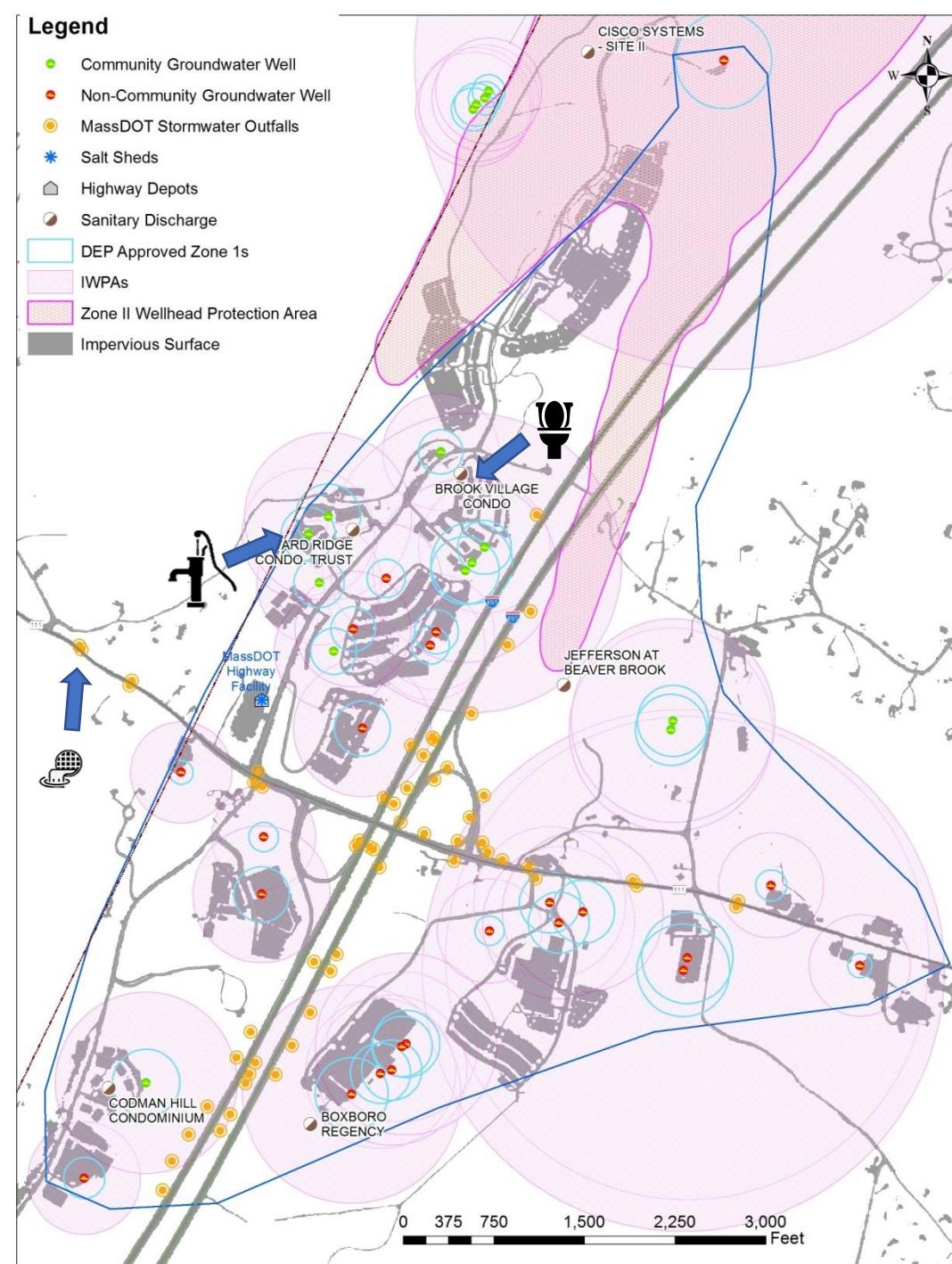
Are there benefits to collaborating?



Water Infrastructure



- Impervious surfaces, stormwater outfalls, and sanitary discharge within Zone I's
- Multiple overlapping IWPA's leads to overdrawing of a well
- Salt contamination of wells from runoff and MassDOT salt shed (in some areas)



**These plans
would not be
accepted today**

The goal of this project was to research water options that would help improve drinking water quality at the 495/111 intersection in Boxborough and to create public outreach materials for stakeholders to determine the best option.



Methodology

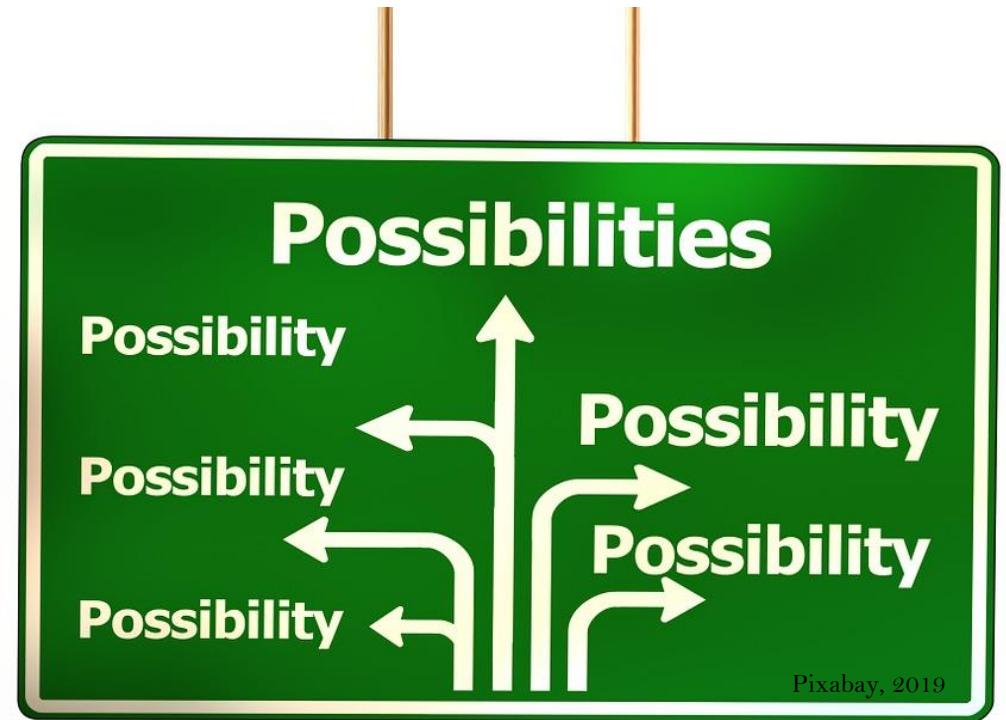


What drinking water options exist?

Option 1: Do it Yourself

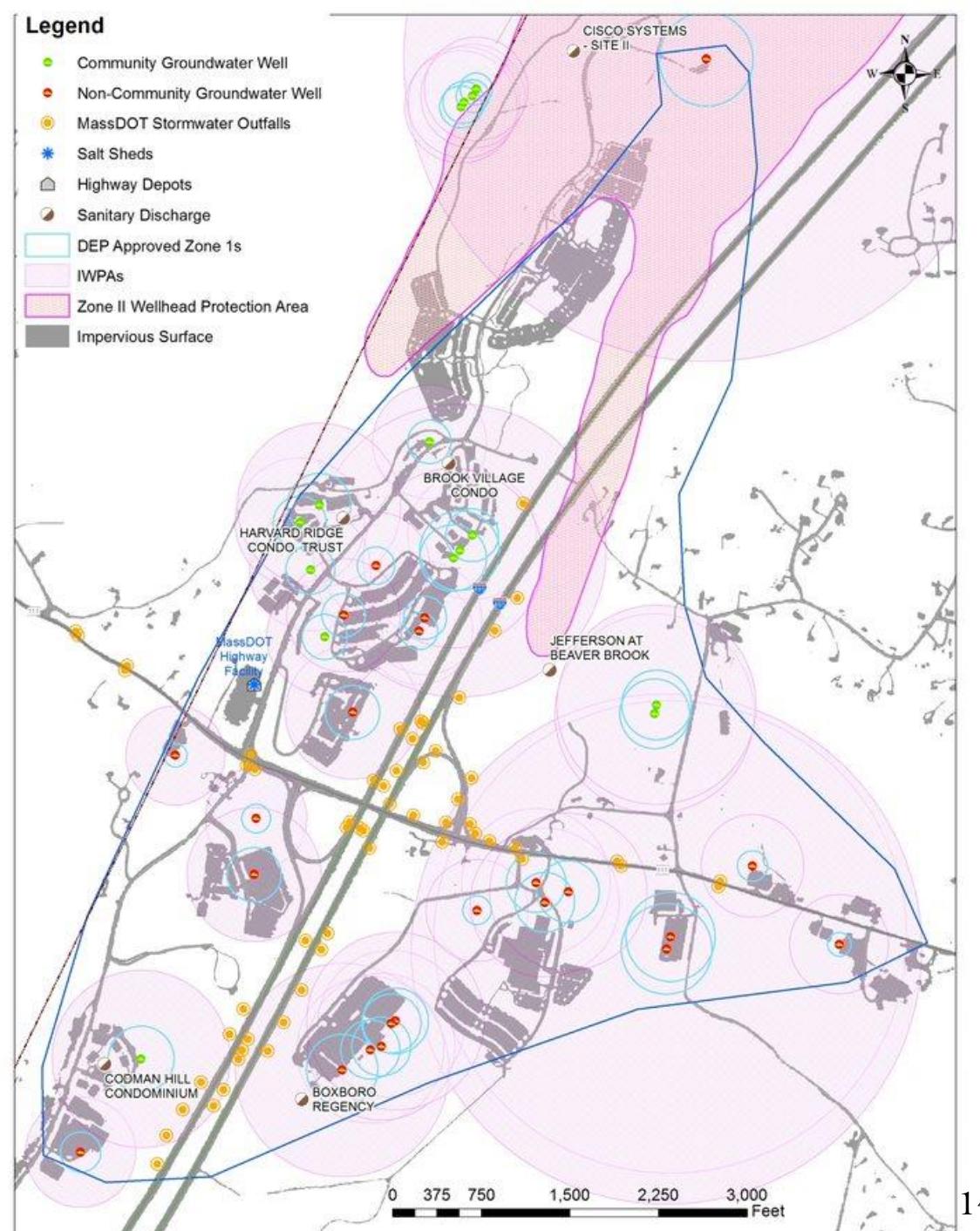
Option 2: Collaborate With Littleton

Option 3: New Water Supplier



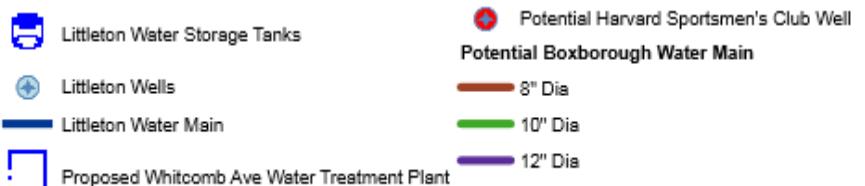
Option 1: Do it yourself

- Current existing circumstance
- Each business and living community finds their own solution for their own issues
- Regulations are likely to continue to change
- This option could limit town expansion



Option 2: Collaborate with Littleton

- Create a shared system between Littleton and Boxborough
- Littleton will be in charge of the water distribution system
- Big investment with a longer timeline, but a very safe and reliable source
- Reduces potential wastewater and stormwater costs

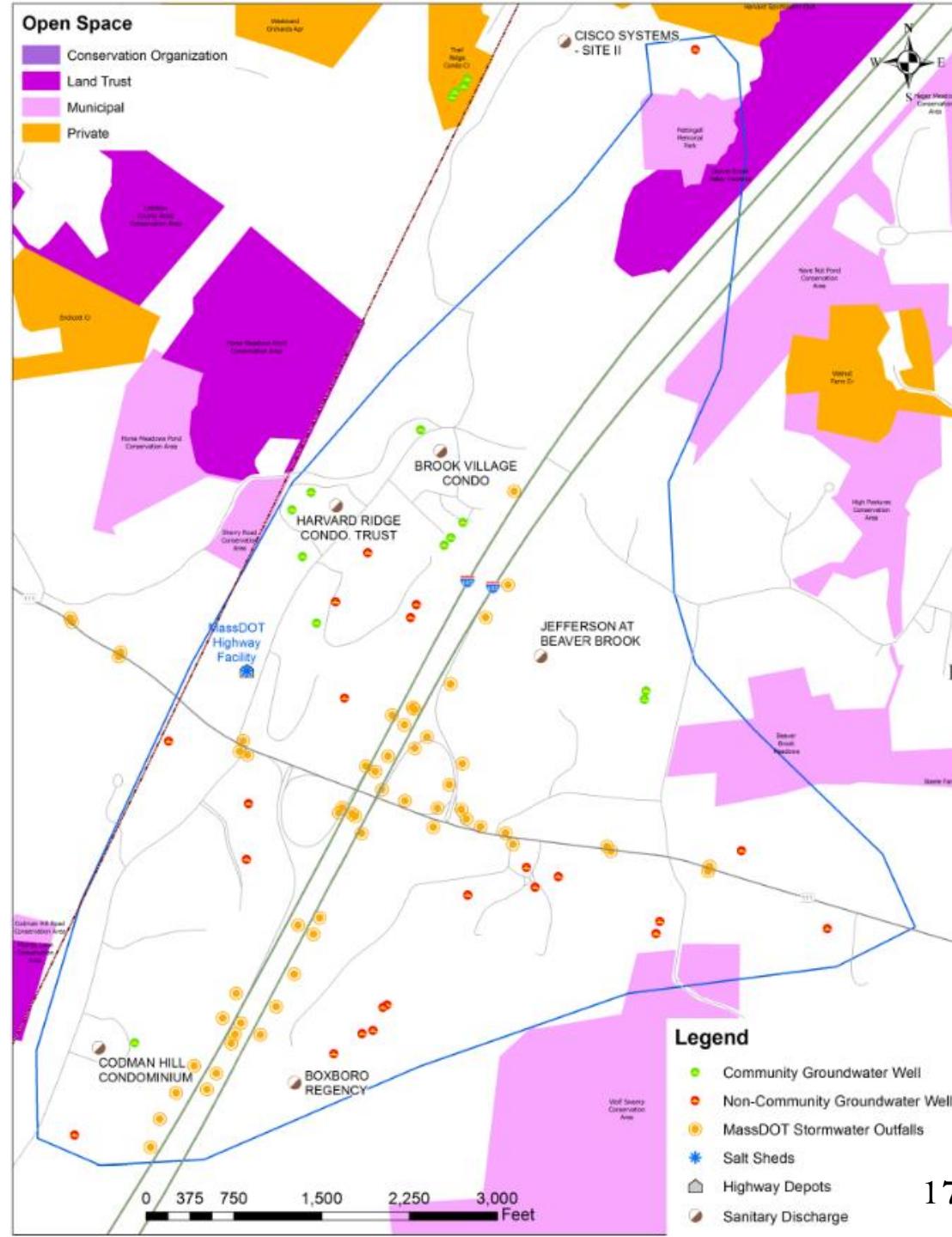


Littleton Cost Analysis Estimates

Location	% Water Usage of Total
1300 Mass. Ave	2%
330 Codman Hill Road	1%
60&70 Codman Hill Road	2%
Boxboro Green	0%
Boxborough Executive Center	0%
Boxborough Regency	17%
Bright Horizons Daycare	2%
Brook Village Condominiums	23%
Cisco Systems, Inc.	8%
Codman Hill Condominiums	10%
Harvard Ridge Condominiums	13%
LPCH Boxborough, LP	2%
Mass. Ave Gulf	2%
National Technical Systems	4%
Sentra Systems Inc.	5%
SYNQOR	5%
Winstanley Enterprise	5%

Option 3: Find a new water supplier

- Preliminary option with many different variations
 - Create a water district or LLC
 - Find someone else willing to be the water supplier
- Collaboration between stakeholders
- Needs to be completely designed from scratch, so this option has the longest timeline



Finding 1: There is an opportunity for stakeholders to communicate more effectively.

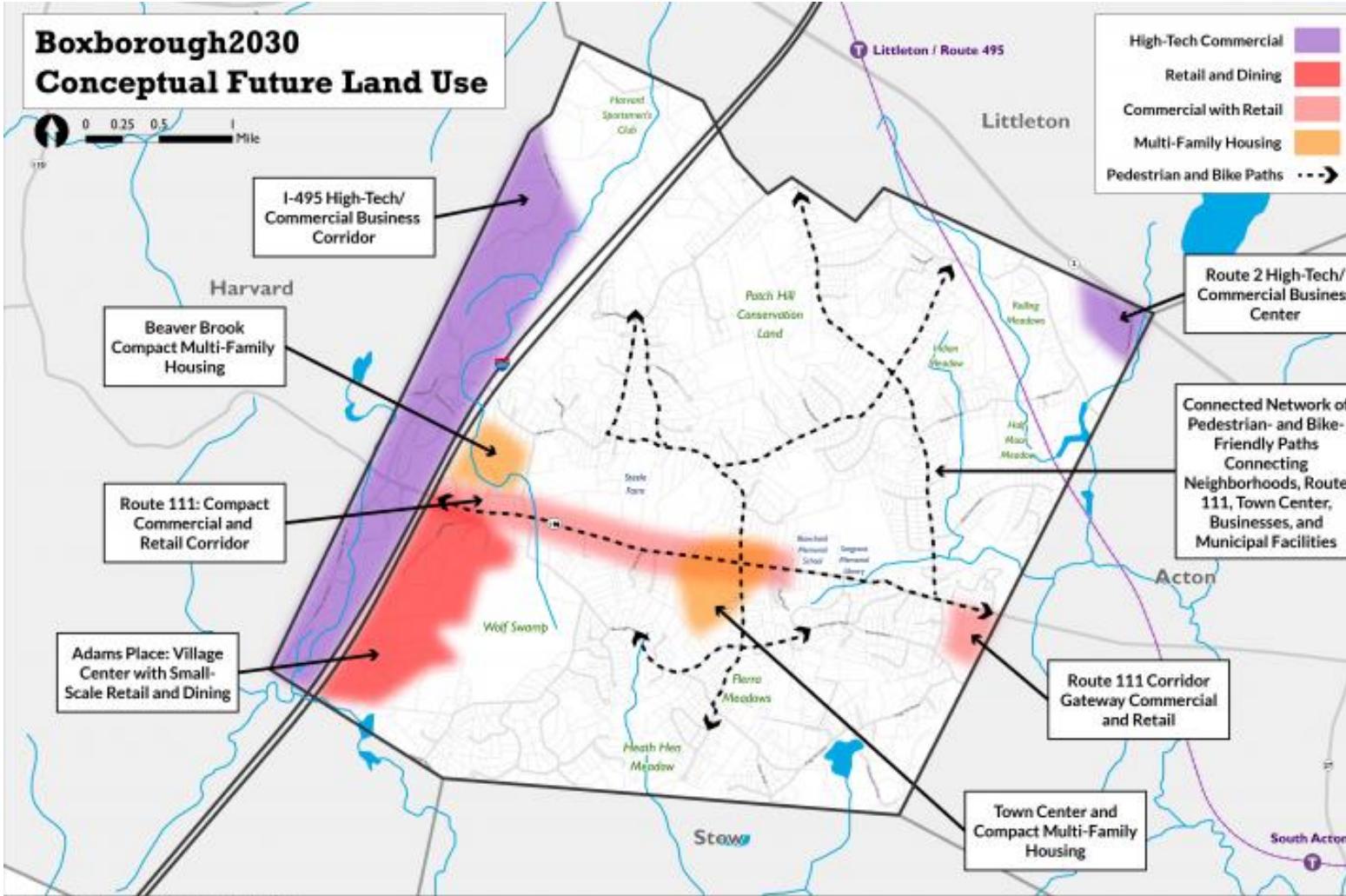
- Involved stakeholders had different understandings of commitment levels and project statuses
- Focus group attendees wanted to work together
- Water Resources Committee is willing to continue developing the Littleton Solution

Name	Attended?
Harvard Ridge Condominiums	y
Brook Village Condominiums	y
Mass. Ave Gulf	y
LPCH Boxborough, LP	y
SYNQOR	y
Sentra Systems Inc.	y
WhiteWater	y
RCAP	y
Water Resources Committee	y
The Dartmouth Group	y
Marlborough Resident (1)	y
Boxborough Residents	y
Codman Hill Condominiums	n
Boxborough Executive Center	n
1300 Mass. Ave	n
60&70 Codman Hill Road	n
Winstanley Enterprise	n
330 Codman Hill Road	n
Boxboro Green	n
Boxborough Regency	n
National Technical Systems	n
Bright Horizons Daycare	n
Paddock Estates	n
Cisco Systems, Inc.	n

Finding 2: Collaborating with Littleton is the most preferred option.

Evaluation Factors:	DIY	Littleton	Other Supplier
Water Supply			
Improves water quality for consumption		x	x
Adds system redundancy		x	
Removes need to operate individual Public Water Supply		x	x
Decreases cost for water over time		x	
Water Distribution			
Create and manage a water distribution system			x
Leave water distribution to another entity		x	
Stormwater Concerns			
Mitigates road salt contamination		x	x
Mitigates salt contamination from salt storage facility		x	x
Mitigates salting of other impervious surfaces, like parking lots		x	
Wastewater Discharge			
Reduces risk of toxins in water supply		x	x
Maintains existing permit limits	x		
Reduces wastewater facility standards and costs		x	x
Regulatory Issues			
Increases risk for more stringent permits	x		

Littleton option would support business and community growth in Boxborough



- Stimulate economic growth
- Support growth of current businesses
- Meet Boxborough2030 town goals

Next Step 1: Create formal working groups.

- Encourage collaboration
- Encourages communication

Water Resources Committee

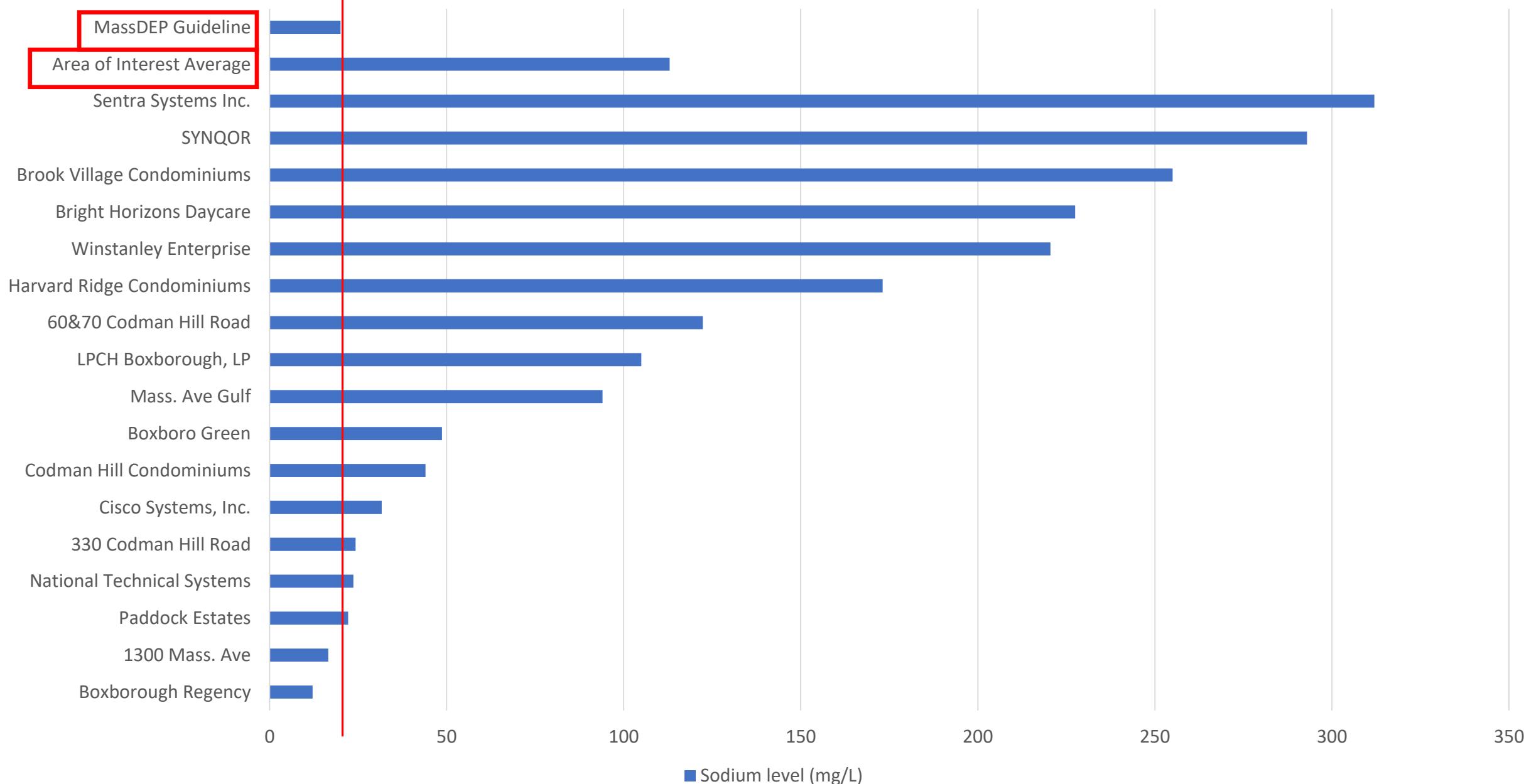


Boxborough Stakeholders representatives

MassDEP and MassDOT technical support

Location	% of Total Water Usage
Brook Village Condominiums	23%
Boxborough Regency	17%
Harvard Ridge Condominiums	13%
Codman Hill Condominiums	10%
Cisco Systems, Inc.	8%
Winstanley Enterprise	5%
SYNQOR	5%
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Bright Horizons Daycare	2%
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330 Codman Hill Road	1%
Boxborough Executive Center	0%
Boxboro Green	0%

Sodium Contamination Levels



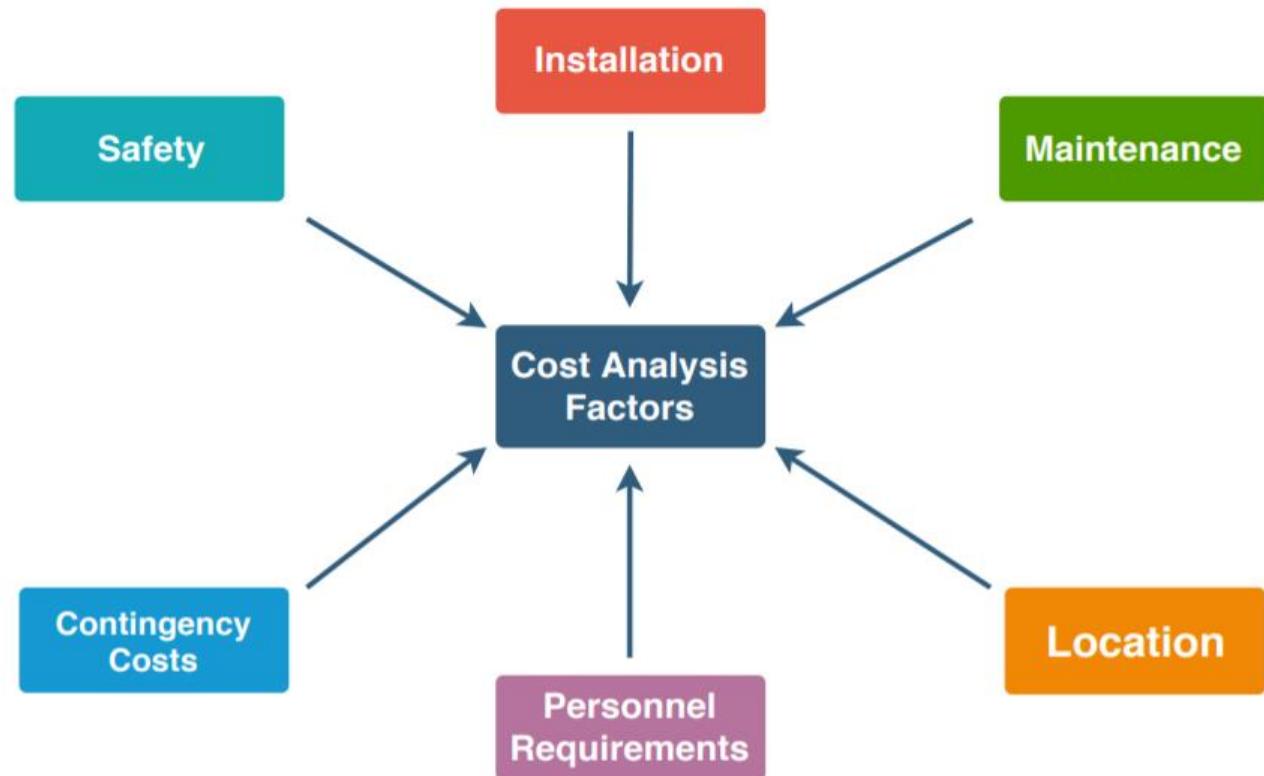
Next Step 2: Apply to the Salt Remediation Program

- One year monitoring process to determine MassDOT's impact in order to create a remediation plan
- More applications could lead to the possibility for more funding for collaborative drinking water options



Next Step 3: Contract engineers for a more exact cost-analysis

- Focused on how costs could be distributed among stakeholders
- Many costs included were estimates based off engineering bids, previous studies, or educated guesses
- Legal fees were not evaluated in this cost analysis



Summary and Conclusions

Assessed possible drinking water solutions

Organized potential cost distributions

Brought together stakeholders to discuss research and best options

- Interest expressed in collaboration and serious talk about next steps has begun
- Businesses have an idea on what the next steps are for the most supported option
- The Water Resources Committee has agreed to take the lead in continuing the conversation

Acknowledgments



WPI

Advisors: Professor Scott Jiusto and
Professor Glenn Gaudette



Water Resources
Committee Members:
Leslie Fox
Bryon Clemence



Corey Godfrey,
Environmental Analyst



Laurene Poland, Salt Remediation Program



Robert Bostwick, Drinking Water Program
David Boyer, Wastewater Program
Marielle Stone, BWR
Juliet Swigor