Planning for the Future: Exploring the Feasibility of Expanding MWRA's Regional Water System

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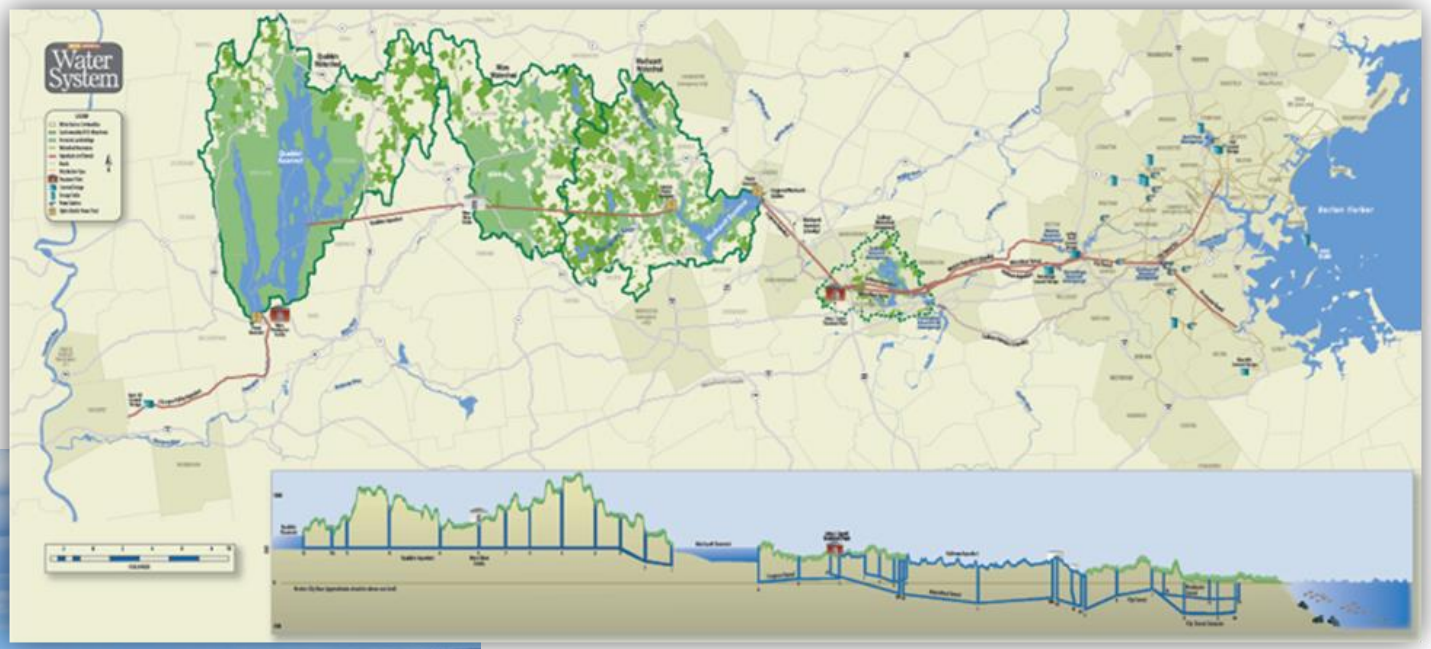
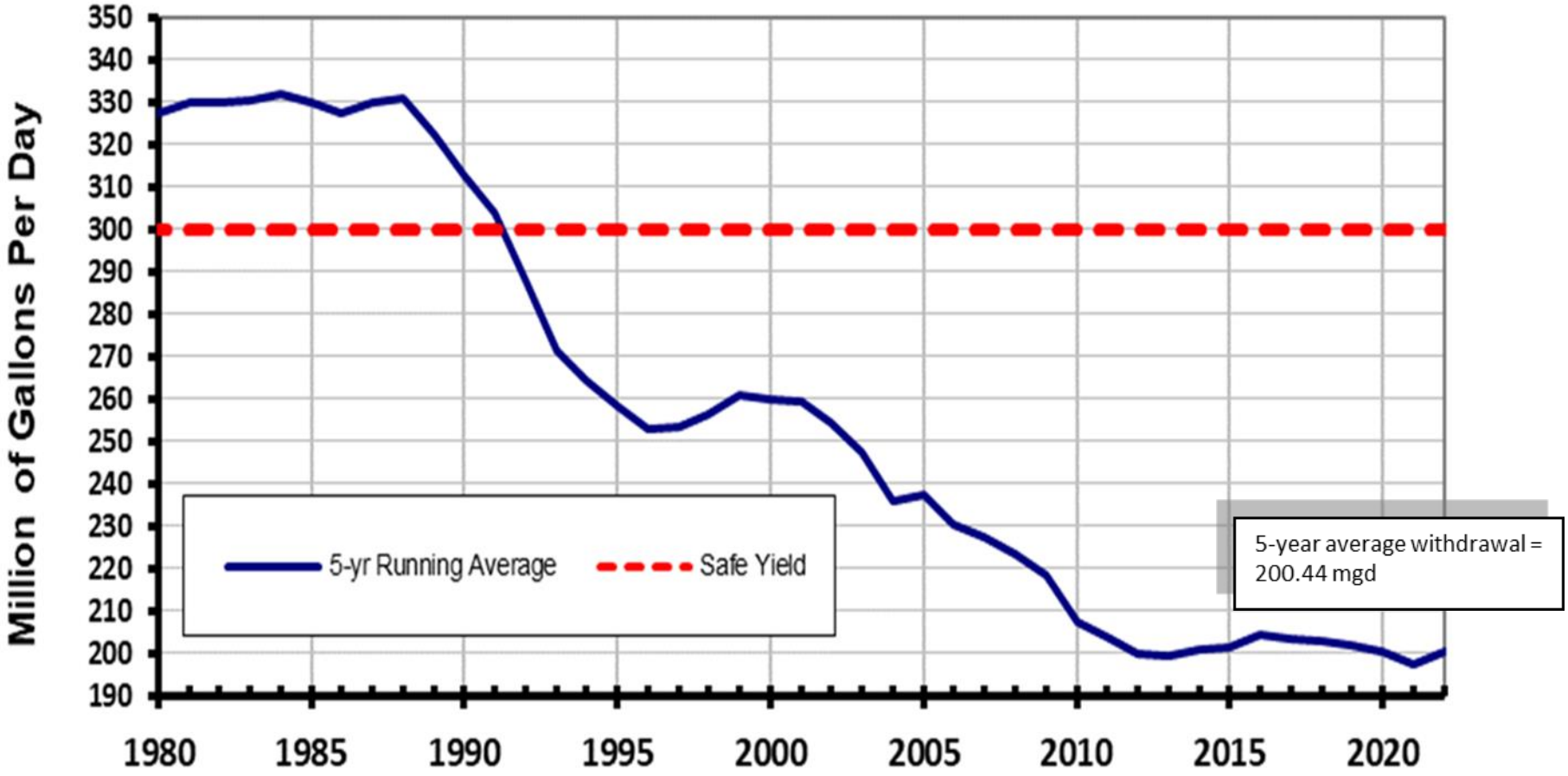
495/MetroWest Partnership Water Resources Committee
December 19, 2023

MWRA Water System

MWRA provides an average of 200 million gallons per day to over 2.5 million customers in 53 communities, with a peak demand of 350 million gallons.



Reservoir Withdrawals from 1980 to 2022

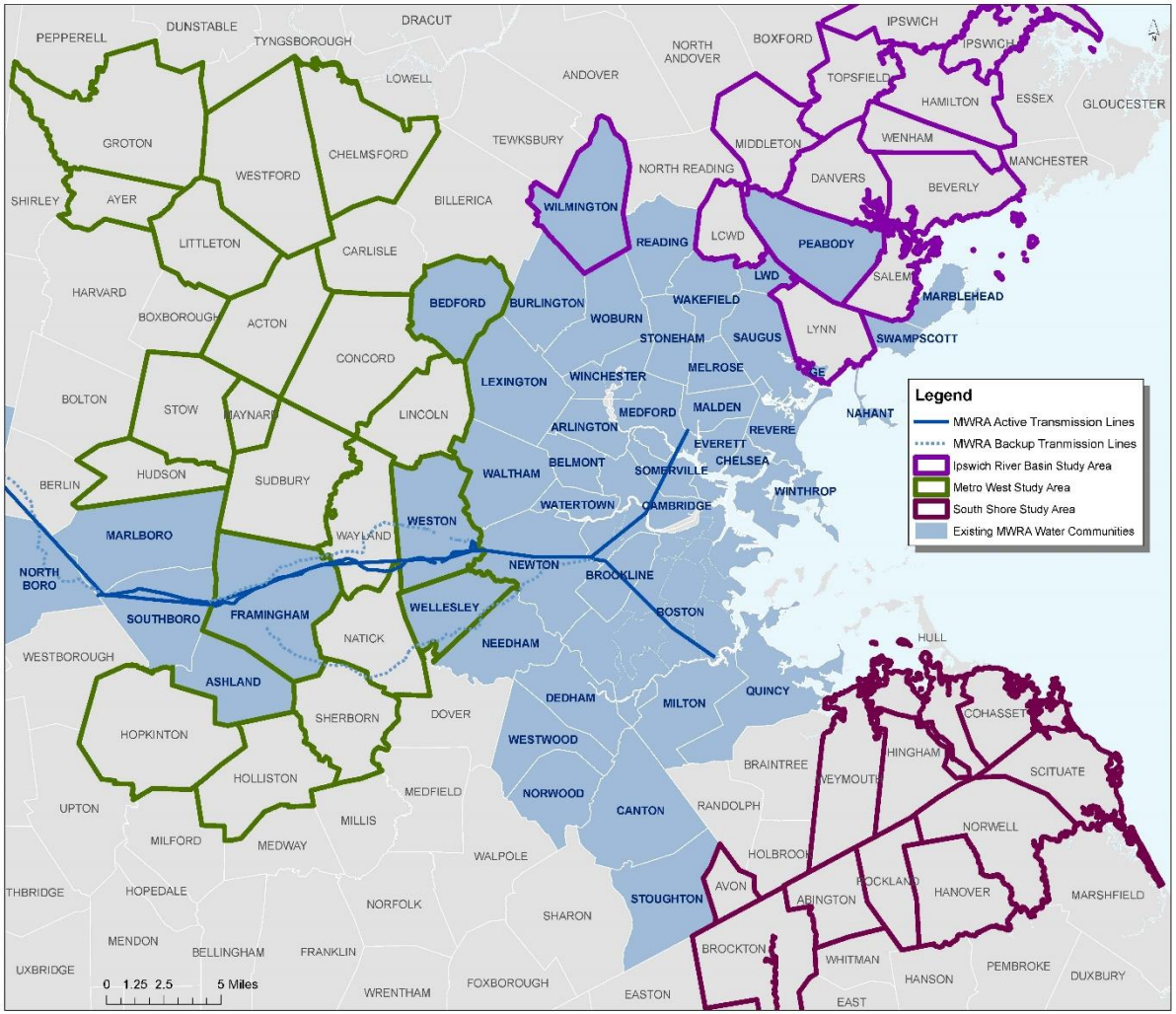


MWRA's Capacity to Provide Additional Water

- Safe Yield = **300 MGD**
  - Amount of water MWRA's source reservoirs, the Quabbin and Wachusett, can safely provide even during periods of extended drought
- Average 5-year reservoir withdrawals (2013-2018)= **203 MGD**
- Conservative growth for increased population and employment = **29 MGD**
- Additional demand from existing partial and emergency users = **17 MGD**
- Conservative Estimate of Future Use = **249 MGD**
- Available supply for new communities = **51 MGD** (average or ≈ 76.5 MDG on a maximum demand day)

MWRA System Expansion Feasibility Study Areas

- Ipswich River Basin (12 Communities, Demand ≈ 42.1 MGD*)
- South Shore (10 Communities, Demand ≈ 40.5 MGD*)
- Metro West (21 Communities, New Demand ≈ 45.3 MGD*)



Notes:
*MGD= Million Gallons per Day

Demands are Maximum Daily Demands (MDD)

Goals of Metro West Study

- Planning Level Study
- Requested by the Communities
- Question: Is connecting to MWRA's Regional Water System Feasible?
  - Could MWRA transport water to these communities?
  - How would communities connect?
  - How much would a connection cost?
  - How long would it take to make these connections?
- Additional work would be required for any community to connect to MWRA

Study Assumptions, Costs, and Schedules

- **Study Assumptions** Communities included in scenarios would be fully-served by MWRA to the greatest extent possible
  - Generally assumed new connection to MWRA's system, limited "wheeling" from one system to another
  - Pipe sizing requires assessment based on maximum daily demands (MDD), not average day demands (ADD)
- **Costs:**
  - September 2023 and estimated 2028 dollars
  - Conceptual, contingencies added to all line items and total cost
  - Infrastructure costs vary significantly based on size
- **Schedule:**
  - Variable, based on size and location of pipe
  - Estimates are included with each option

Example of the installation of a 60 inch MWRA pipeline. Picture taken in Arlington.

Potential MWRA Expansion to MetroWest

- **Communities Included in Study:**
  - Acton, Ayer, Bedford, Chelmsford, Concord, Groton, Holliston, Hopkinton, Hudson, Lincoln, Littleton, Maynard, Natick, Sherborn, Stow, Sudbury, Wayland, Wellesley, Westborough, Westford, Weston

- **Considered Multiple Connection Points**
  - Two options to supply Communities north of the MetroWest Tunnel and Hultman Aqueduct
  - Two pipelines to supply Communities south of the MetroWest Tunnel and Hultman Aqueduct
  - A connection for Westborough based on an existing pipeline
  - One connection to supply several Communities south of the MetroWest Tunnel and Hultman Aqueduct via wheeling water

Overview of all Projects included in Study

CONCEPTUAL PROJECTS:

Project 1a (and 1b)
Service to Communities North of the MetroWest Water Tunnel

Project 2
Service to Weston, Wellesley, and Natick

Project 3
Service to Holliston

Project 4
Service to Westborough

Project 5
Wheeling to Hopkinton and Sherborn

LEGEND

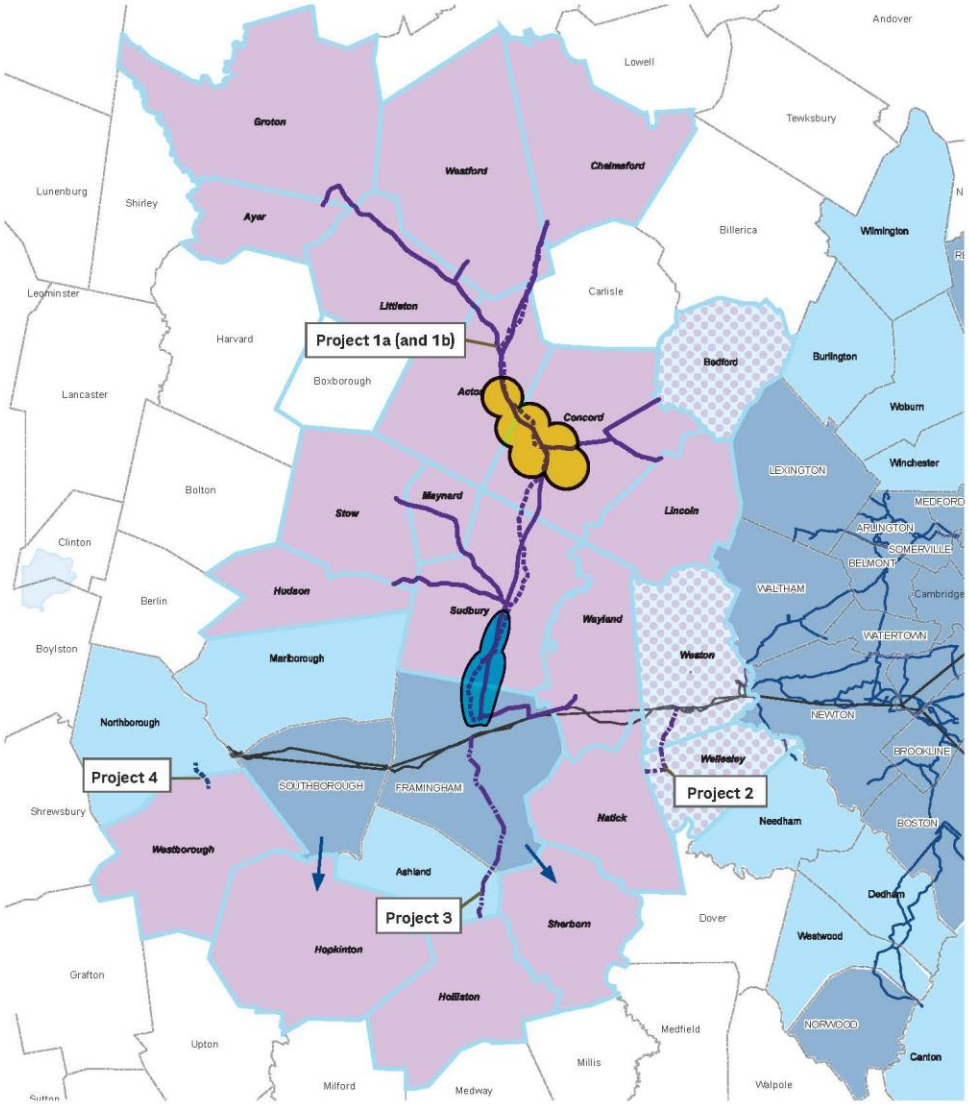
- Study Community
- Study Community (MWRA served)
- MWRA Member Community
- MWRA Partially Served Community
- Expanded MWRA Service Area
- Existing MWRA Distribution System
- Existing MWRA Transmission System
- Proposed Pipe Route (Project 1a)
- Proposed Pipe Route (Project 1b)
- Proposed Pipe Route (Project 2)
- Proposed Pipe Route (Project 3)
- Existing Pipe Route (Project 4)
- Represents Wheeling (Project 5)
- Assumed Transmission Main Pumping Station (Location TBD)
- Assumed MWRA Storage (Location TBD)

CDM Smith

Water Resources Authority Massachusetts

1.25 2.5 5 Miles

Source: MWRA, CDM Smith, Open Streetmap



MetroWest Projects 1a and 1b

CONCEPTUAL PROJECTS:

Project 1a
Service to Communities North of the MetroWest Water Tunnel using Rail Trails

Project 1b
Service to Communities North of the MetroWest Water Tunnel using Local Roadways

CDM Smith

Water Resources Authority Massachusetts

LEGEND

- Study Community
- Study Community (MWRA served)
- MWRA Member Community
- MWRA Partially Served Community
- Expanded MWRA Service Area
- Existing MWRA Distribution System
- Existing MWRA Transmission System
- Proposed Pipe Route (Project 1a)
- Proposed Pipe Route (Project 1b)
- Assumed Transmission Main Pumping Station (Location TBD)
- Assumed MWRA Storage (Location TBD)
- Proposed Community Pipe Connection with Expected Service Volume
- Proposed Community Pump Station
- Existing MWRA Service Volume

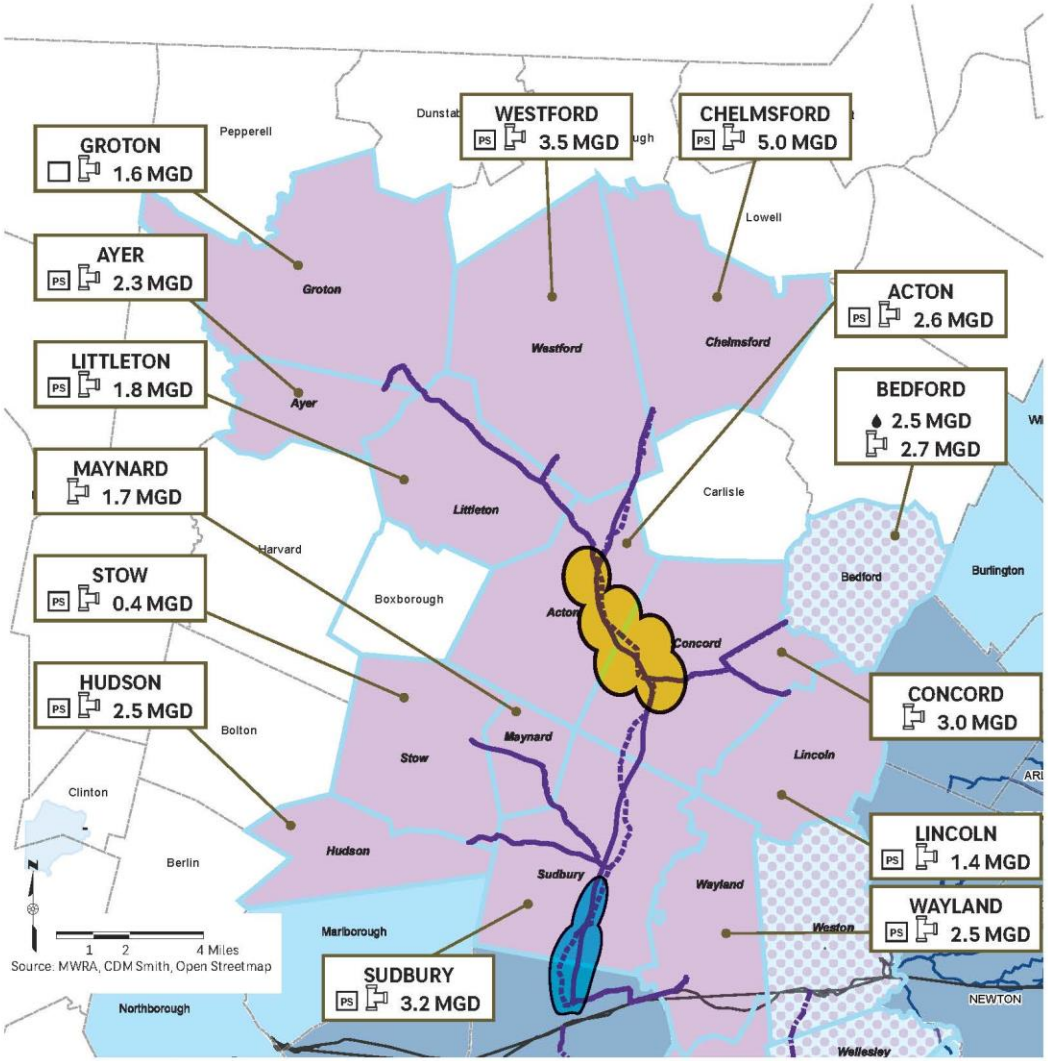
Notes:

- MGD: million gallons per day
- Due to differences in hydraulics between Projects 1a and 1b, it is anticipated that Sudbury will not require its own community pump station for Project 1b.

Conceptual Project Cost Estimate

Item Description	Cost Estimate ($ millions)	
	Project 1a	Project 1b
Pipe and Appurtenances Construction	$470	$490
Allowance for Pumping Stations, Storage, Chemical Feed Stations Construction	$130	$130
Design and Construction Phase Engineering	$150	$160
Project Contingency	$190	$200
CONCEPTUAL PROJECT COST (2022 dollars)	**$940**	**$980**
CONCEPTUAL PROJECT COST (2028 dollars)	**$1,120**	**$1,160**
Design/Construction Duration	*25-30 years*	*25-30 years*

Excludes costs for pre-design studies, permitting, community infrastructure and community mitigation.



MetroWest Projects 2 through 5

CONCEPTUAL PROJECTS:

Project 2
Service to Weston, Wellesley, and Natick

Project 3
Service to Holliston

Project 4
Service to Westborough

Project 5
Wheeling to Hopkinton and Sherborn

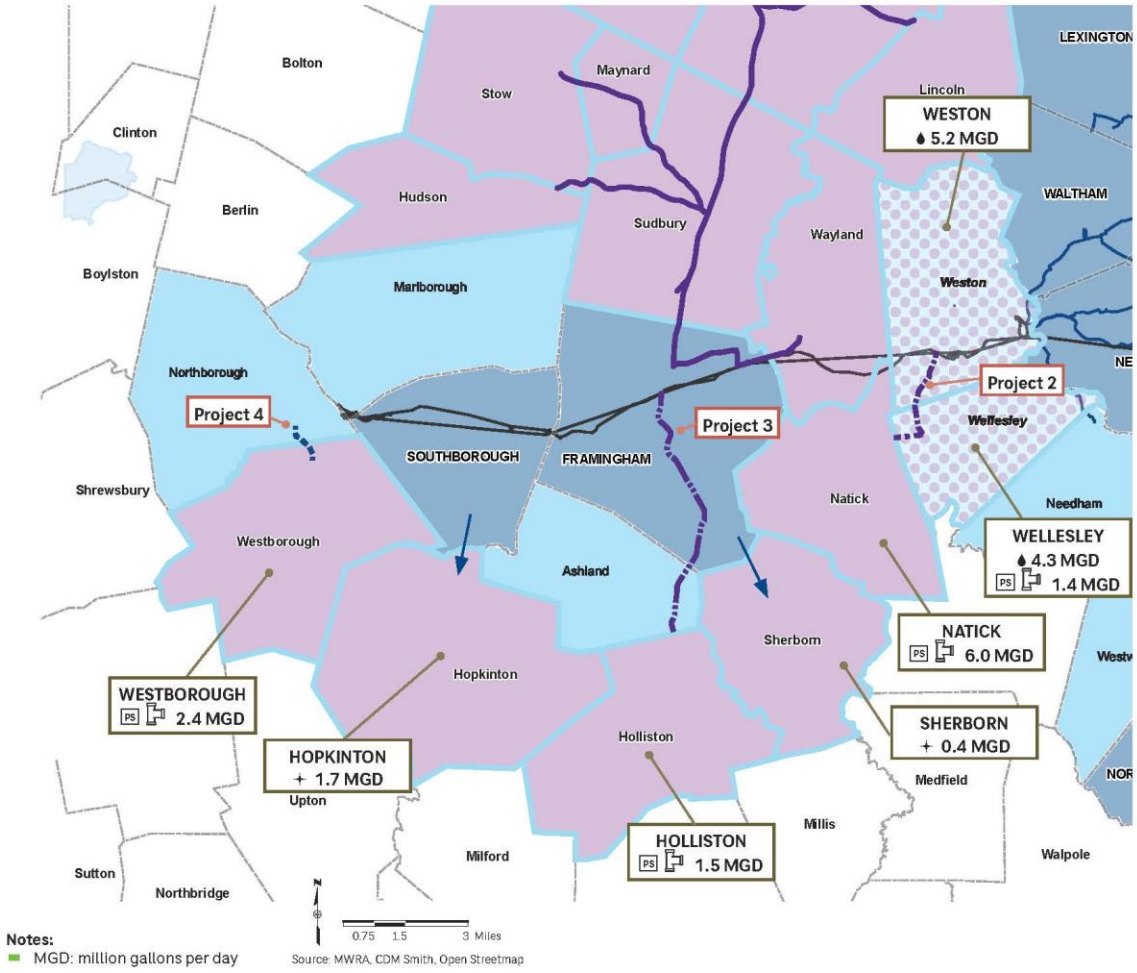
LEGEND

- Study Community
- Study Community (MWRA served)
- MWRA Member Community
- MWRA Partially Served Community
- Expanded MWRA Service Area
- Existing MWRA Distribution System
- Existing MWRA Transmission System
- Proposed Pipe Route (Project 2)
- Proposed Pipe Route (Project 3)
- Existing Pipe Route (Project 4)
- Represents Wheeling (Project 5)
- Assumed Community Wheeling Service Volume
- Proposed Community Pipe Connection with Expected Service Volume
- PS Proposed Community Pump Station
- Existing MWRA Service Volume

Conceptual Project Cost Estimate

Item Description	Cost Estimate ($ millions)		
	Project 2	Project 3	Project 4
Pipe and Appurtenances Construction	$20	$20	$1
Allowance for Pumping Stations, Storage, Chemical Feed Stations Construction	$20	$10	$6
Design and Construction Phase Engineering	$10	$10	$2
Project Contingency	$10	$10	$2
CONCEPTUAL PROJECT COST (2022 dollars)	**$60**	**$50**	**$11**
CONCEPTUAL PROJECT COST (2028 dollars)	**$70**	**$60**	**$13**
Design/Construction Duration	*5-7 years*	*5-7 years*	*4-5 years*

Excludes costs for pre-design studies, permitting, community infra-structure and community mitigation. Project 4 assumes no new pipelines.



Notes:
- MGD: million gallons per day

Study Update and Next Steps

- **This study was one of three recently completed feasibility studies**
  - **https://www.mwra.com/02org/html/expansion.html**

- **MWRA's Board of Directors Waived MWRA's Entrance Fee**
  - Up to 20 MGD for new communities seeking admission
  - Must have water quality or quantity issues, or need additional water for economic development
  - Must complete MWRA Admission process by December 31, 2027 (does not require completed connection to MWRA's system)

- **Next Steps:**
  - Working with interested communities
  - Fourth study in the Quabbin Watershed