



# Metropolitan Water Tunnel Program

Town of Needham

Select Board Meeting

January 28, 2025



# Agenda

- MWRA – Introduction
- Tunnel Program - Goals
- Tunnel Program - Update
  - Status
  - Schedule
- Informational Resources
- Questions?



**Metropolitan Water Tunnel Program  
Public Information Session**

**Wednesday, February 5<sup>th</sup>  
7:00PM (Hall will open at 6:30PM)**

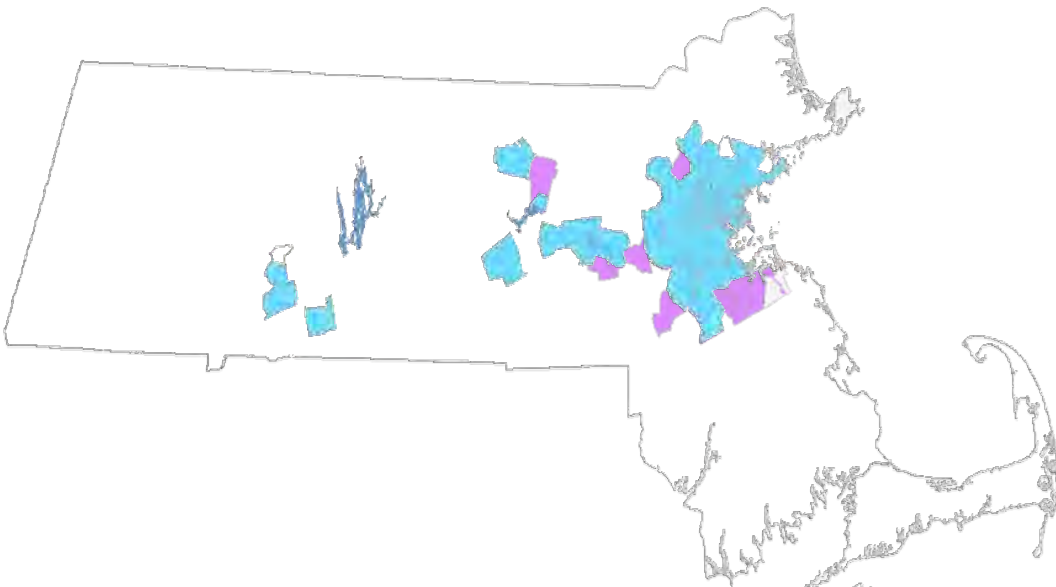
**James Hugh Powers Hall  
Needham Town Hall  
1471 Highland Ave, Needham, MA**



# MWRA – Who We Are.... What We Do ...

## The MWRA ...

- provides wholesale water and wastewater services to over 3.1 million customers in 61 communities
- delivers an average of 200 million gallons per day to its water customers
- collects and treats an average of 350 million gallons of wastewater per day, with a peak capacity of 1.2 billion gallons



## We have ...

- 5 years of storage for water supply
- State of the art water treatment facility
- 102 miles of active transmission mains and tunnels (plus 43 miles on standby), including a number of deep rock pressure tunnels
- 284 miles of distribution mains with over 4,700 valves
- 12 pump stations and several covered storage tanks
- ~ 85% of our water is delivered by gravity

## We Must....

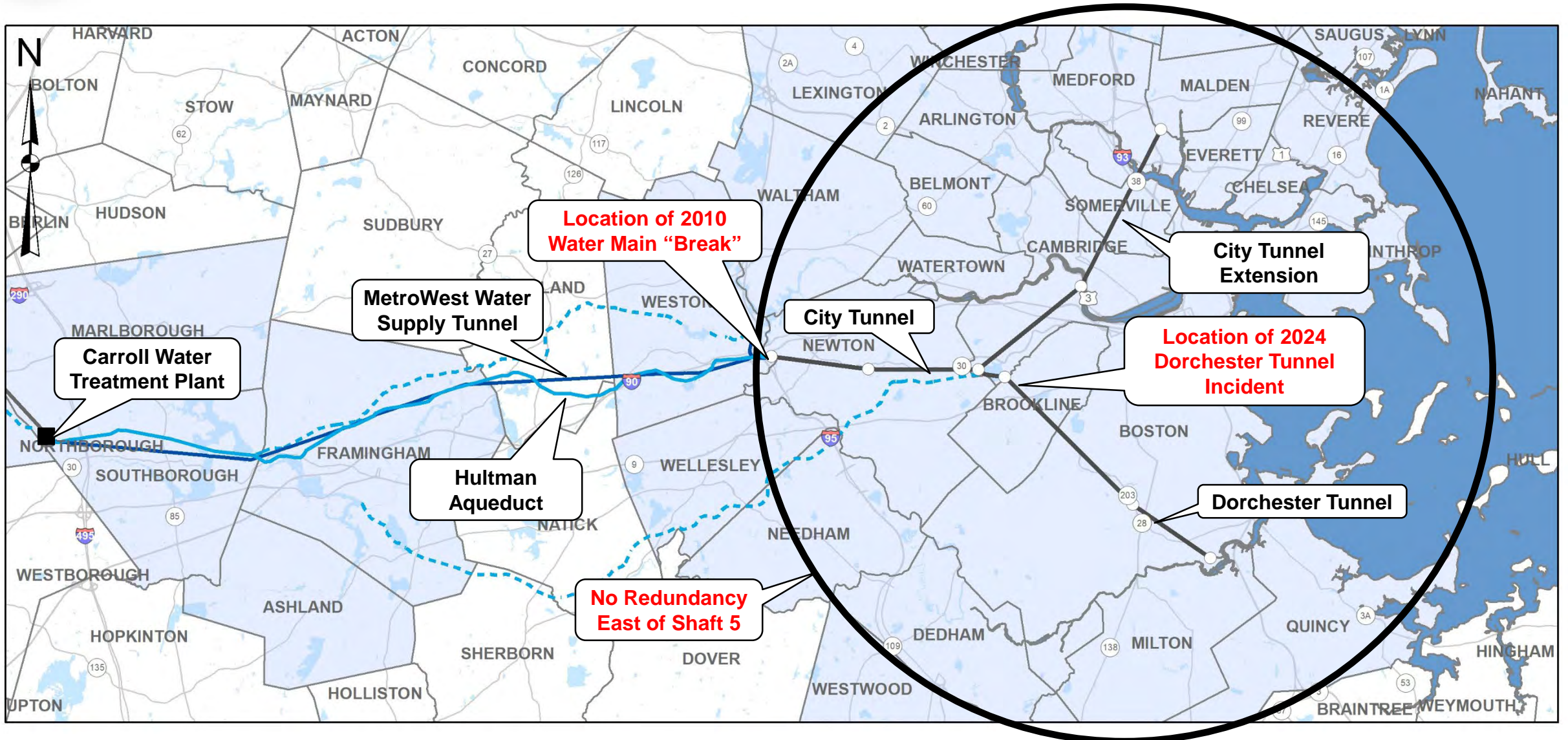
- Deliver water to protect **public health**, provide **sanitation**, and **fire protection**

## We Need to....

- Have the ability to swiftly respond to a disruption in service
- Maintain and rehabilitate surface piping, key valves and tunnels on a periodic basis



# Metropolitan Tunnel System Serves About 60 Percent of Water Demand in Metropolitan Area





# Metropolitan Water Tunnel Program - Goal

## Provide Full Redundancy for the Metropolitan Tunnel System:

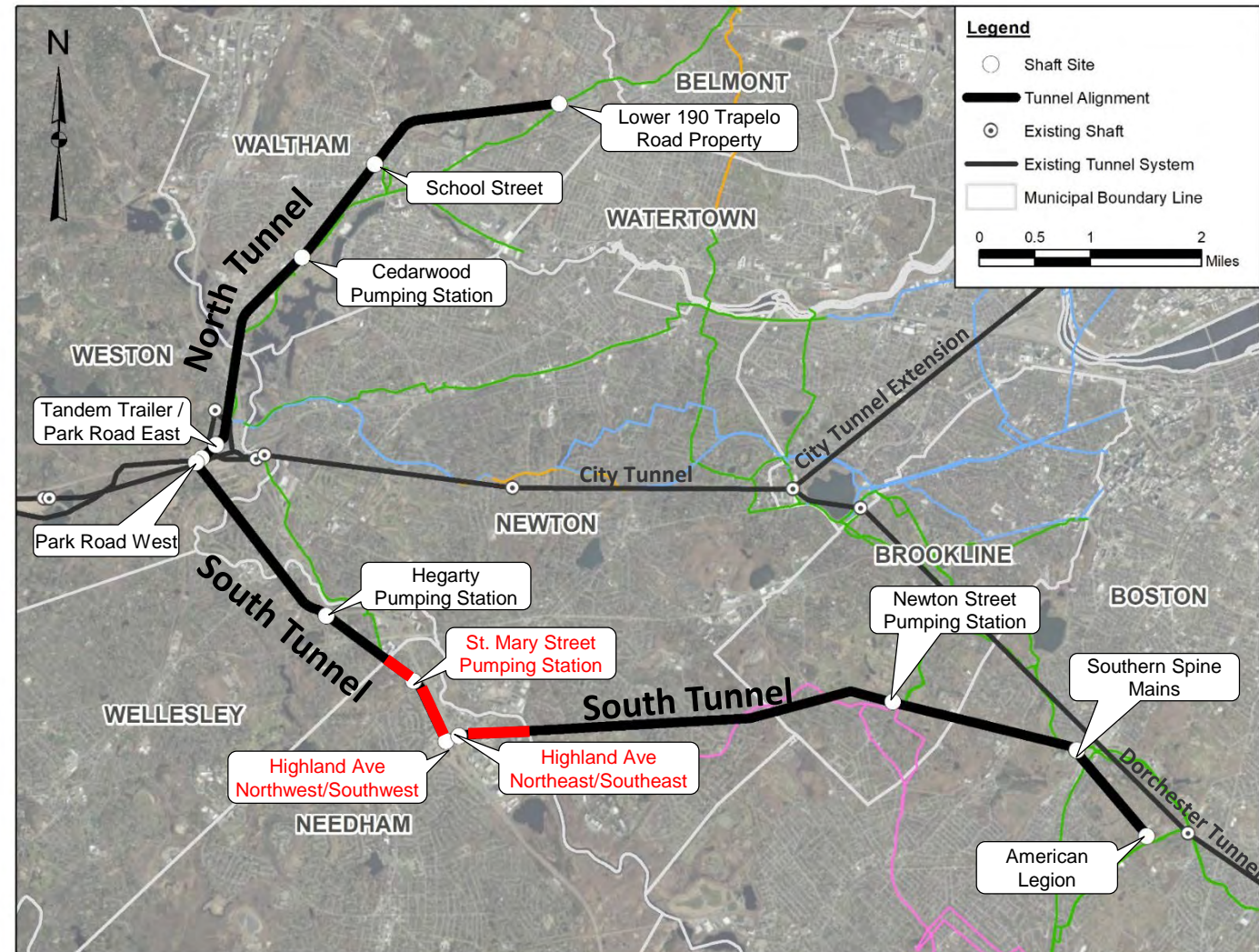
- Provide normal water service and fire protection when the existing tunnel system is out of service
- Provide the ability to perform maintenance on existing tunnels year-round
- Provide uninterrupted service in the event of an emergency shut down
- Meet high day demand flow with no seasonal restrictions
- Avoid activation of emergency reservoirs
- Meet customer expectations for excellent water quality





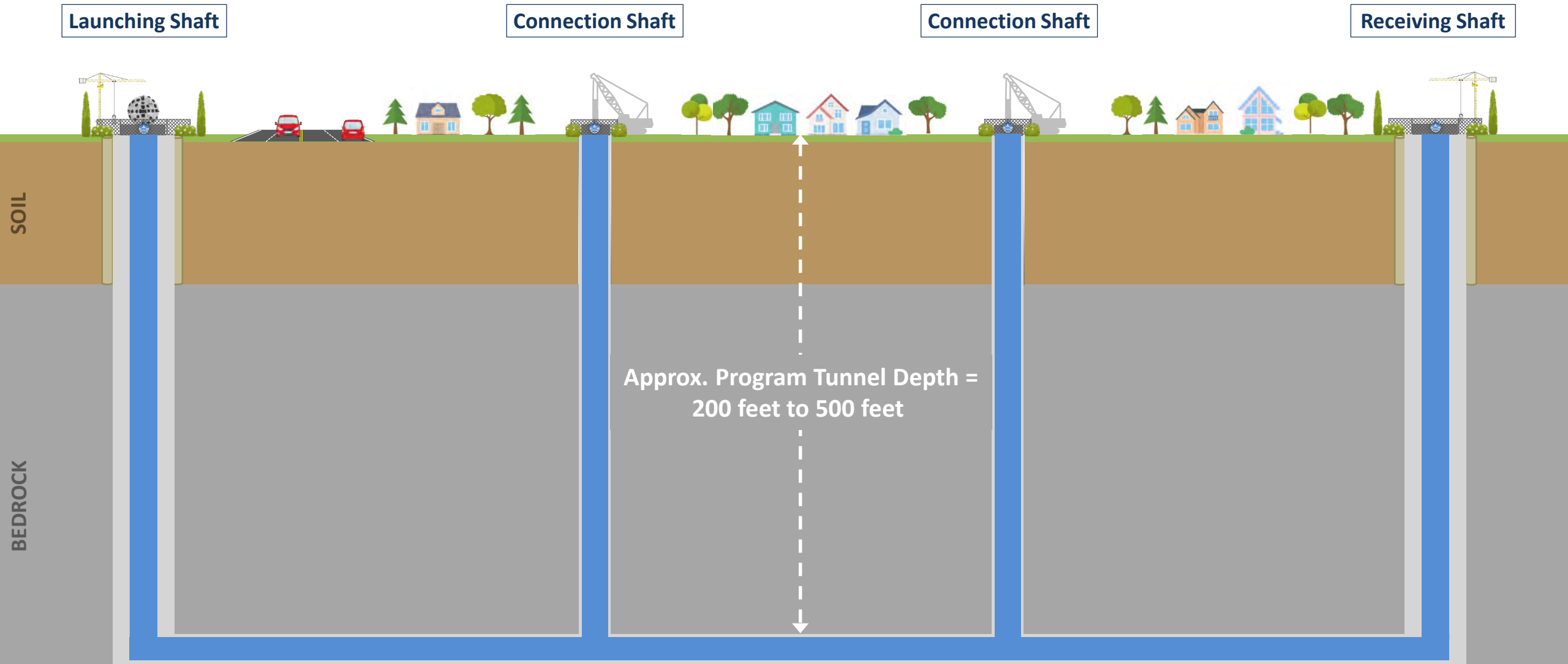
# Metropolitan Water Tunnel Program - Overview

- ~15 miles of deep, hard rock, pressure water tunnels
- 13 Shaft Sites
- Tunnels will begin in Weston (I-90/I-95)
- North Tunnel - ~5 miles, ends in Waltham
- South Tunnel - ~10 miles, ends in Mattapan near American Legion Hwy
- Tunnel Construction anticipated between 2028 and 2040





# Conceptual Construction Sequence



NOT TO SCALE  
For discussion only



# How Did We Get Here?



## Early Concepts:

- Establish Program Goal = Full Redundancy
- Evaluated numerous tunnel and non-tunnel alternative
- Selected all tunnel alternative (maximize work underground, least impacts)

## Preliminary Design & EIR – Performed in Parallel:

- Gather Stakeholder input, incorporate into environmental analysis and preliminary design
- Shaft site selection
  - Meet system hydraulic requirements
  - Provide sufficient space for construction and permanent infrastructure
- Establish tunnel alignment
  - Minimize overall tunnel length and avoid geo-hazards, when possible
  - Establish readily constructible tunnel segment lengths
- Avoid, minimize, and mitigate impacts to the environmental and communities to the maximum extent practicable



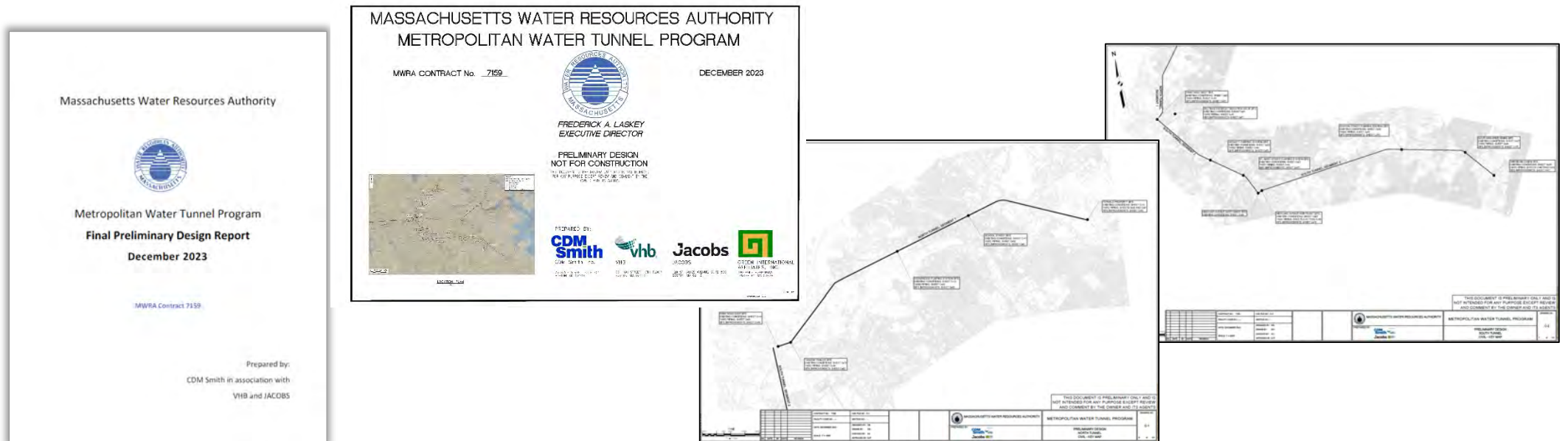


# Preliminary Design



## Preliminary Design (2020 – Early 2024) Complete ✓

- 15 miles of deep rock tunnel
- 100 Year Service Design Life
- Preliminary tunnel alignment and profile, valve chambers and surface pipeline connections
- Construction contract packaging and sequence approach
- Updated construction cost estimate and construction schedule



For discussion only



# Environmental Review Documents



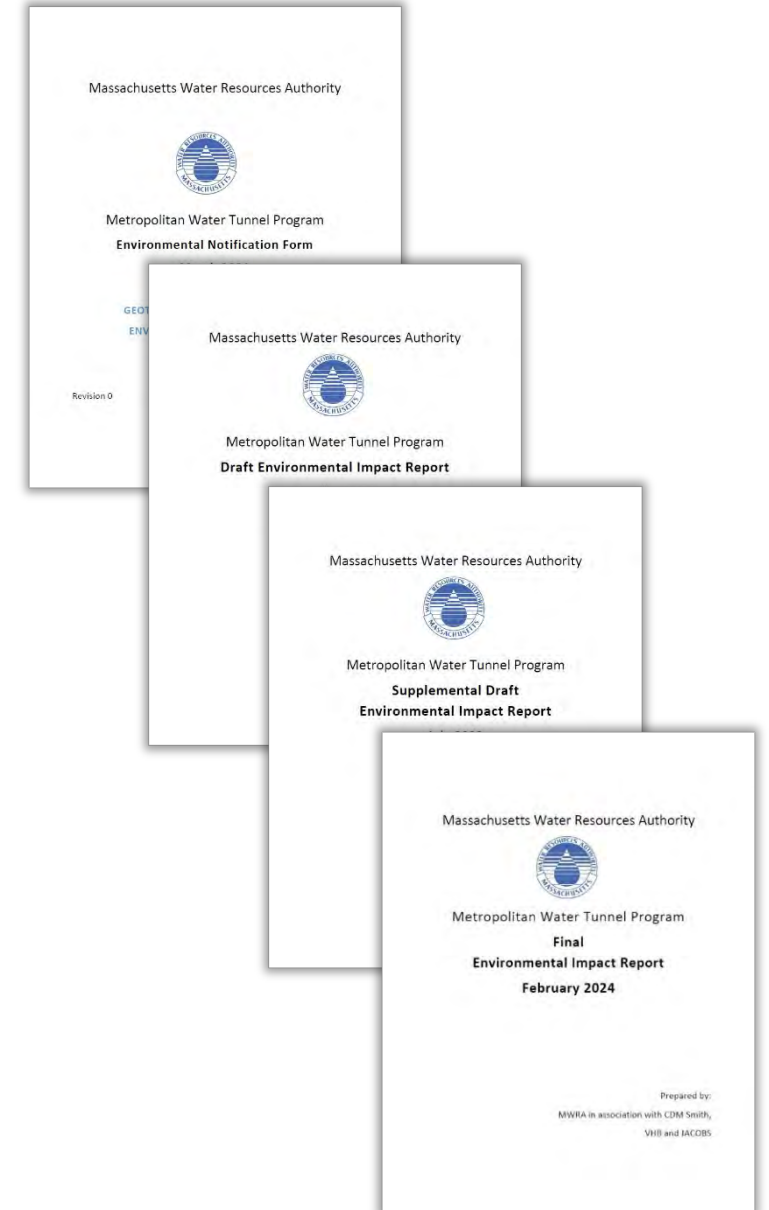
## MEPA filings and Environmental Impact Reports: **Complete ✓**

- Environmental Notification Form (ENF), March 2021
  - Certificate Issued May 2021
- Draft Environmental Impact Report (DEIR), October 2022
  - Certificate Issued December 2022
- Supplemental Draft Environmental Impact Report (SDEIR), July 2023
  - Certificate Issued September 2023
- Final Environmental Impact Report (FEIR), February 2024
  - Certificate Issued April 2024

## Stakeholder Comments Were Addressed as Part of the Environmental Review Process

Documents are available on our website:

<https://www.mwra.com/mwtp/resources.html#resources>





# Geotechnical Investigation



- Phase 1, Preliminary Design/Environmental Impact Report (2020 – 2023) **Complete ✓**
- Phase 2, Geotechnical Support Services (2023 – Early 2026) **Ongoing**
- Phase 3, Final Design (2025 – 2028) **Up Next**



St Mary Street, Needham



Highland Circle, Needham

METROPOLITAN WATER TUNNEL PROGRAM  
 MWRA CONTRACT NO. 7557  
 BORING: 6-56-105  
 CORE RUN: C51-157  
 DATES: 08/01/24  
 DEPTH: 171-187

CORE RUN	DEPTH (ft)	PEN (in)	REC (in)	REC (%)	RQD (in)	RQD (%)
C51	177-177	61	61	100	61	100
C52	177-184	60	60	100	60	100
C53	182-187	60	60	100	60	100

MWRA CONTRACT No. 7557 B-GSS-405 BOX 10 OF 24 171.9 - 187.0 ft.

**About MWRA's Metropolitan Water Tunnel Program Geotechnical Field Investigation**

The Massachusetts Water Resources Authority (MWRA) will be conducting field work to support a major water supply tunnel program in the Metropolitan Boston area. The two new water tunnels will improve the reliability of our water infrastructure and allow our aging existing water tunnel system to be rehabilitated without interrupting service.

The MWRA will be drilling test borings and conducting geophysical surveys in the Metropolitan Boston area. The MWRA will use the data from the field investigations to design and construct solutions that are best suited for the Tunnel Program. The geographical limits of the field investigations are shown in the shaded area below.

Distributed 12/4/2024

**METROPOLITAN WATER TUNNEL PROGRAM**

**NOTICE TO ABUTTERS**

**NEEDHAM**

The Massachusetts Water Resources Authority (MWRA) will be conducting field work to support a major water supply tunnel program in the Metropolitan Boston Area. The two proposed water tunnels will improve reliability for our water infrastructure and allow our aging existing water tunnel system to be rehabilitated without interrupting service.

As part of the design effort, MWRA has hired GEI-Delve Joint Venture and other firms to perform pavement cores, vacuum excavations, and test borings to study the existing geological conditions, as well as collecting subsurface soil samples. Observation wells may be installed within selected boreholes to measure groundwater levels.

The site activities will include establishing a work area around each boring location, to provide providing a working space for a drill rig, support trucks, and equipment. Erosion and sedimentation controls will be installed, as needed. At each of the boring locations, the work is estimated to take about 1 to 2 days to complete, including site set-up and breakdown. Upon completion of site activities, our crews will restore the work sites.

MWRA has planned for a total of six test borings along Fremont Street, Charles Street, Wexford Street, Arlington Road, and Brook Road in Needham. The work will be on the public roadways and not on any private property.

Construction Zone Safety will be in place and project signage at locations that will pose minimal disruptions to temporary changes in pedestrian and vehicular travel will be installed upon completion generally on Monday, December 9th, 2024. Upon completion of the field work, our crews will restore the work sites and thank you for your patience.

For more information, please contact: [Name] at the MWRA phone at (617) 963-9876



# Outreach



- Met with communities in the study area; established Working Groups with representatives from each community
- Numerous meetings with the 7 communities in which the tunnel will be constructed:
  - Town Management, Public Works, Public Safety/Fire, Conservation Commission, etc.
- Multiple meetings with key stakeholders and permit agencies
- Met with numerous organizations, businesses & private property owners to coordinate field work
- Met with several community interest groups
- Established a Website <https://www.mwra.com/mwtp.html> and email address (for questions) [Tunnels.info@mwra.com](mailto:Tunnels.info@mwra.com)
- Created multiple Fact Sheets – available in 4 languages
- Public Information Sessions **Starting in February!**

Outreach will continue throughout final design and construction

For discussion only

**Metropolitan Water Tunnel Program How Were Shaft Sites Selected?**

Through the Metropolitan Water Tunnel Program, the Metropolitan Water Resources Authority (MWRA) will construct two new water supply tunnels that will allow our aging existing water tunnel system to be rehabilitated without interrupting service. Implementing the Program will require construction of deep shafts, rock tunnels, and near surface valve vaults, and pipeline connection facilities.

Most of the construction will take place deep below the surface, as the tunnel boring machines (TBM) excavates through rock up to 400 feet underground. However, several shafts will connect the tunnel to the surface. Launching and receiving shafts allow the TBM to enter and exit the tunnel, while connection shafts provide important connections from the new tunnels to our existing water tunnel system and to the local communities that we serve. This fact sheet describes these shafts and how the sites were selected.

*What is each shaft site used for?*

**About MWRA's Metropolitan Water Tunnel Program**

Although less known for the successful cleanup of Boston Harbor, the Massachusetts Water Resources Authority (MWRA) also provides safe drinking water to over 10 million residents and 16,000 businesses in Massachusetts. Our water system dates back to the 19th century and has been continually expanded and improved upon for over 200 years. Our main water source, the Quabbin and Wachusett Reservoirs, is a natural source of water for our region and has been used since the late 19th century in Massachusetts. In 2010, we started our water delivery system in New England for the first time since 2011.

When it was created in 1984, MWRA inherited one of the country's great water systems; however, it had been neglected for decades. We have since invested heavily to modernize the water system, constructing a 17.6-mile water tunnel, a fully automated water treatment plant, and two new reservoirs. We have also replaced or rehabilitated nearly 70 miles of water pipelines. In recent years, our focus has been ensuring reliability to enable us to serve our customers better and to protect our investment in the water system.

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**MWRA's Metropolitan Water Tunnel Program Potential Traffic Impacts Fact Sheet**

Through the Metropolitan Water Tunnel Program, the Metropolitan Water Resources Authority (MWRA) will construct two new water supply tunnels that will allow our aging existing water tunnel system to be rehabilitated without interrupting service. Implementing the Program will require construction of deep shafts, tunnels, and near surface valve vaults, and pipeline connection facilities.

Most of the construction will take place below the surface, as the tunnel boring machines (TBM) excavates through rock up to 400 feet underground. However, several shafts will connect the tunnel to the surface. Most of these shaft sites, you may notice an increase in truck traffic. Truck routes have been identified and evaluated through the Environmental Impact Review (EIR) process, which includes a traffic impact analysis of potential impacts and strategies to avoid, minimize, and/or mitigate any impacts. This fact sheet describes the potential traffic impacts during construction of the Program.

**Where will the construction take place?**

Even though the new water supply tunnels will be mostly constructed several hundred feet below ground, surface-level construction will take place primarily around up to seven launching/receiving shafts and six connection shaft sites. The location of each shaft site were selected to avoid and minimize construction truck traffic, in addition to considerations for environmental, social, and community impacts.

**Metropolitan Water Tunnel Program How Is A Tunnel Constructed?**

Through the Metropolitan Water Tunnel Program, the MWRA will construct two new water supply tunnels that will allow our aging existing water tunnel system to be rehabilitated without interrupting service. Implementing the Program will require construction of deep shafts, tunnels, and near surface valve vaults, and pipeline connection facilities. This fact sheet provides a description of these elements and some typical construction methods that will be used to complete the Program.

**Types of Tunnel Shafts**

Construction will start at the surface with shaft construction. Shafts provide the vertical connections from the surface to the depth of the tunnel. Three types of shafts will be constructed: launching shafts, connection shafts, and receiving shafts. During construction, launching shafts, connection shafts, and receiving shafts. When the tunnel is in operation, these shafts will provide the connections from the new tunnels to our existing water tunnel system and to the local communities that we serve.

**Launching Shafts**

Launching shafts are the largest diameter shafts to be constructed for the Program and will provide the primary support for tunnel construction. A launching shaft will be approximately 40 feet in diameter. Two to three of these types of shafts may be required. A minimum of approximately 5 acres of land surrounding the shaft are required at the surface to allow launching shaft site to support tunnel boring machine (TBM) assembly, tunnel excavation, tunnel muck handling, water handling, and tunnel installation. A smaller footprint of approximately 1.5 to 2 acres may be needed for the permanent top of the shaft structure, valve vaults, and near surface pipelines which will provide connections to our existing water distribution system.



## **Metropolitan Water Tunnel Program Public Information Session**

**Wednesday, February 5<sup>th</sup>  
7:00PM (Hall will open at 6:30PM)**

**James Hugh Powers Hall  
Needham Town Hall  
1471 Highland Ave, Needham, MA**

<https://www.mwra.com/about-mwra/calendar>



# Highland Avenue Northwest and Northeast – Shaft Sites

## Site Purpose:

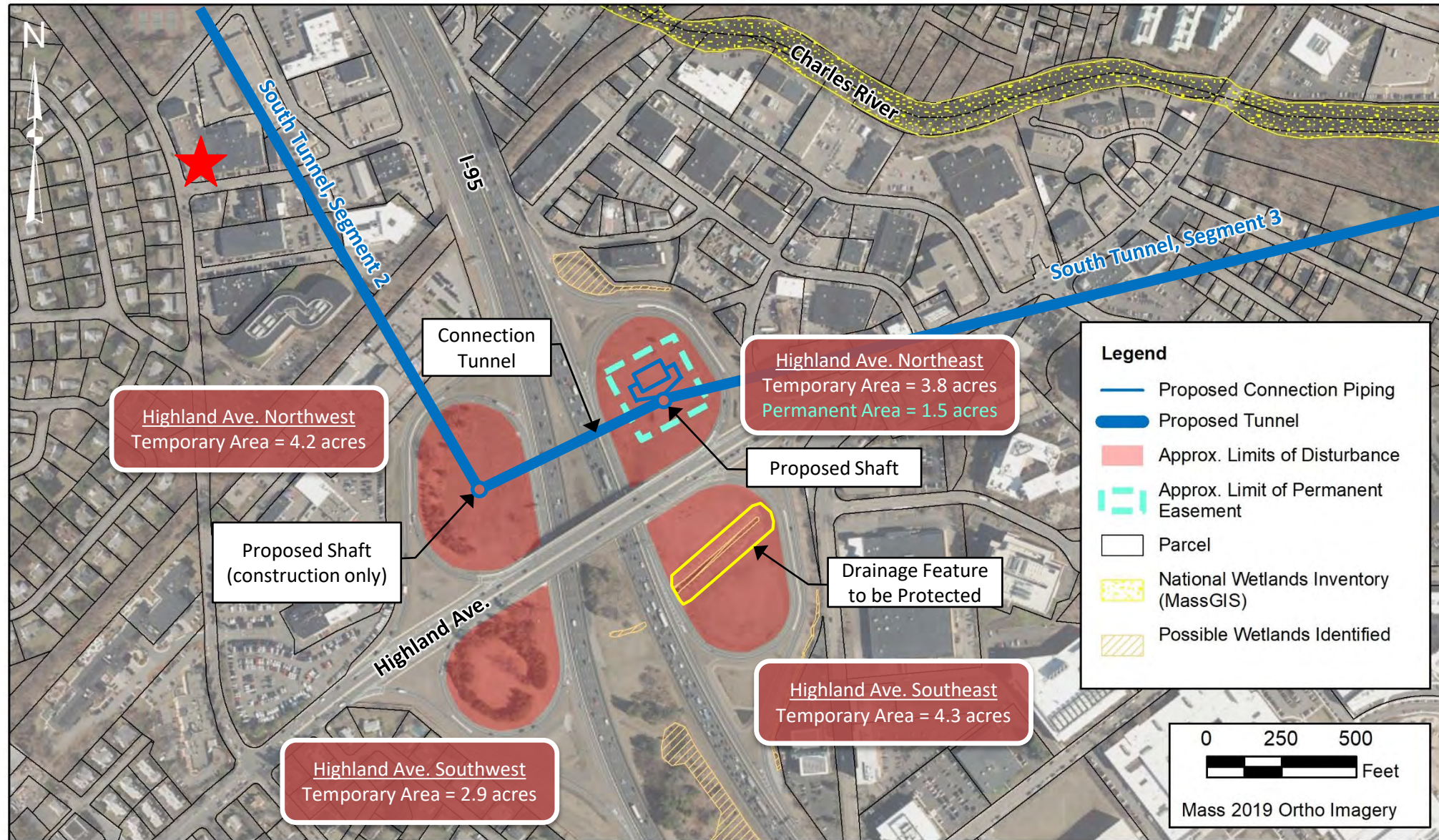
- Launch TBM from Northwest Cloverleaf to Weston
- Launch TBM from Northeast Cloverleaf to Mattapan
- Connector tunnel below I-95

## Site Characteristics:

- Coordination with MassDOT is ongoing
- Sites were previously used for construction staging

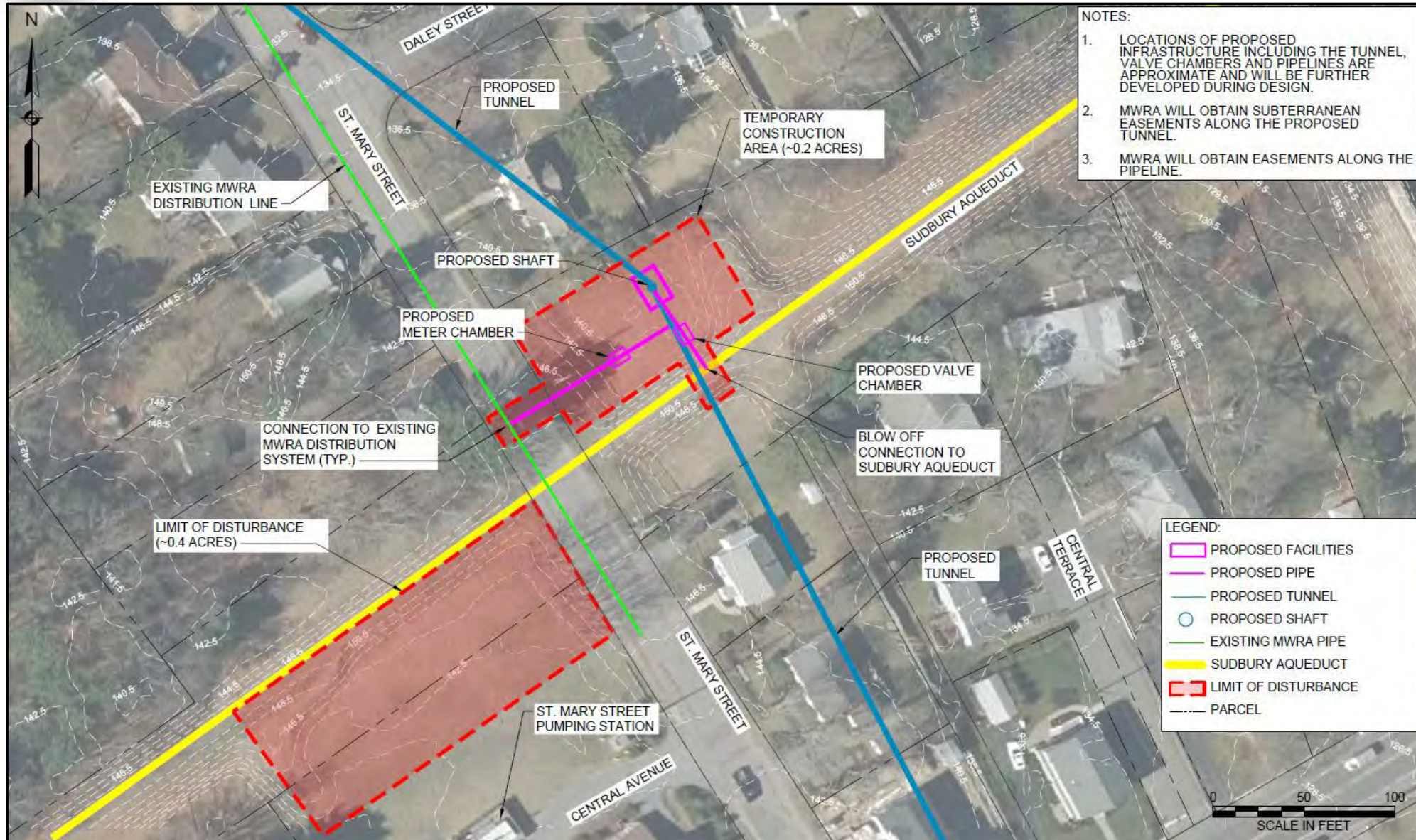


MWRA Tunnel Program Office (and Rock Core Storage Facility)





# St Mary St Pumping Station – Connection Shaft



- Most work on MWRA property
- Limited in road work



# Construction

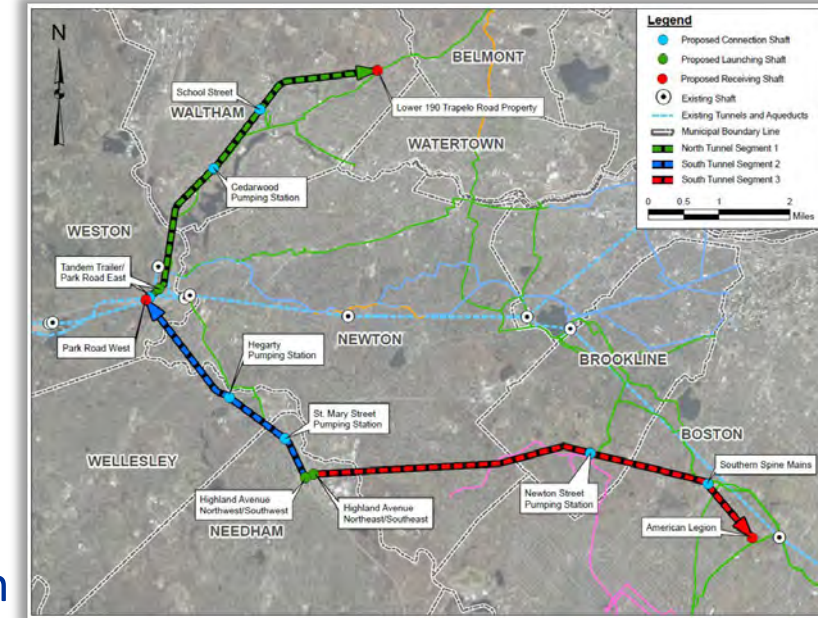


## Tunnel Construction:

- South Tunnel - 2028 ←
- North Tunnel - 2029
- Complete by 2040

## Early Enabling Construction Work: Target to begin 2026

- TBM Power Supply – by Eversource ←
- Needham Dewatering Drainage Line ←
- Lower 190 Trapelo Road Property - Building Demolition
- Tandem Trailer Parking Relocation



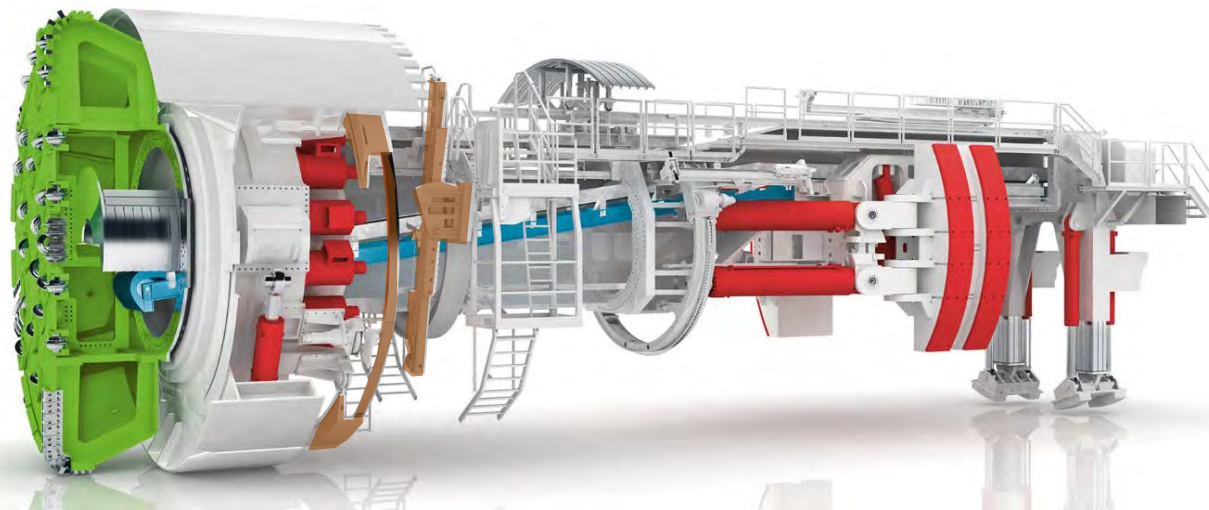




# TBM Power Supply – by Eversource



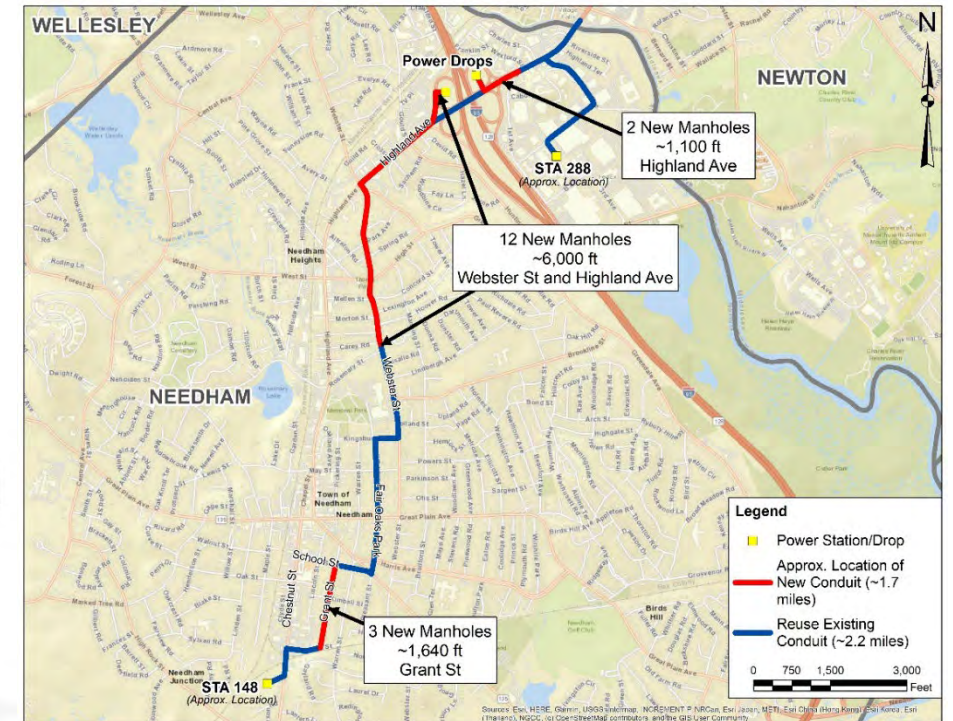
- The tunnel boring machines (TBMs) are very large machines and are powered by electricity
- There is not sufficient power supply in the Highland Ave area to support TBM operations
- MWRA is working with Eversource to bring a new power infrastructure to the launching shaft sites
- This new power infrastructure will remain after the Tunnel Program is complete



Source: [www.herrenknecht.com](http://www.herrenknecht.com)

## Highland Ave Launching Shaft Sites:

- ~1.7 miles of new duct bank & cable
- ~2.2 miles of reused duct bank & cable

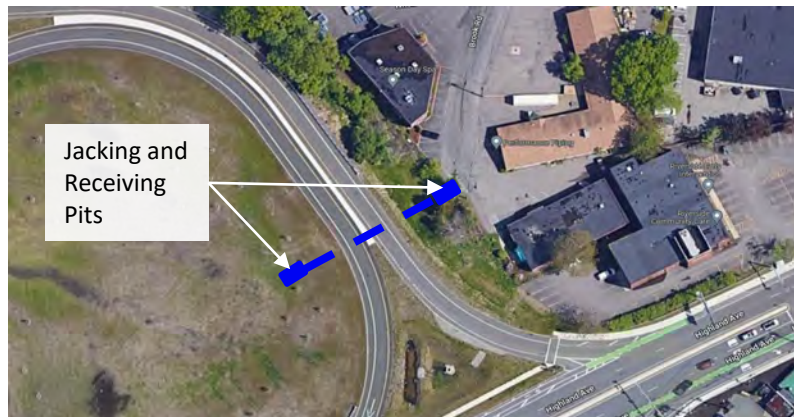




# Dewatering Drainage Pipeline



- Early enabling construction project
- New pipeline for construction dewatering and future unwatering of the south tunnel
- Requires a short trenchless crossing of an I-95 Ramp (within MassDOT ROW)
- New outfall to the Charles River



For discussion only



# Tunnel Program – Current Schedule



- Preliminary Design & EIR: 2020 – 2024 **Complete ✓**
- Final Design: 2024 – 2029 **Ongoing**
- Eversource - Power Supply Construction: 2025 – 2029
- Early Enabling Projects Construction : 2026 – 2029
- Land Acquisition: 2021 – 2029 **Ongoing**
- South Tunnel Construction: 2028
- North Tunnel Construction: 2029
- New Tunnel System in Operation: by 2040

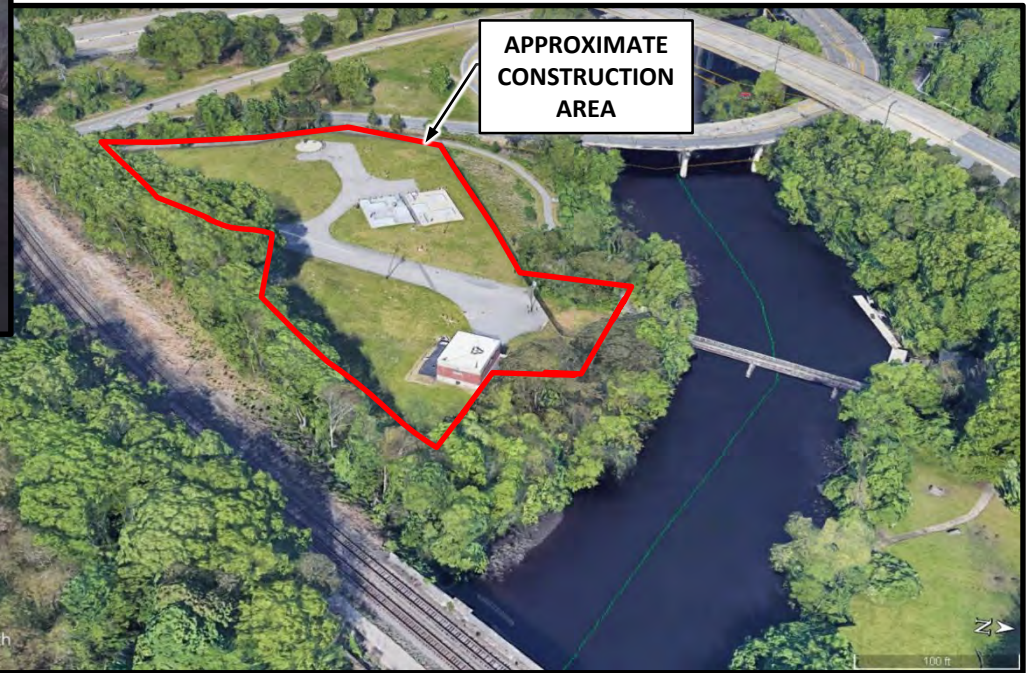


# Launch Shaft Site

- Early Concepts
- Prelim. Design & EIR
- Geotechnical Investigations
- Final Design
- Construction
- Operations



MWWST Shaft 5A – During Construction



MWWST Shaft 5/5A – Post Construction



# Permanent Infrastructure



Permanent infrastructure is mostly below grade:

- Top of shaft structure and valve chamber (~2 ft above grade)
- Connection piping (all buried)



MWWST Shaft 5/5A, Weston



MWWST Wellesley St  
Connection Shaft, Weston



MWWST Shaft L, Framingham



MWWST Shaft E, Southborough



# Emergency Response Coordination



- Shafts are located in six (6) communities, tunnel alignment is beneath seven (7) communities
- Advance coordination is needed to ensure coordinated emergency response during construction
  - Uniqueness of the underground construction environment and its hazards
  - Anticipated role and responsibilities of the MWRA tunnel contractors and local Emergency Responders
    - Tunnel Contractors to provide all OSHA required tunnel rescue resources (2 teams)
    - Local Emergency Responders assume incident command on the surface and, if needed, provide support underground (e.g. for extrication and medical care)
  - Training and equipment needed by the local Emergency Responders throughout tunnel construction
- Emergency response coordination needs to be tailored to each communities' capabilities and size
- MWRA resources will be provided to ready the local Emergency Responders
- **MWRA is working with local Emergency Responders to determine what resources will be needed**





# Where to Find Information / How to Contact Us

- Tunnel Program Website: <https://www.mwra.com/mwtp.html>
  - Program Information
  - Reports and other Documents
  - Meeting Agendas and Minutes
- Needham - Notices and Info:  
<https://www.mwra.com/mwtp/resources.html#resources>
- Program email address: [Tunnels.info@mwra.com](mailto:Tunnels.info@mwra.com)
  - Public inquiries and information requests
- Contact Us!
  - Carmine DeMaria, Community Relations Coordinator
  - 617-305-5725
  - [Carmine.DeMaria@mwra.com](mailto:Carmine.DeMaria@mwra.com)





# Metropolitan Water Tunnel Program

**Thank You!**

