# Metropolitan Water Tunnel Program

## Town of Needham

## Select Board Meeting

November 22, 2022

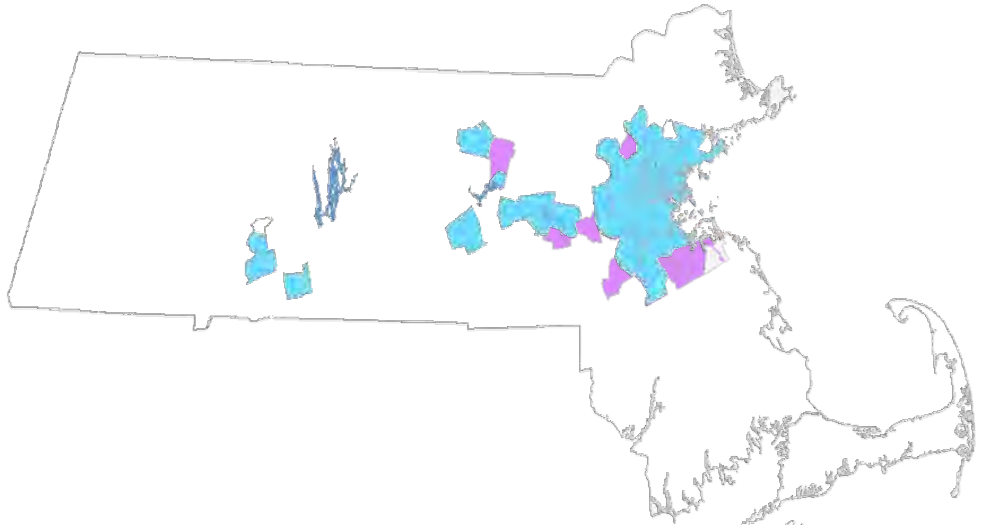
# Topics

- MWRA
- Metropolitan Water Tunnel Program
- DEIR / Preferred Alternative
- Tunnel Program Schedule
- What Happens at a Shaft Site
- Possible Construction Impacts & Management
- Community & Stakeholder Outreach
- Where to Find Information / How to Contact Us
- Questions?

# MWRA - 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 …

- 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
- 5 years of storage for water supply
- 12 pump stations
- ~ 85% of our water is delivered by gravity

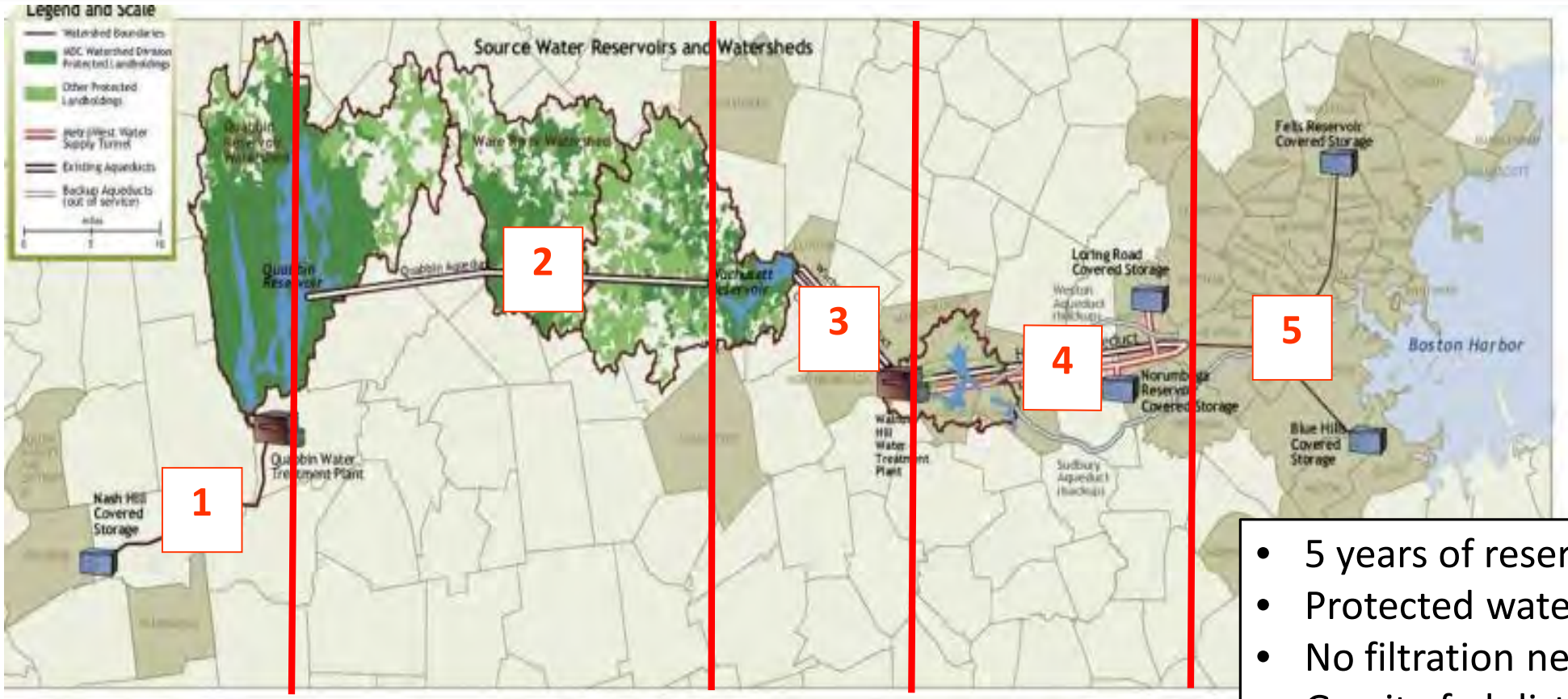
We Must….

- 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

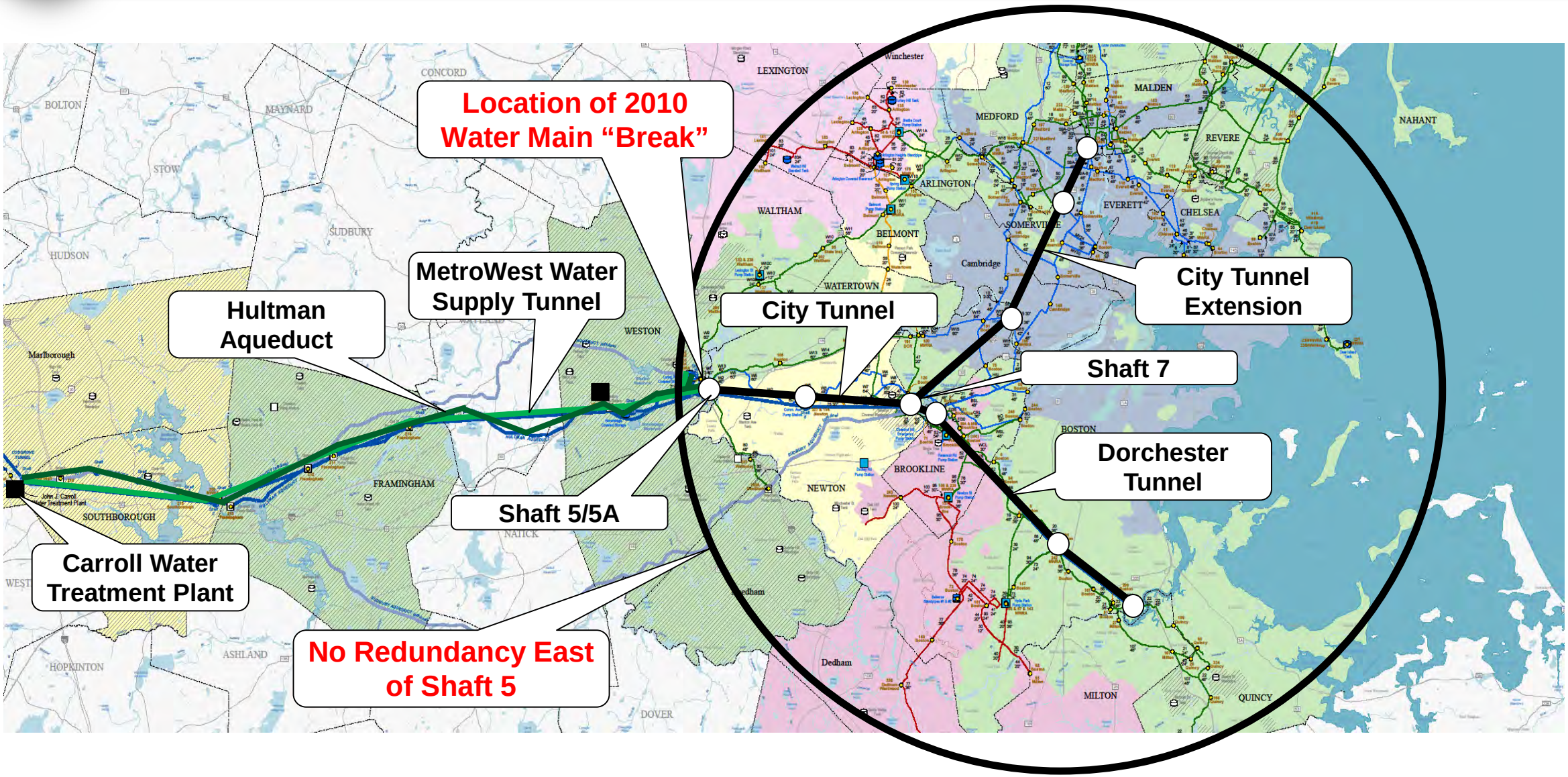
# MWRA Water System




1. Chicopee Valley Aqueduct — 2007 Improvements ✓
2. Quabbin Aqueduct — Inspection planned ✓
3. Cosgrove Tunnel / Wachusett Aqueduct — 2019 Improvements ✓
4. MetroWest Tunnel / Hultman Aqueduct — 2003/2013 Improvements ✓
5. Metropolitan Tunnels — Significant Needs ← Next!

- 5 years of reservoir capacity
- Protected watershed
- No filtration need
- Gravity fed distribution
- Great taste!

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



# Metropolitan Water Tunnel Program Purpose

- Our current Metropolitan Tunnel System, servicing the Boston area, is in need of repair
- The tunnels, valves, chambers & pipelines are between 50 – 80 years old


- Currently we cannot maintain our tunnel system east of Shaft 5 in Weston because a shutdown of the entire Metropolitan Tunnel System would be required
- The Metropolitan Water Tunnel Program will solve that problem by creating a redundant water tunnel system allowing the old system to be completely taken offline for inspection, maintenance, and repair

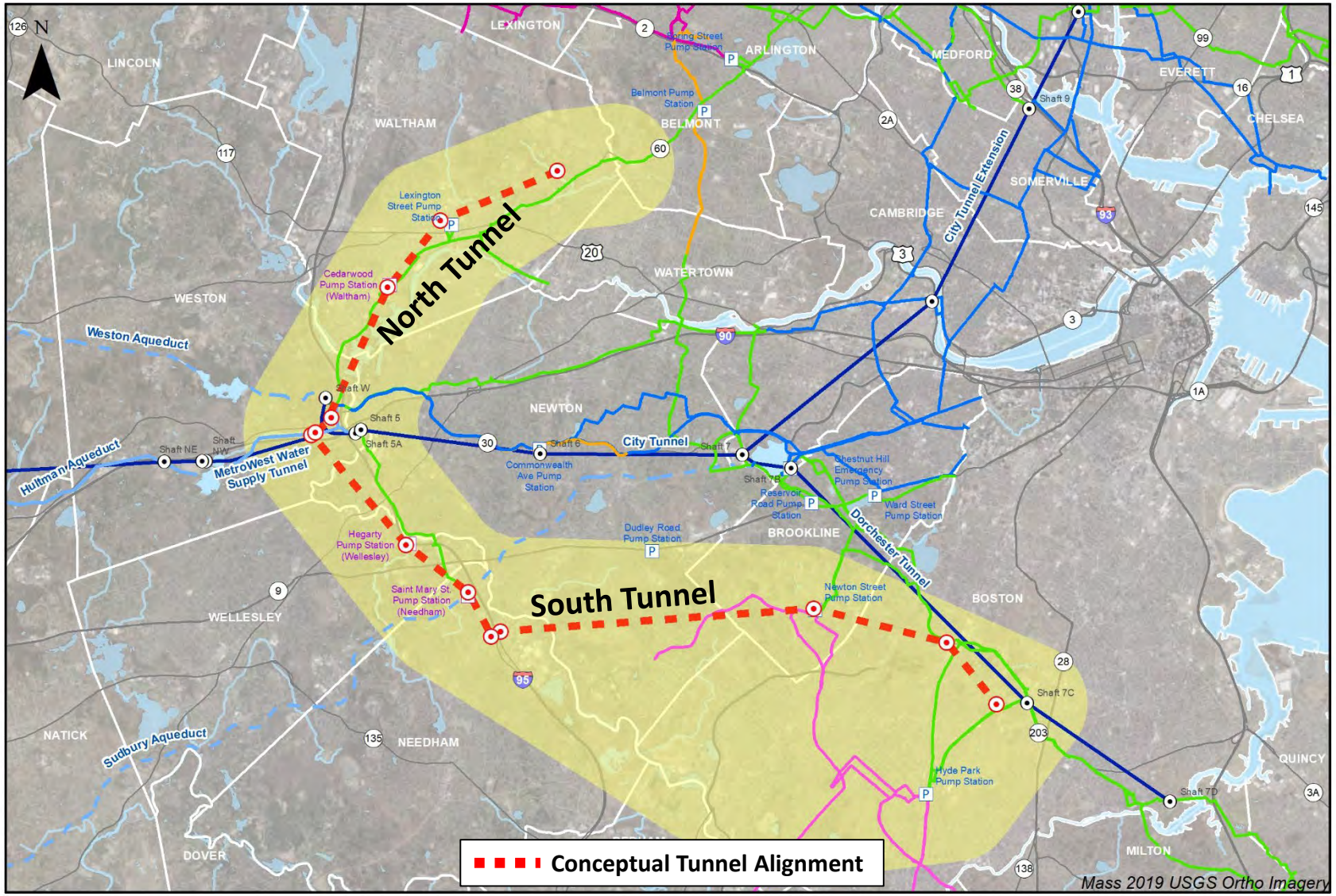
# Metropolitan Water Tunnel Program Goals

## Protect Public Health, Provide Sanitation and Fire Protection

- 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
- Result in no future boil orders!


# Metropolitan Water Tunnel Program

- ~14.5 miles of deep, hard rock, pressure tunnel
- Tunnels will begin in the Weston (I-90/I-95 vicinity)
- Northern Tunnel - ~4.5 miles, ends in Waltham/Belmont line
- Southern Tunnel - ~10 miles, ends in Mattapan near American Legion
- Six intermediate connections to existing water infrastructure
- ~8,850 ln ft of tunnel, ~350’ deep below Needham
- Construction anticipated between 2027 and 2040




For discussion only

# Metropolitan Water Tunnel Program

## Construction Shaft Sites

- Fernald Property, Waltham
- I90/I95 Interchange, Weston
- Highland Ave/I95 Interchange, Needham
- American Legion, Mattapan

## Connection Shaft Sites

- Lexington St Pump Station, Waltham
- Cedarwood Pump Station, Waltham
- Hegarty Pump Station, Wellesley
- St. Mary Street Pump Station, Needham
- Newton Street Pump Station, Brookline
- Southern Spine Mains, Boston

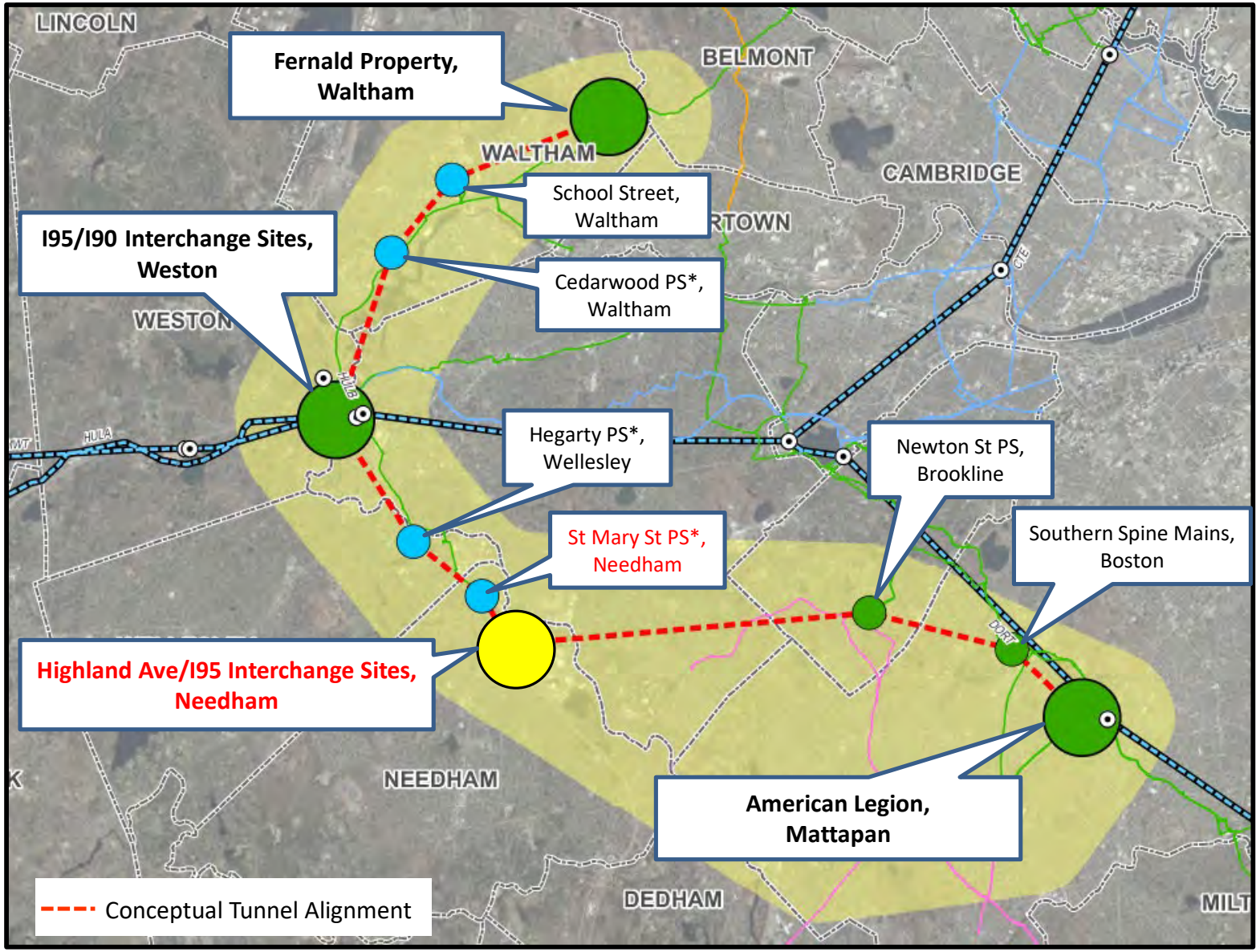
Final shaft locations subject to permits and real estate acquisition

* Non MWRA Pump Station

Required Connection (required for system redundancy)

Secondary Connection (provides local benefit)

Construction Shaft (no connection)




**For discussion only**

# Tunnel Program Schedule

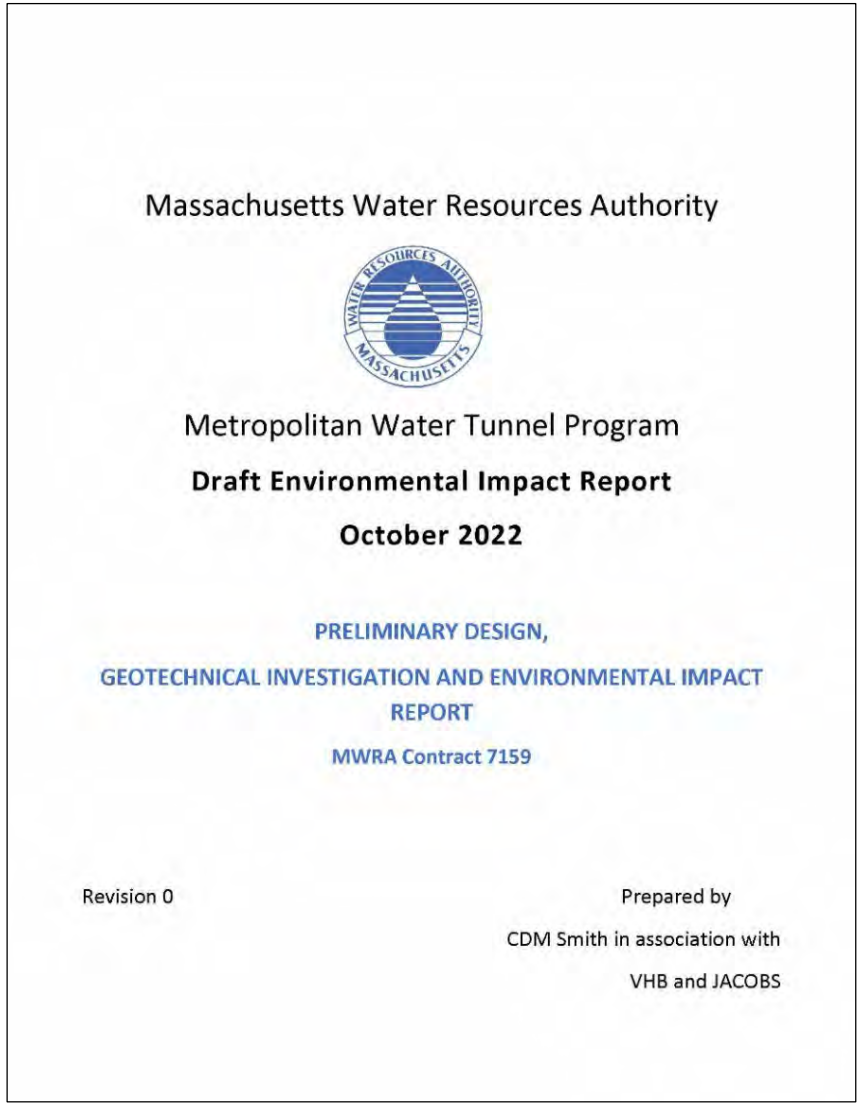
- Overall Program Schedule
  - Preliminary Design is ongoing thru early Jan 2024
  - Currently planning a large geotechnical investigation program to start in 2023
  - Targeting Final Design to start in mid 2024
  - Targeting first tunnel construction contract to bid in 2027
  - Program completion by 2040

- Preliminary Design Status
  - Evaluate tunnel alignment alternatives
  - Geotechnical investigations
  - Environmental Impact Reports
  - Preliminary Design Report
  - Establish contract packages
  - Refine Program cost and schedule

We are Here

# Draft Environmental Impact Report

- Submitted in October 2022
- Public comment period ends Dec 9, 2022
- Certificate will be issued on Dec 16, 2022
- Includes:
  - Alternatives evaluation process and results
  - Preferred Alternative + 2 backups
  - Details of proposed shaft sites (location, limits, purpose, duration, land needs, etc.)
  - Construction impacts at each site (traffic, noise, air quality, vibrations, water supply, wetlands impacts, etc.)
  - Proposed management of impacts (Section 61 Findings)
  - Stakeholder and community outreach
- www.mwra.com/mwtp/resources.html#docs


Massachusetts Water Resources Authority

Metropolitan Water Tunnel Program

**Draft Environmental Impact Report**

**October 2022**

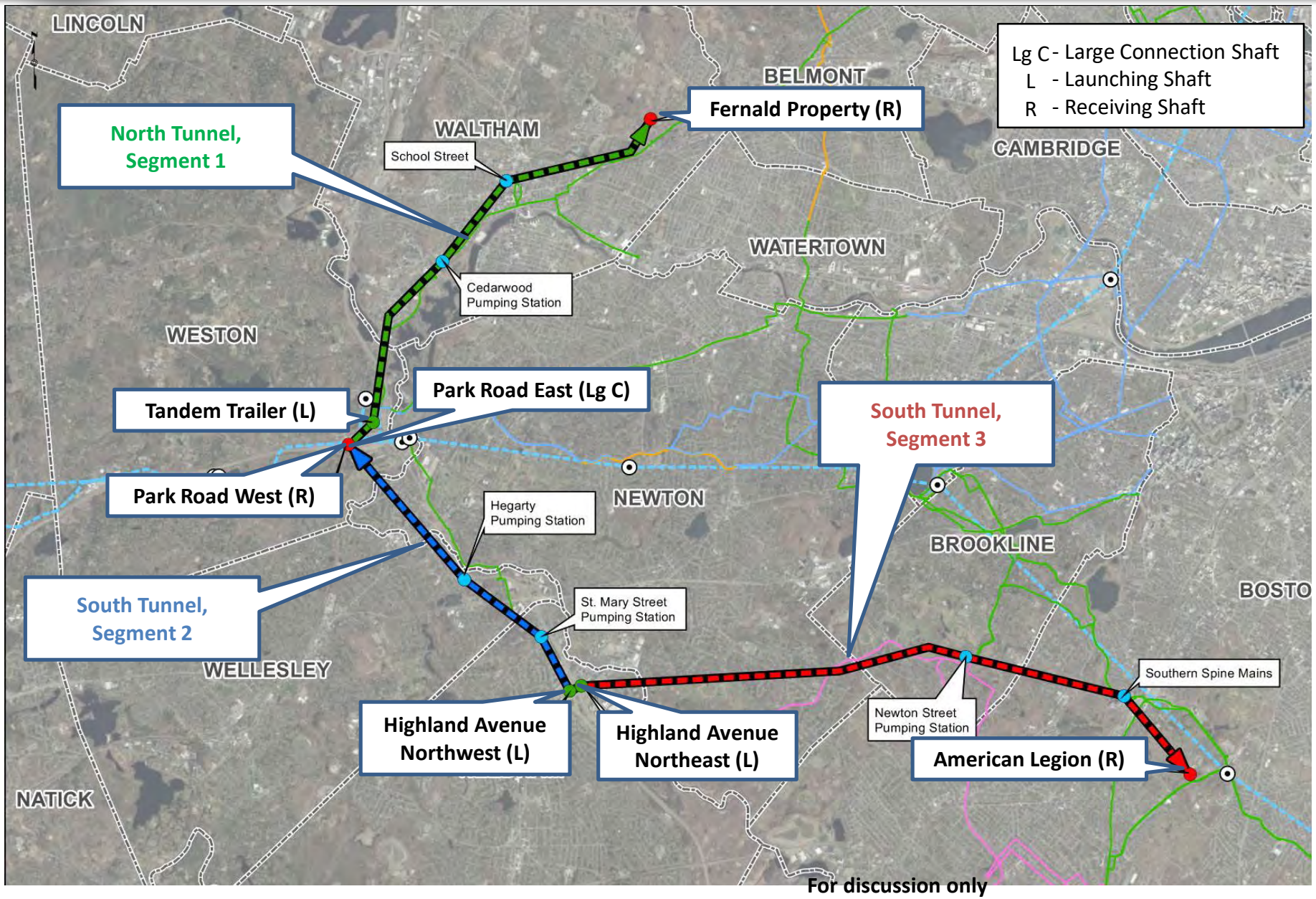
PRELIMINARY DESIGN,
GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL IMPACT REPORT

MWRA Contract 7159

Revision 0

Prepared by
CDM Smith in association with
VHB and JACOBS

# Preferred Alternative




**Preferred Alternative Includes:**

- 14.7 miles to deep rock tunnel
- 3 launching shaft sites
- 3 receiving shaft sites
- 1 large connection shaft site
- 6 connection shaft sites
- 3 tunnel segments
  - Segment 1 = tunnel from Weston (Tandem Trailer) ~4.5 miles to Waltham (Fernald Property)
  - Segment 2 = tunnel from Needham (Highland Ave NW) ~3.4 miles to Weston (Park Road W)
  - Segment 3 = tunnel from Needham (Highland Ave NE) ~6.8 miles to Mattapan (American Legion)
- Tunnel system will operate as 2 tunnels (North Tunnel & South Tunnel)

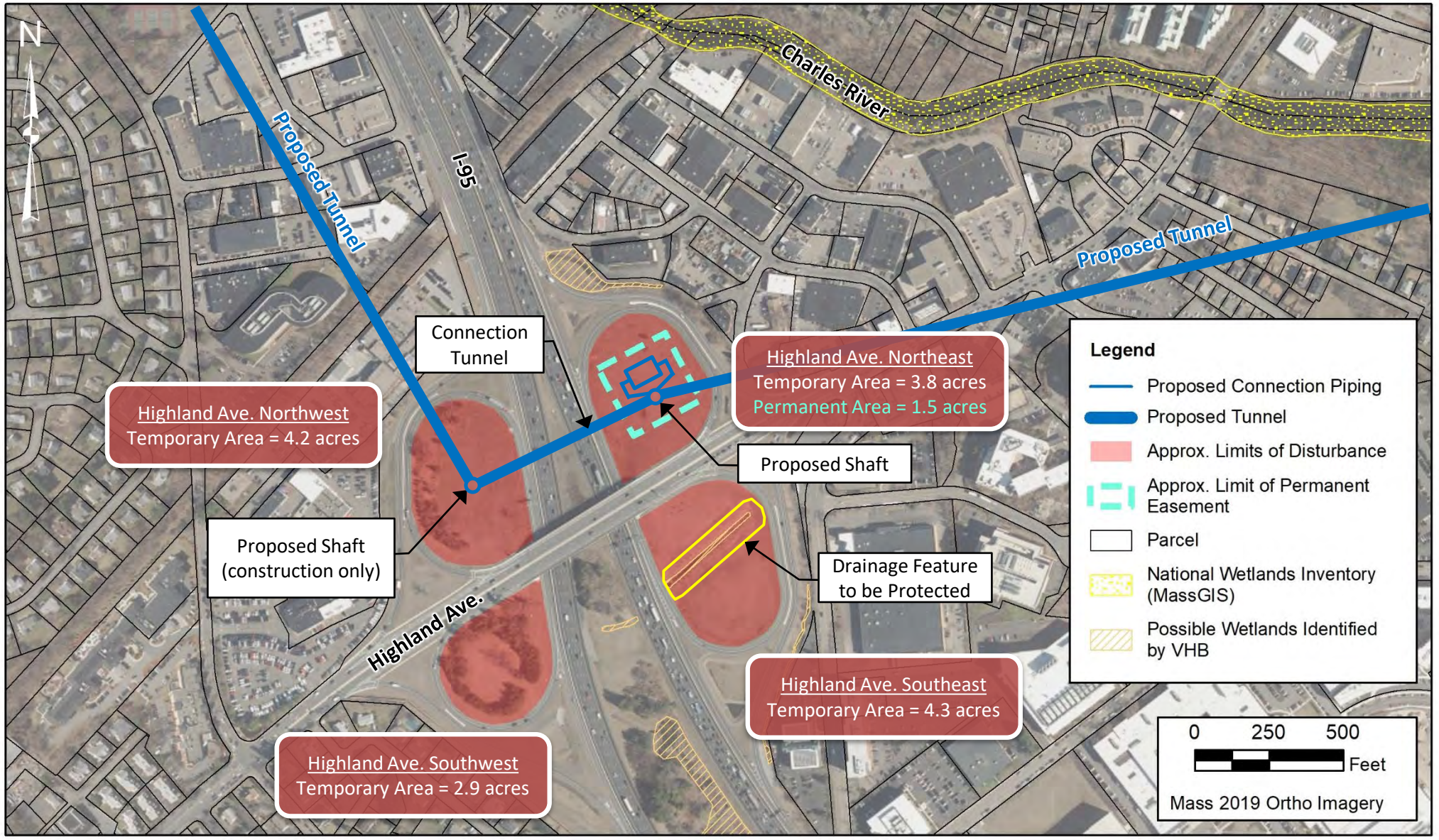
# Highland Avenue Northwest and Northeast – Shaft Sites

**Site Purpose:**

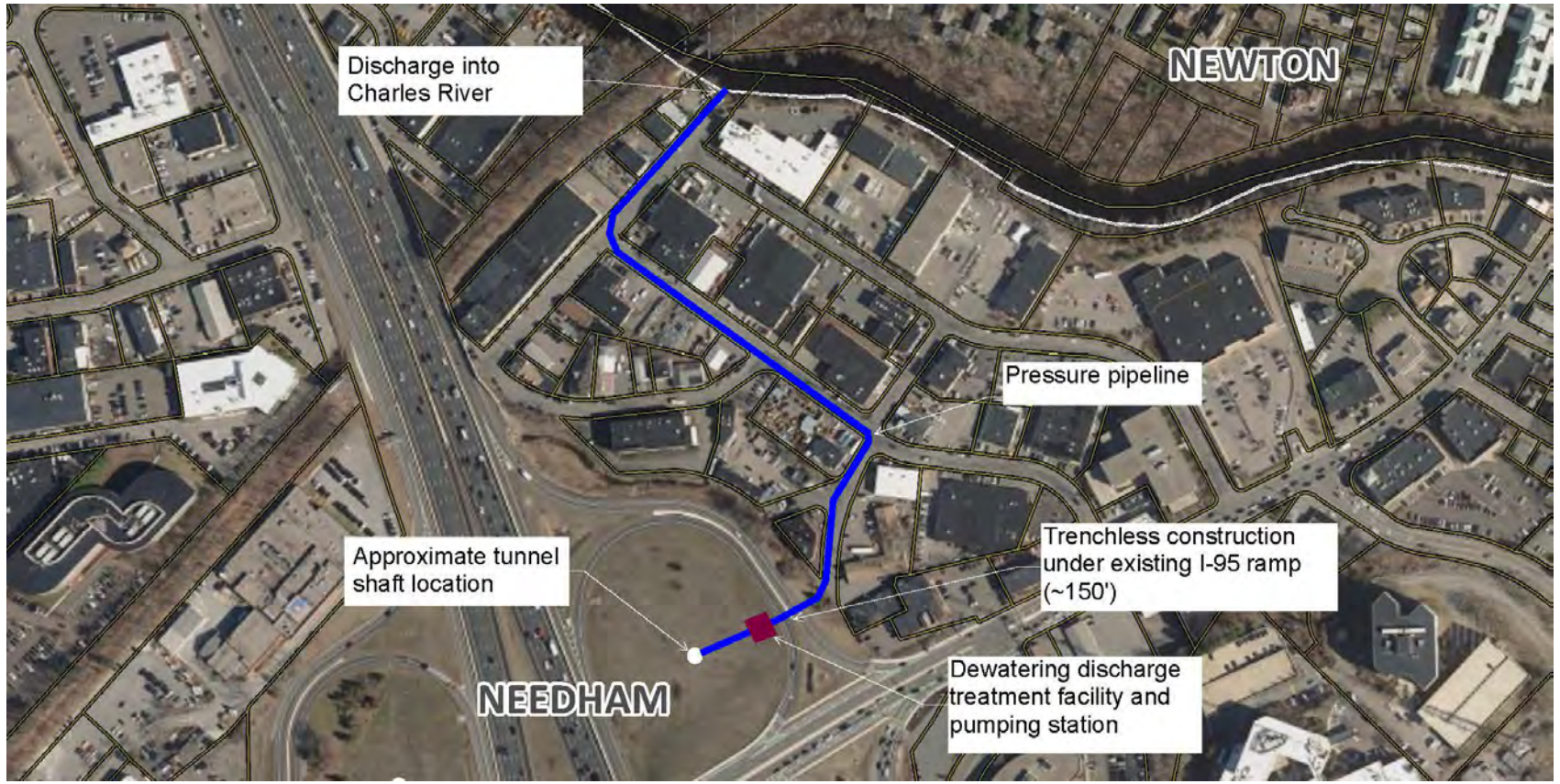
- Launch TBM from Northwest Cloverleaf to Weston
- Launch TBM from Northeast Cloverleaf to Mattapan
- Connector tunnel below I-95
- Dewatering pipeline to Charles River

**Site Characteristics:**

- Controlled by MassDOT
- Coordination is ongoing
- Previously used for construction staging



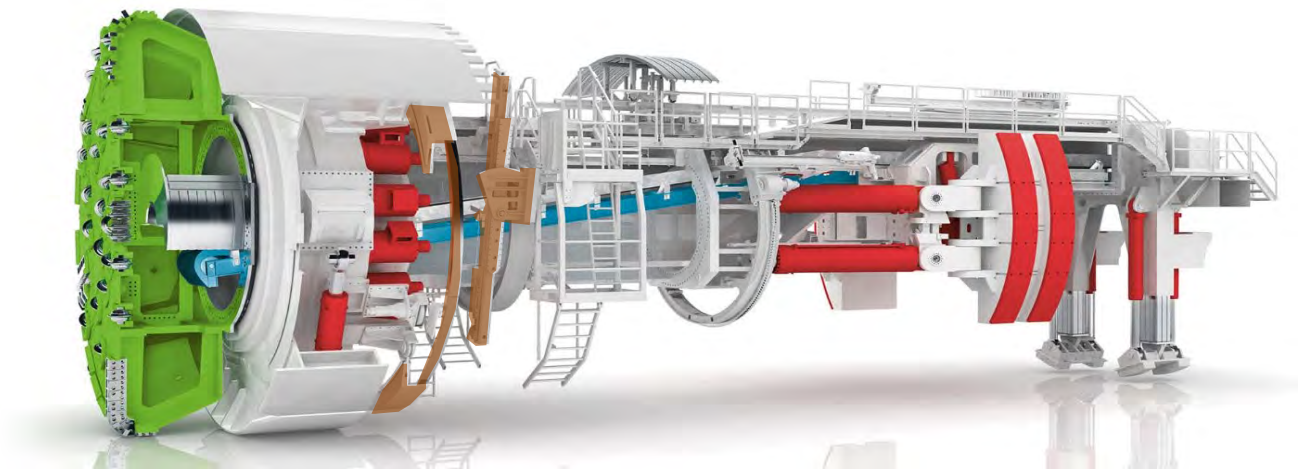
# Highland Ave - Dewatering Pipeline



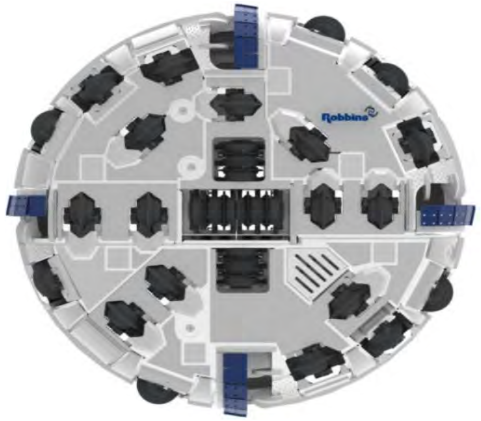

- New pipeline for construction dewatering and future unwatering of the tunnel
- Requires a short trenchless crossing of an I-95 Ramp
- New outfall to the Charles River

# TBM Power Supply

- The tunnel boring machines (TBMs) are powered by electricity
- There is not sufficient power supply in the Highland Ave area to support the Program
- MWRA is working with Eversource to bring a new power source to the shaft sites, route TBD
- This new power infrastructure will remain after the Program is complete

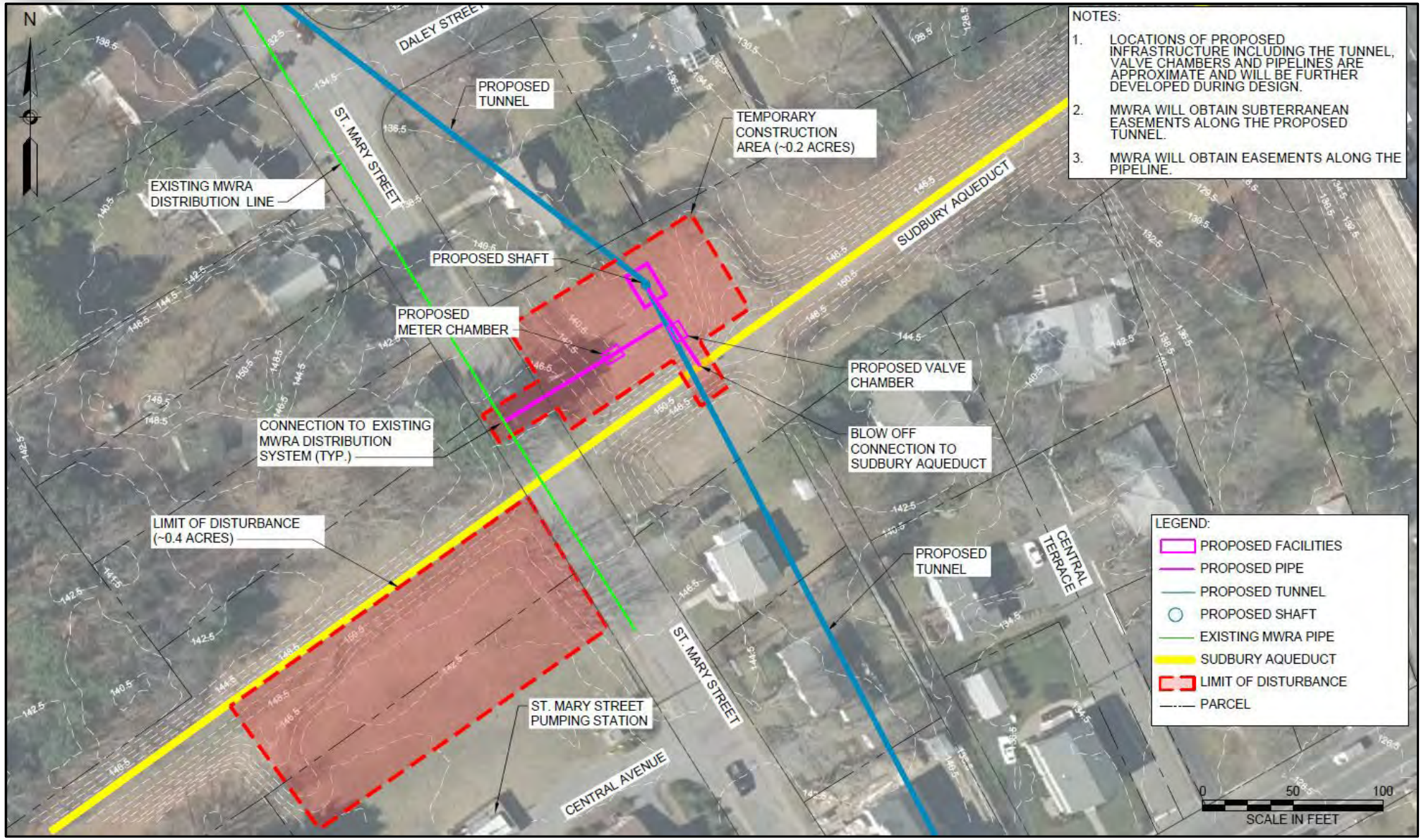


Source: www.herrenknecht.com



Source: www.robbins.com

# St Mary St Pumping Station – Connection Shaft



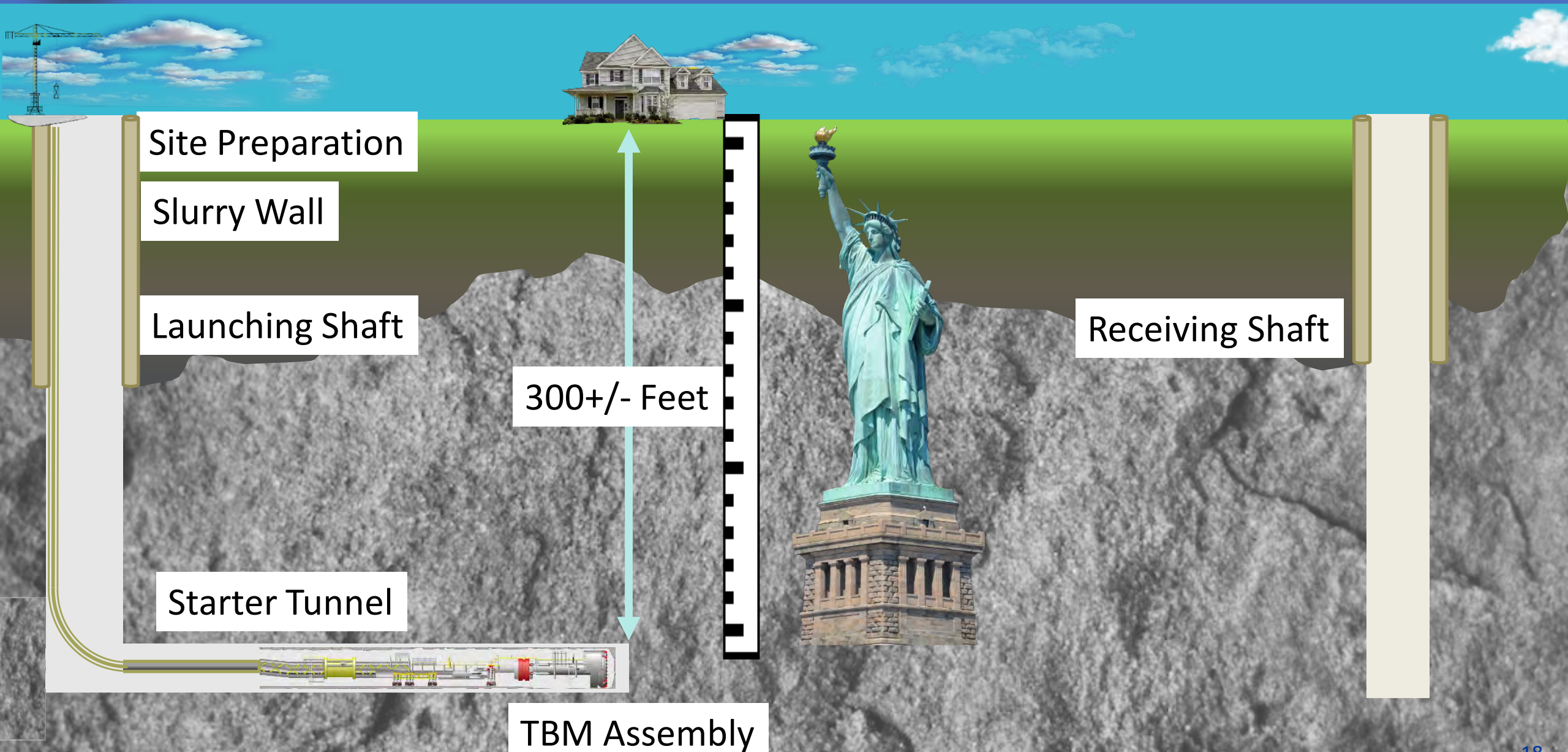

- Most work on MWRA property
- Some in road work

**For discussion only**

# What Happens at a Shaft Site During Construction

- Each shaft site has a specific function during construction
  - TBM launching (L) ⬅ Highland Avenue
  - TBM receiving (R)
  - Large connection (Lg C)
  - Connection (C) ⬅ St. Mary Street PS
- Activity is dependent on site function and phase of construction
- Most work occurs below ground
- Level of activity at the ground surface will vary to support work underground
- Some utility work will extend outside the shaft site limits
- Most notable above ground activity will be trucking

# Tunnel Sequence

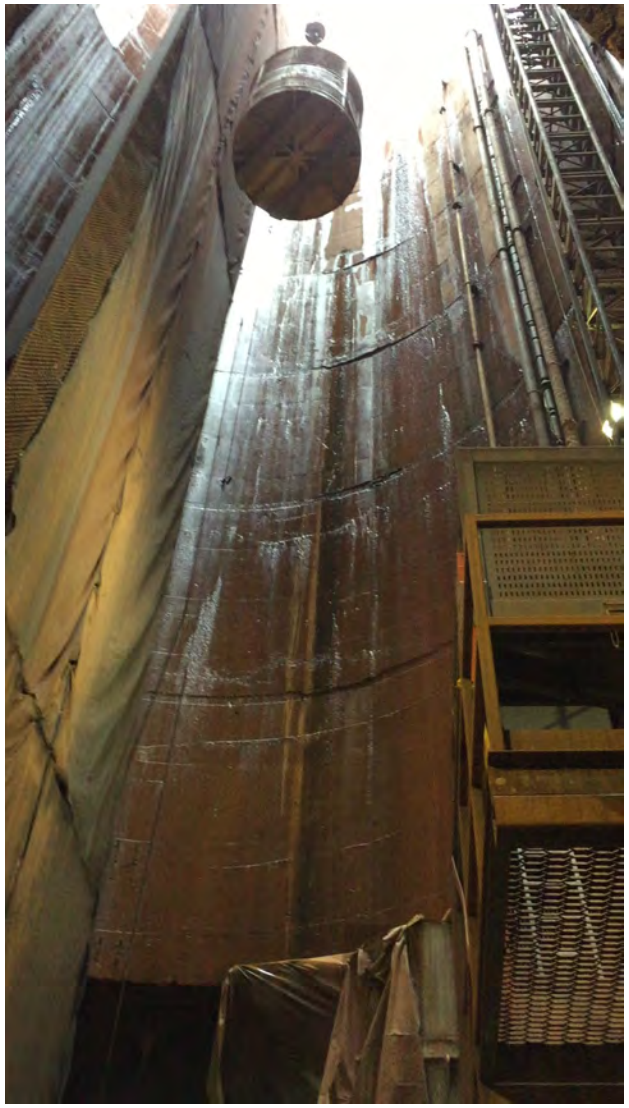


# Launch Shaft Site


MWWST Shaft 5A – During Construction

Shaft 5/5A – Post Construction

# Launching / Receiving Construction Shafts



- ~25’ – 40’ diameter
- ~250’ – 400’ deep
- Launching shaft is the only access to the tunnel until breakthrough into the receiving shaft

# Permanent Infrastructure – Construction Shaft

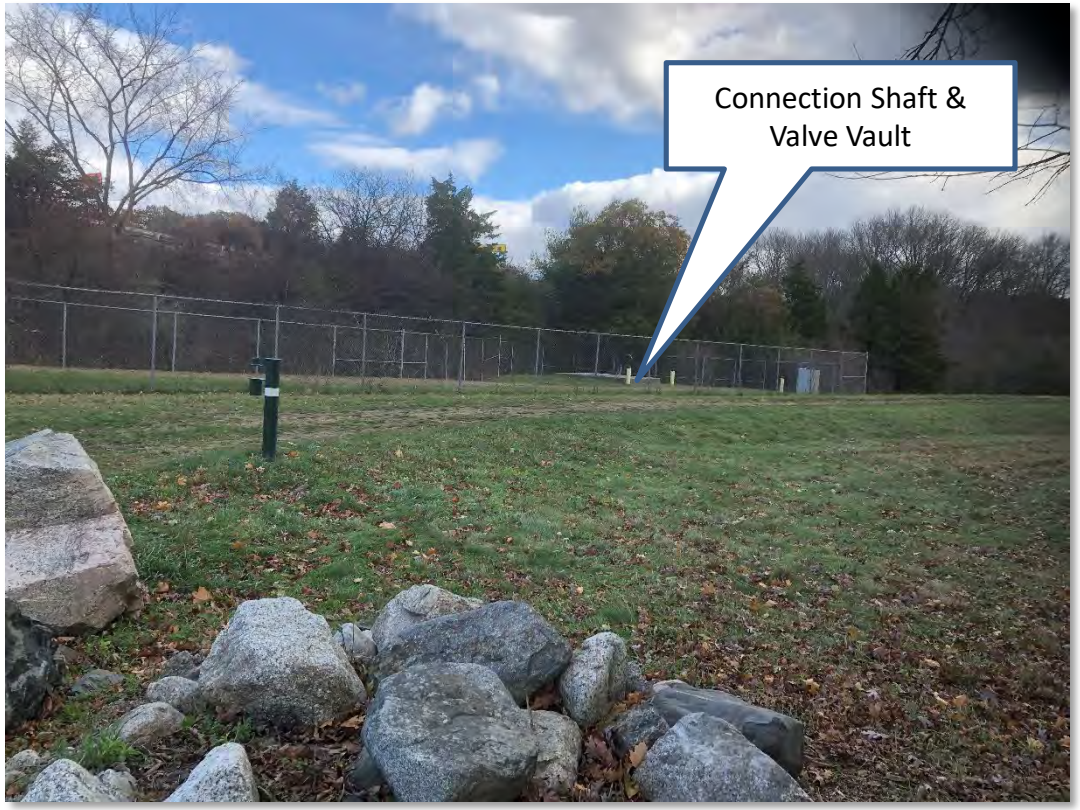
MWWST Shaft 5/5A

Infrastructure is mostly below grade

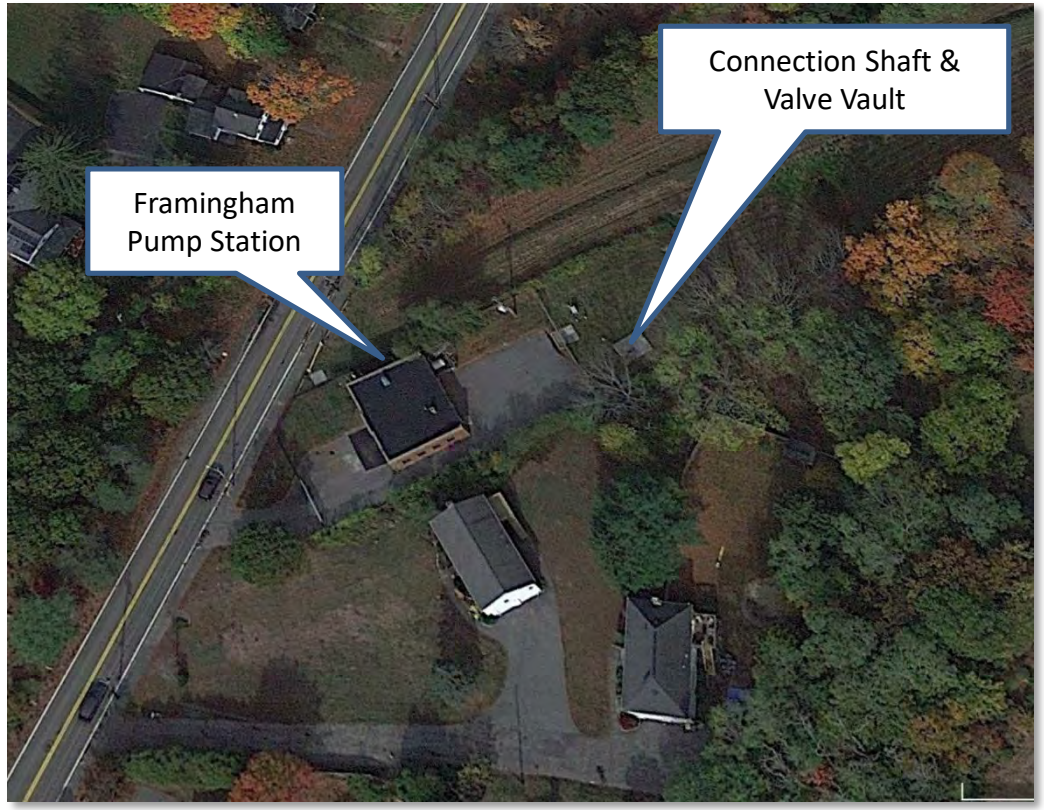
- Top of shaft structure (~2 ft above grade)
- Valve chamber (~2 ft above grade)
- Connection piping (all buried)

MWWST Shaft E

# Permanent Infrastructure – Connection Shaft




Wellesley St Riser Shaft, Weston




Edgell Rd Riser Shaft, Framingham

**Conceptual for discussion only**

# Potential Construction Impacts & Planned Management

- Construction activity (amount and duration) and potential impacts will vary between shaft sites based on function & phase of construction
- Not all tunnel segments & shaft sites will be active at the same time
- Some sites (i.e., connection shaft sites) will have least and infrequent activity
- Some sites (i.e., launching shaft sites) will have the most activity
- Potential impacts include
  - Traffic
  - Water supply
  - Noise and vibrations

# Traffic & Water Supply

- Traffic increases will be most noticeable near launching shaft sites at shift change
- Less traffic is expected near receiving shaft site and least near connection shaft sites
- Haul routes and hauling hours will be established, no exceptions
- Police details and flaggers will be used to keep everyone moving
- Wheel wash and street sweeping will help keep areas clean

- Tunnel construction will not impact the existing MWRA water tunnels
- There are no public water supply wells close to the new tunnel alignment
- Prior to construction any private wells near the tunnel alignment will be checked and monitored during construction
- During construction water levels along the tunnel alignment will be monitored
- The construction the contractor will limit groundwater inflow into the tunnel
- A water supply contingency plan will be put in place, just in case

# Noise & Vibrations

- Noise levels will vary by shaft site, function, and phase of construction
- Launch shaft site ~ 24/7 once TBM excavation begins
- Receiving shaft site – Mostly daytime work, some nighttime work
- Connection shaft site – Day time work, no night work planned
- Noise level criteria will be set & monitored during construction
- Permanent condition will not increase noise levels above existing
    - Construction methods will be adjusted to control vibrations
    - No blasting for connection shaft construction, use drilling methods
    - Rock removal for launch/receiving shafts will be done via controlled blasting
    - Max vibration criteria will be set & vibration monitoring will occur to protect nearby homes/businesses/infrastructure
    - Close coordination with local Fire Department, Emergency Personal, and MassDOT
- Additional details are presented in the DEIR, Chapter 7
- www.mwra.com/mwtp/resources.html#docs

# Community & Stakeholder Outreach

- Met with all 10 communities in the study area
- Established a Working Group with representative form each community – ongoing meetings
- Meetings with key communities in which the tunnel will be constructed:
  - Town Management, Public Works, Public Safety/Fire Dept, Con-Com, etc.
- Met with key stakeholders:
  - EEA, MassDOT, DCR, DPH, DYS, and DCAMM
- Outreach will continue throughout design and construction

# Where to Find Information / How to Contact Us

- https://www.mwra.com/mwtp.html
  - Program documents (ENF, DEIR)
  - Meeting notices, agendas, presentations, minutes

- Contact Us
  - Carmine DeMaria, Community Relations Coordinator
  - 617-305-5725
  - Carmine.DeMaria@mwra.com
  - Tunnels.info@mwra.com

# Questions / Comments?

Thank you for your support!