

STAFF SUMMARY


TO: Board of Directors
FROM: Frederick A. Laskey, Executive Director
DATE: September 14, 2022
SUBJECT: Metropolitan Water Tunnel Program Update



COMMITTEE: Water Policy and Oversight

X INFORMATION
 VOTE

Paul V. Savard, P.E., Director, Design and Construction
Preparer/Title


Kathleen M. Murtagh, P.E.
Director, Tunnel Redundancy

RECOMMENDATION:

For information only.

DISCUSSION:

This staff summary provides an update on the following ongoing activities for the Metropolitan Water Tunnel Program:

- Evaluation of Alternatives;
- Preferred Alternative Selection;
- DEIR Submittal / Draft Section 61 Findings;
- Preliminary Design; and
- Community and Stakeholder Outreach.

Staff will provide future updates to the Board at key milestones during the remainder of the Preliminary Design phase of the Program, such as completion of the Final Environmental Impact Report, completion of the Preliminary Design Report and Program cost estimate and schedule. Staff will also provide updates to the Board throughout later phases of the Program, including Final Design.

On February 15, 2017, the Board approved staff’s preferred alternative of construction of northern and southern deep rock tunnels from the Hultman Aqueduct and MetroWest Water Supply Tunnel to the Weston Aqueduct Supply Main No. 3 (WASM 3) and to the Southern Spine water mains. These two tunnels will provide the needed redundancy for the Metropolitan Tunnel System (City Tunnel, City Tunnel Extension and Dorchester Tunnel.) The Board also directed staff to proceed with preliminary design, geotechnical investigations and Massachusetts Environmental Policy Act (MEPA) review of the project. The MEPA review process is designed to provide meaningful opportunities for public review of potential environmental impacts of certain projects for which certain actions by state agencies are required. The ultimate goal is to use all feasible measures to avoid, minimize, and mitigate damage to the environment that may be associated with the Program.

On May 27, 2020, the Board approved the award of Contract 7159, Metropolitan Tunnel Redundancy Program Preliminary Design, Geotechnical Investigation and Environmental Impact Report to CDM Smith, Inc. This contract includes preliminary geotechnical investigation (deep rock borings),

evaluation of preliminary tunnel alignment and shaft site alternatives, preliminary design, preliminary contract packaging, preparation of the required MEPA filings and development of a comprehensive list of the environmental permits needed.

Evaluation of Alternatives / Preferred Alternative

The primary goal of the Program is to protect public health and water service in line with the mission of the Authority. In support of this goal, the Program is intended to:

- provide 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 the existing tunnel system year-round;
- provide uninterrupted water service in the event of an emergency shutdown;
- meet high day demand flow with no seasonal restrictions;
- avoid activation of emergency reservoirs;
- meet customer expectations for excellent water quality;
- preserve sustainable and predictable rates at the water utility level;
- be constructible; and
- avoid boil water orders.

Staff submitted an Environmental Notification Form (ENF) to the MEPA Office for public comment in March 2021. The ENF included an Alternatives Screening Report that documented the comparison and selection of the preferred two-tunnel concept to other surface pipe and tunnel alternatives. The Secretary of Energy and Environmental Affairs (EEA) issued a certificate on the ENF that requires the submittal of a mandatory Draft Environmental Impact Report (DEIR). The DEIR is to include an alternatives evaluation which would advance the Alternatives Screening Report that was included in the ENF and presented the preferred two-tunnel concept, as well as the study area for identifying and evaluating potential tunnel shaft sites and tunnel alignment alternatives (Refer to Figure 1).

Staff evaluated over 30 potential shaft sites within the study area. Each shaft site was considered for its potential to be used for a specific function during construction as either a Tunnel Boring Machine (TBM) launching, TBM receiving, or intermediate connection shaft. Shafts and their functions were then connected by tunnel segments (tunnel alignment between shaft sites) to comprise one alternative (a north tunnel and a south tunnel system) that together meets the Program goals for full system redundancy. The process to select shaft sites prioritized avoiding direct impacts to resource areas and sensitive receptors to the greatest extent practicable while also confirming the selected shaft sites would be constructible and meet MWRA operations requirements.

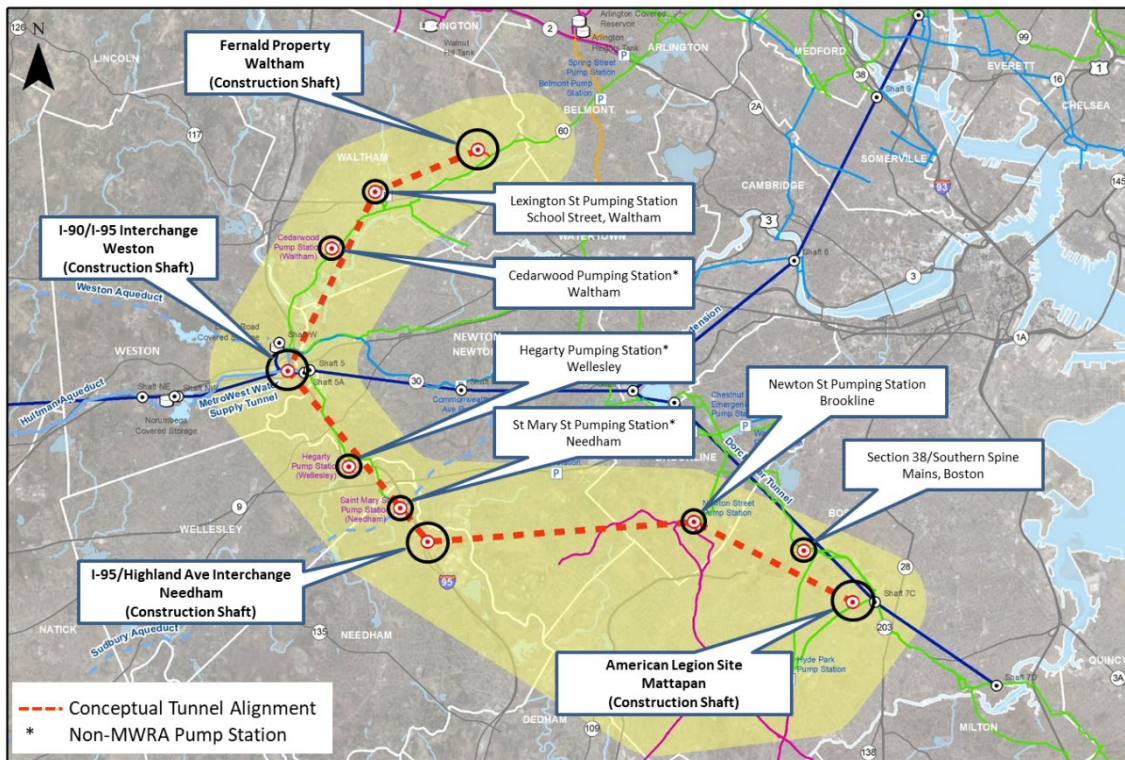


Figure 1 - Conceptual North and South Tunnel Alignment

Following an initial screening, staff narrowed down to ten tunnel alternatives based on a set of evaluation criteria. Consistent application of the evaluation criteria to the ten alternatives led to the selection of three alternatives that will proceed into the DEIR. The evaluation criteria included:

- Constructability/Engineering;
- Land Availability;
- Environmental;
- Social/Community;
- Operations;
- Cost; and
- Schedule.

The top selected alternatives were Alternative 3, Alternative 4, and Alternative 10. (Please refer to Figures 2 through 4 for the three DEIR Alternatives.) For all three selected alternatives, the tunnels will originate in the vicinity of the Interstate I-90/I-95 (I-90/I-95) Interchange in Weston where they will connect to the Hultman Aqueduct.

The North Tunnel will include a completed tunnel from the I-90/I-95 Interchange to the Fernald Property in Waltham (Segment 1) and connect to WASM 3. The South Tunnel will include a completed tunnel that can be isolated in two segments: from the I-90/I-95 Interchange to the Highland Avenue/I-95 interchange in Needham (Segment 2) and from there to the American Legion site in Mattapan (Segment 3) near Shaft 7C of the Dorchester Tunnel.

Primary distinguishing factors between the three DEIR Alternatives relate to how the shaft sites are used to construct the tunnels, direction of mining, and tunnel segment length. Operation of the tunnels would be the same for all three alternatives once construction is completed.

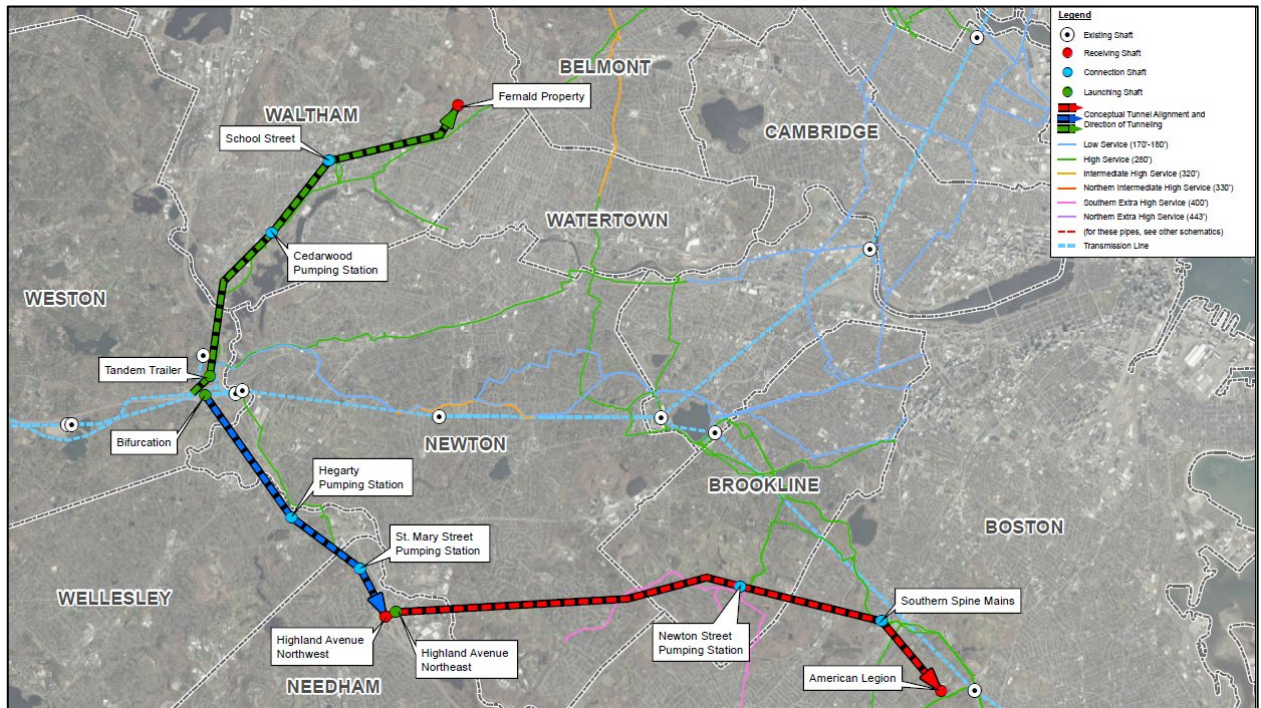


Figure 2 - Alternative 3 Tunnel Alignment

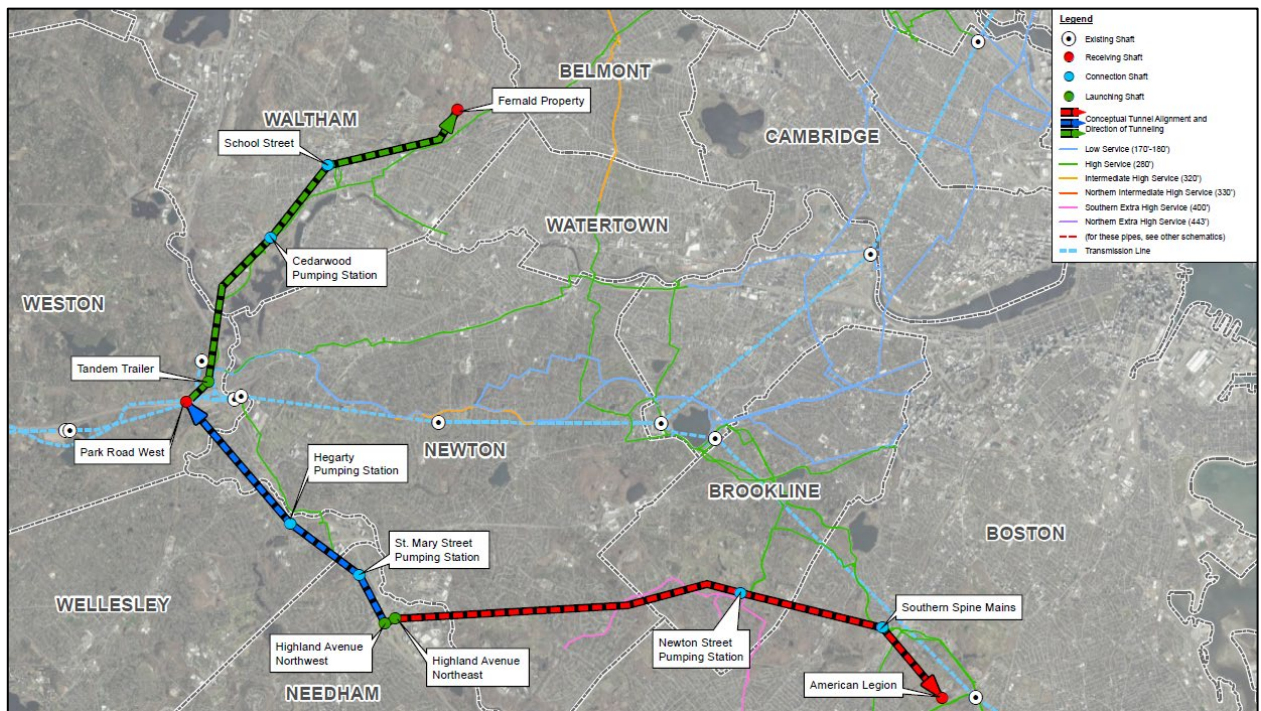


Figure 3 - Alternative 4 Tunnel Alignment

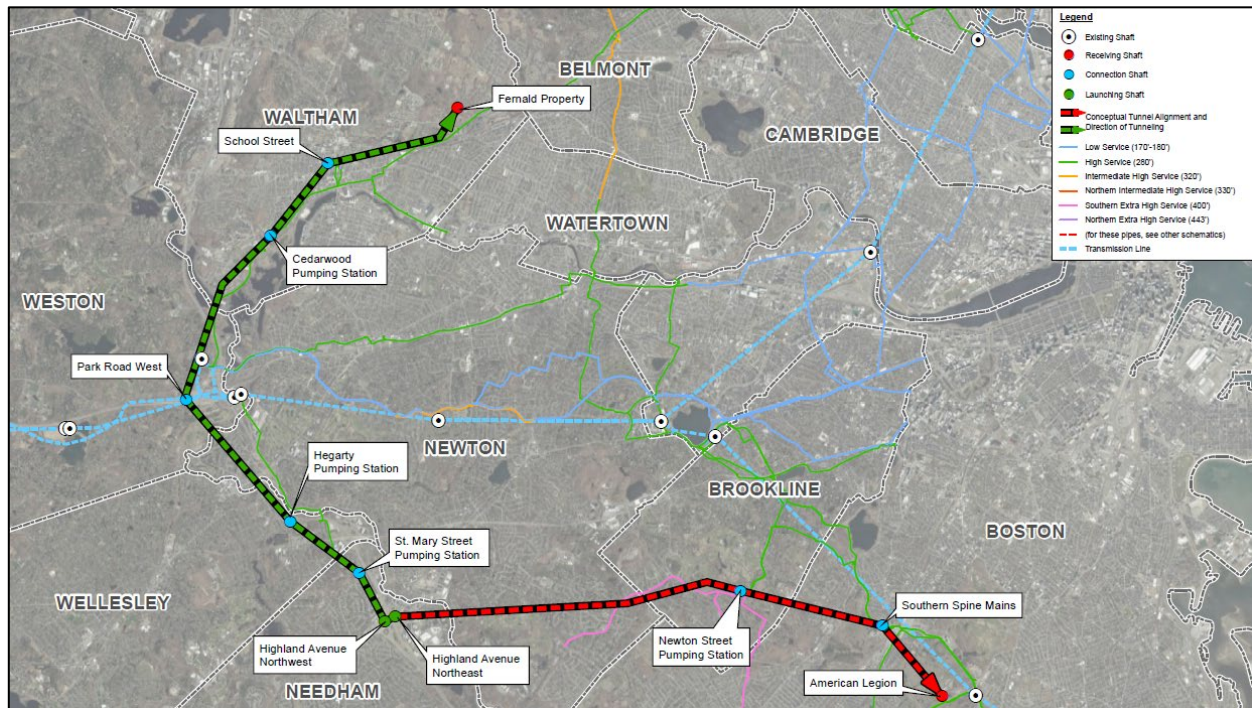


Figure 4 - Alternative 10 Tunnel Alignment

The intermediate connection points are common to all three DEIR Alternatives. For the North Tunnel, there are two intermediate connection points, both in Waltham: MWRA’s Lexington Street Pumping Station; and Waltham’s Cedarwood Pumping Station.

For the South Tunnel, there are four intermediate connection points: Hegarty Pumping Station in Wellesley; St. Mary Street Pumping Station in Needham; MWRA’s Newton Street Pumping Station in Brookline; and MWRA’s Section 38 and the Southern Spine Mains in Boston.

DEIR Submittal / Draft Section 61 Findings

The preferred alternative (Alternative 4) along with the two backup alternatives (Alternatives 3 and 10) were evaluated for the DEIR. The backup alternatives are included in the event MWRA determines the preferred alternative or its component(s) no longer effectively meet the Program’s goals. Only the preferred alternative will advance into preliminary design.

The DEIR includes information on the following topics for the three DEIR Alternatives:

- Project Description and Permitting;
- Public Outreach/Environmental Justice;
- Alternatives Analysis;
- Land Alteration, Open Space, Wetlands, Rare Species Habitat, Cultural and Historical Resources;
- Water Management Act/Water Supply;
- Climate Change (adaption and resiliency, greenhouse gas emissions);
- Construction Period; and
- Responses to ENF Comments.

All three DEIR Alternatives provide the required hydraulic, redundancy, and operational features to meet the Program goals. Additionally, all have very similar environmental impact considerations for land alteration, open space, wetlands, rare species habitat, water management act, and climate change, for both the construction period and for the build condition. They also have very similar social/community impact considerations for cultural resources, community impacts, traffic, air, and noise for both the construction period and for the build condition. The results of the DEIR show that, overall, each alternative has limited impact in these areas and the DEIR identifies what can be done to minimize or mitigate the impacts that do occur.

Alternative 4 was selected as the preferred alternative in large part because it provides the most flexibility for construction and shortest overall construction schedule. Because each alternative is very similar in length of tunnel and number of shafts, the cost differences between the three alternatives was not a distinguishing factor. Selection of Alternative 4 as the preferred alternative is supported by the Program's Expert Review Panel.

The DEIR also includes Mitigation and Draft Section 61 Findings, as required by MEPA, that:

- demonstrate MWRA consulted with the MEPA Office prior to filing the DEIR for guidance on the analyses of impacts and mitigation measures appropriate for the level of Program information to be provided;
- summarize all proposed mitigation measures, including construction-period measures;
- include draft Section 61 Findings for each permit to be issued by state agencies; and
- contain clear commitments to implement these mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation, and provide a schedule for implementation.

The DEIR is scheduled to be completed and submitted to the MEPA office in fall 2022. This is followed by a two-week period at the end of which the DEIR is noticed in the Environmental Monitor. The regulatory comment period is 30 days, although MEPA may provide an extension to this time, if requested. Hard copies of the DEIR will be provided to the libraries in the communities affected and it will be posted on MWRA's website. It is anticipated that the Secretary would issue a certificate along with public comments received that MWRA will need to fulfill and then file the Final EIR, which is expected to be completed in late summer 2023.

Staff are tailoring outreach to Environmental Justice communities throughout the Program to facilitate involvement in the environmental review process. The Program Team identified Environmental Justice communities within the Program Study Area and is utilizing a combination of methods to enable full participation in the environmental review process. These methods include wide dissemination and translation into relevant language of a written project summary and fact sheets for key topics such as traffic and noise/vibration, use of non-English and/or community-specific media outlets to publicize the project, including local newspapers, and hosting a project website. MWRA will provide translators for public information sessions as requested by the community.

Preliminary Design

Preliminary design of the tunnel system and surface connections has been initiated. Many aspects of the design underway are common to all three DEIR Alternatives and include geotechnical investigations, hydraulic analysis, topographic survey, shaft site design, surface piping connections, and the tunnel alignment (horizontal and vertical) between shafts. Analysis of shaft and tunneling methods and design (initial support and final liner), TBM type and capabilities,

groundwater control, ground water discharge, excavated material disposal, easement research, and tunnel disinfection, start up, and operations planning are ongoing. A draft Preliminary Design (reports and drawings) is scheduled to be completed in early 2023 with the final Preliminary Design completed in January 2024. An updated Program cost estimate and schedule will be completed toward the end of preliminary design.

The Program's Expert Review Panel (ERP) will continue to be engaged throughout this phase of the Program. ERP workshops on topics including contract packaging and value engineering of the preliminary design are planned over the next several months.

Community and Stakeholder Outreach

As the MEPA process and preliminary design have progressed, staff have simultaneously implemented a communication plan to ensure that communities and stakeholders are informed as to the importance of this effort and what can be expected in the years ahead. Staff have contacted all ten communities within the Program Study Area and have formed a working group, which includes representatives of each of the ten communities, the MWRA Advisory Board, the Water Supply Citizens Advisory Committee and the Metropolitan Area Planning Council. These working group members participate in regular meetings with the Program Team to be kept informed on progress, and provide input on certain elements of the Program. The goals of the working group meetings are to provide a collaborative and transparent process for evaluating alternatives and yield more informed comments during the MEPA process. The working group has met five times since it was formed in April 2021. Staff are holding additional meetings with community representatives of the seven communities in which the tunnel will be constructed.

The development of the preliminary design and environmental impact reports required substantial amounts of coordination with environmental regulatory agencies in order to ensure the data and documentation generated result in a robust alternatives analysis in the MEPA process. Staff have already met several times with members of the Massachusetts Department of Environmental Protection (representatives of Wetlands and Waterways, Chapter 91 licensing, Water Management Act) and the MEPA Office. These pre-filing meetings presented the proposed Program and provided an opportunity to discuss the environmental findings being described in the DEIR and the regulatory process that will be followed during design to obtain the necessary permits and approvals for construction. This ongoing interaction with regulators will give MWRA staff the opportunity to address comments and concerns raised by agencies in the environmental review and permitting phases.

MEPA requires that the DEIR delineate and describe existing land ownership and identify acquisitions and easements that may be required for the Program. Staff met with key stakeholders of the selected shaft sites, including the City of Waltham, MassDOT, the Town of Wellesley, DPH, and DCR to identify the land needed for construction and operation of the tunnels. All property stakeholders have been supportive of the Program. Discussions with other property owners have been equally effective. As the design proceeds, staff will present property acquisition needs to the Board for consideration.

BUDGET/FISCAL IMPACTS:

The FY23 CIP includes \$1.6 billion for the Metropolitan Tunnel Redundancy Program. This budget will be refined at the completion of Preliminary Design.



*Metropolitan Water Tunnel Program
Program Update*

September 14, 2022



Program Update

- Evaluation of Alternatives
- Preferred Alternative
- DEIR Submittal / Draft Section 61 Findings
- Preliminary Design
- Community and Stakeholder Outreach

- Program Schedule
 - Currently in preliminary design – through January 2024
 - Begin final design in 2024
 - Targeting first tunnel segment construction to start in 2027



Key Locations

Construction Shaft Sites

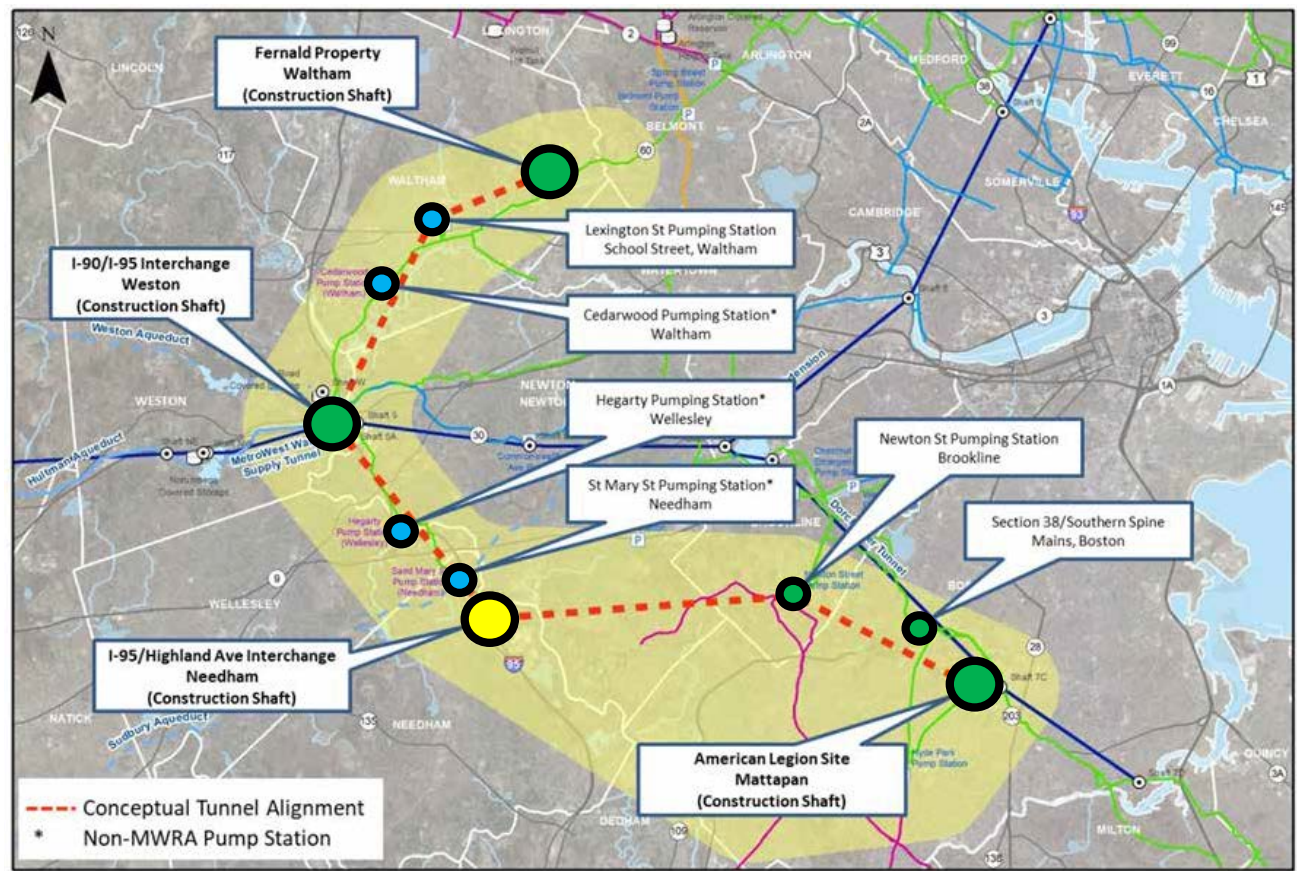
- Fernald Property, Waltham
- I90/I95 Interchange, Weston
- Highland Ave/I95 Interchange, Needham
- American Legion, Mattapan

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

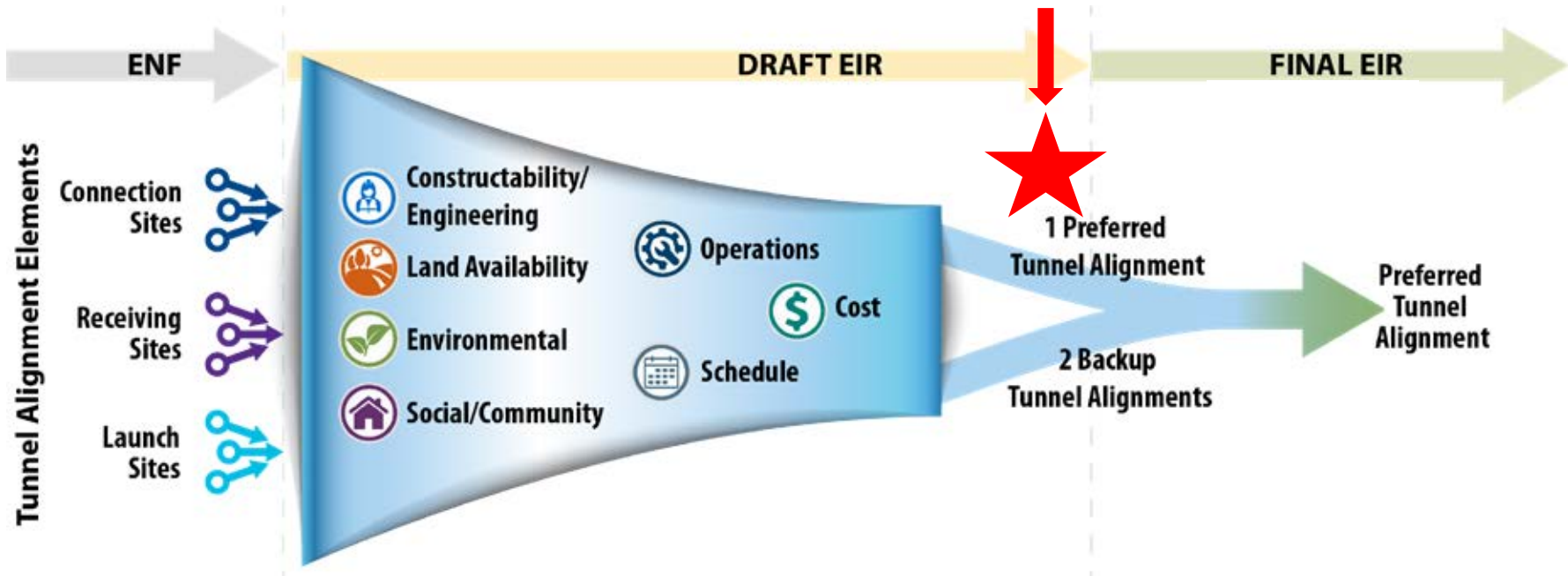
Final shaft locations subject to permits and real estate acquisition

- * Non MWRA Pump Station
- Required Connection (required for system redundancy)
- Secondary Connection (provides local benefit)
- Construction Shaft (no connection)



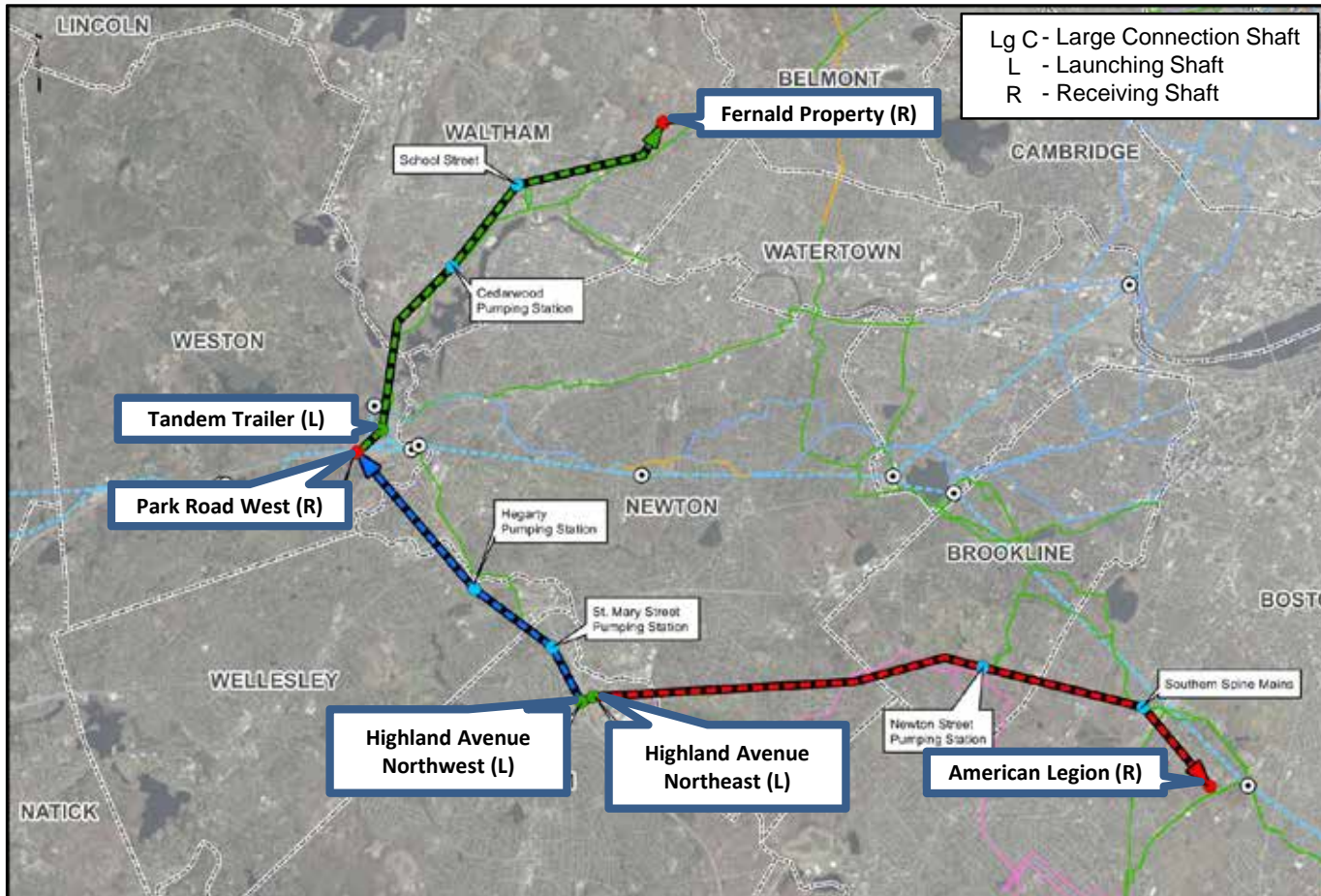


Alternatives Evaluation Process





Alternative 4 – Preferred

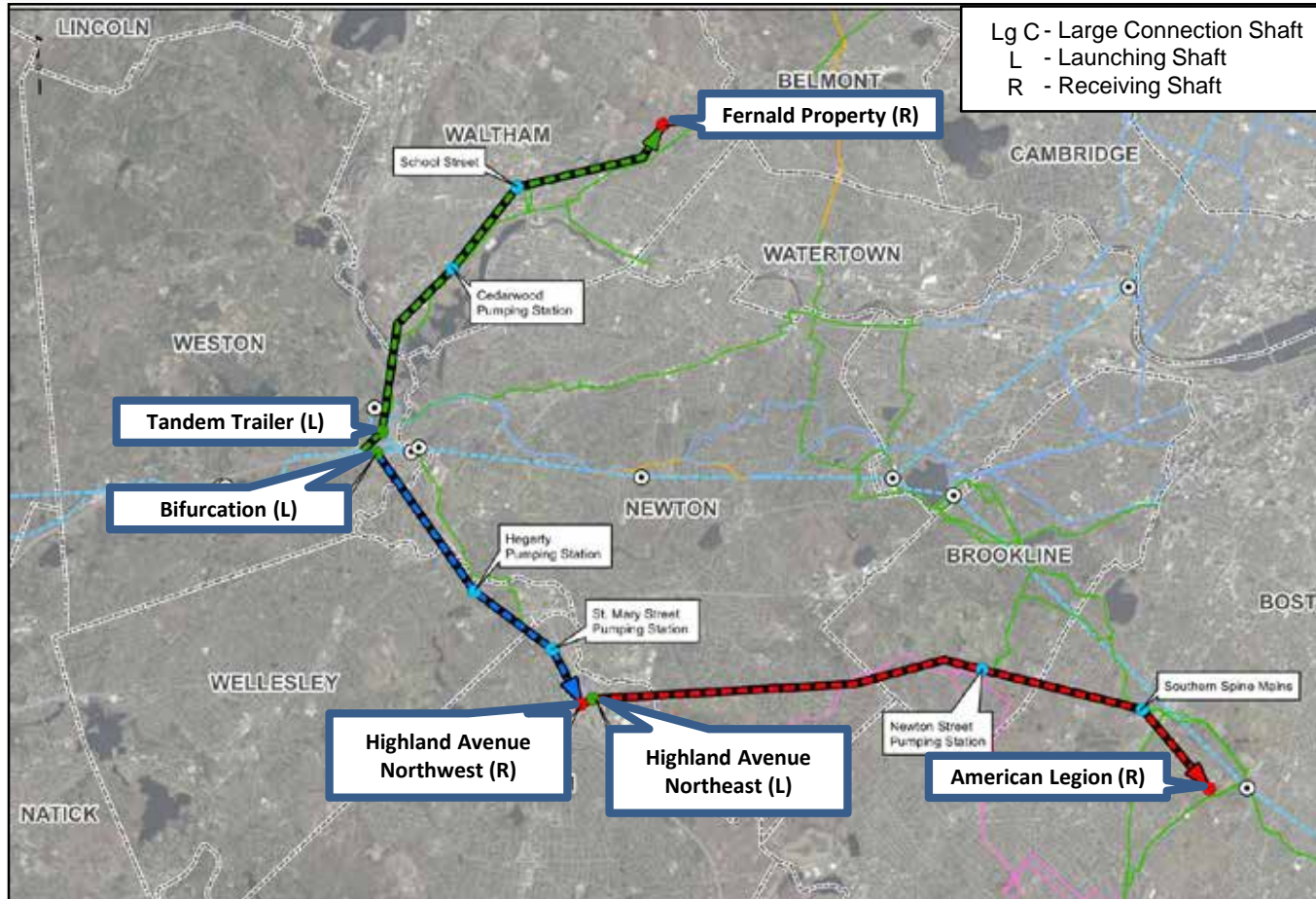


- Use of Tandem Trailer Parcel after completion of future MassDOT bridge construction

- Shares Tandem Trailer parcel
- Substantially mitigates impact from MassDOT bridge project
- Highland Ave splits southern tunnel into shorter tunnel segments
- Provides additional security by separating Hultman connections
- Contract packaging flexibility (2 or 3 packages)
- Earliest opportunity to put either north or south tunnel “in service”



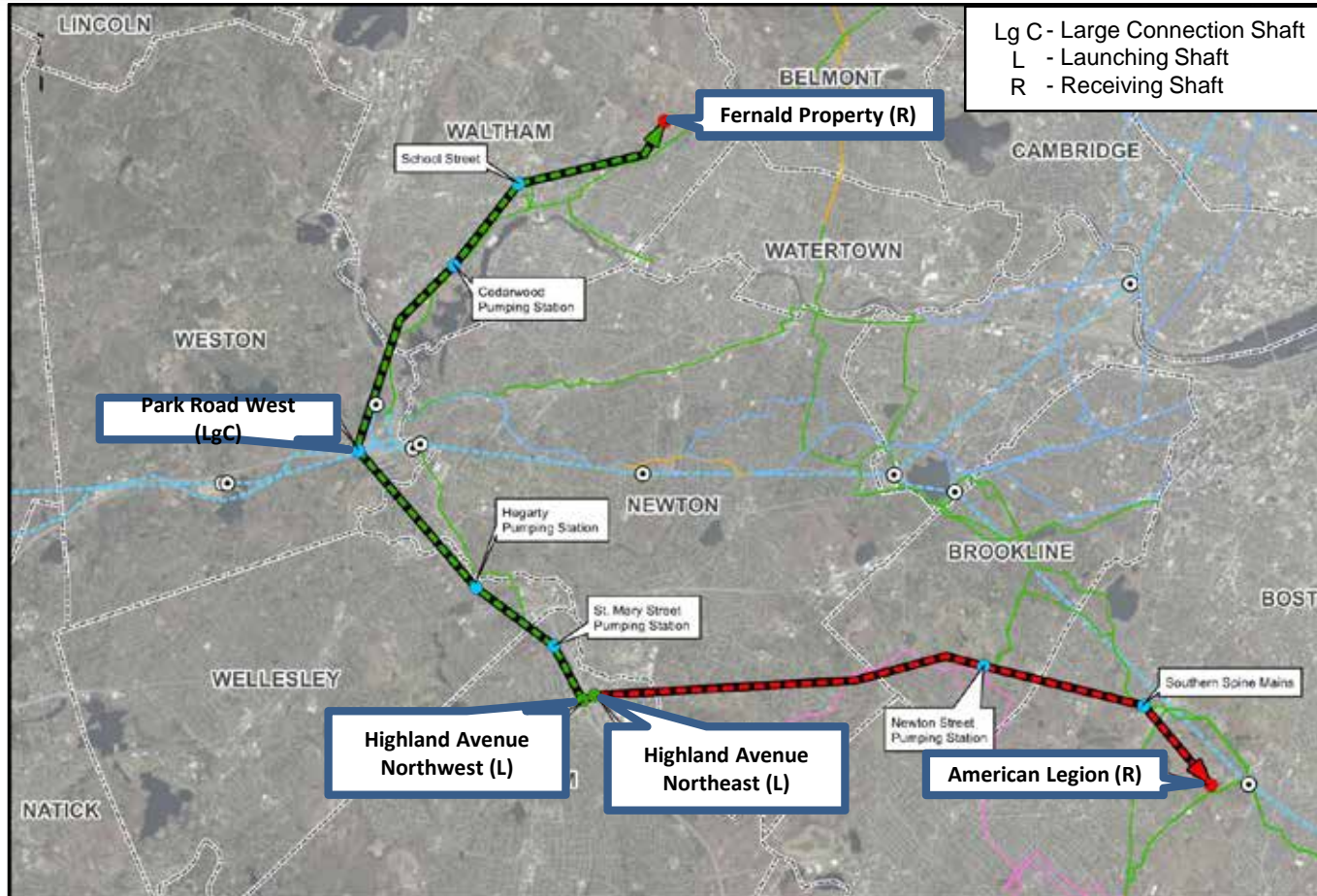
Alternative 3 - Backup



- Use of Tandem Trailer Parcel after completion of future MassDOT bridge construction
 - Heavily relies on MassDOT I-90/I-95 sites for two launching shaft sites
 - Includes three launch sites, which complicates contract packaging
-
- Shares Tandem Trailer parcel
 - Highland Ave splits southern tunnel into shorter tunnel segments
 - Provides additional security by separating Hultman connections
 - Earliest opportunity to put either north or south tunnel "in service" (tied with Alt 4)



Alternative 10 - Backup



- Latest “in service” of North or South Tunnel
 - Long 8-mile long tunnel to construct
 - Relies on completion of both contract packages for South Tunnel to be “in service”
 - Two tunnel construction contracts. No option for 3 tunnel contract packages
 - Provides least separation between Hultman connections
-
- Does not need to share Tandem Trailer parcel
 - Substantially mitigates impact from MassDOT bridge project
 - Least reliance on MassDOT I-90/95 interchange property



Draft Environmental Impact Report

- DEIR evaluates the preferred and 2 backup alternatives equally
 - All 3 alternatives meet hydraulics, redundancy, and operational needs
 - Similar environmental impact (land alteration, open space, wetlands, rare species habitat, water management act, and climate change) for both the construction period and for the build condition
 - Key differences between alternatives are a few shaft sites, direction of tunneling, tunnel segment length, and schedule
- Environmental Justice community outreach planned
 - Program Website <https://www.mwra.com/mwtp.html>
 - Translate Outreach Materials (Fact Sheets, Newspaper Notices, Advanced Notification Form)
 - Email Advanced Notification form to Community Based Organizations
 - Public Information Sessions (translation services as requested)
- DEIR filing (with draft Section 61 Findings) to the MEPA office in fall 2022
- Final EIR in late summer 2023 addressing public comments received



Preliminary Design

- Preliminary Design will be based on the preferred alternative only
 - Preliminary design report and drawings
 - Contract packaging, phasing, sequencing, etc.
 - Identify land acquisition needs
 - Updated Program cost estimates
 - Updated Program schedule
- Community and Stakeholder Outreach
 - Consultations held with MEPA, DEP, MHC, Communities, MassDOT, DCR, DPH
 - Working Group – representatives from all ten communities within the Program Study Area, MWRA Advisory Board, WSCAC, MAPC (met five times so far)
 - Additional meetings with community representatives of the seven communities in which the tunnel will be constructed