



# Massachusetts Water Resources Authority

## Metropolitan Water Tunnel Program

### Working Group Meeting No 5

### Shortlisted Alternatives

June 15, 2022

Please visit the project website  
[www.mwra.com/mwtp.html](http://www.mwra.com/mwtp.html)



# Metropolitan Water Tunnel Program





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# Agenda

- Metropolitan Water Tunnel Program Update
- Alternatives Evaluation Refresher
- Alternative Shortlist (3 tunnel alignments and shaft sites)
- Upcoming Meetings
- Thank You and Questions





# Metropolitan Water Tunnel Program Update

## Program Schedule

- Preliminary design – thru Jan 2024
- Begin final design in 2024
- Targeting construction to start in 2027

## Geotechnical Field Investigation

- Phase 1A Field Work Complete ✓
- Phase 1B Surface Geophysics – Start May 2, 2022 ✓
- Phase 1B Borings – Start May 23, 2022
- Geotechnical Support Services – Procurement summer 2022 for NTP November 2022

## MEPA Review Process

- Shortlisted three Alternatives ✓
- Constructability Review ✓
- Ongoing Preliminary Design investigations to inform the DEIR
- DEIR Submitted to MEPA Fall 2022

## Community & Stakeholder Outreach

- Ongoing Working Group meetings
- Ongoing property acquisition discussions with MassDOT, DCR, DPH





## **Alternatives Evaluation Refresher**

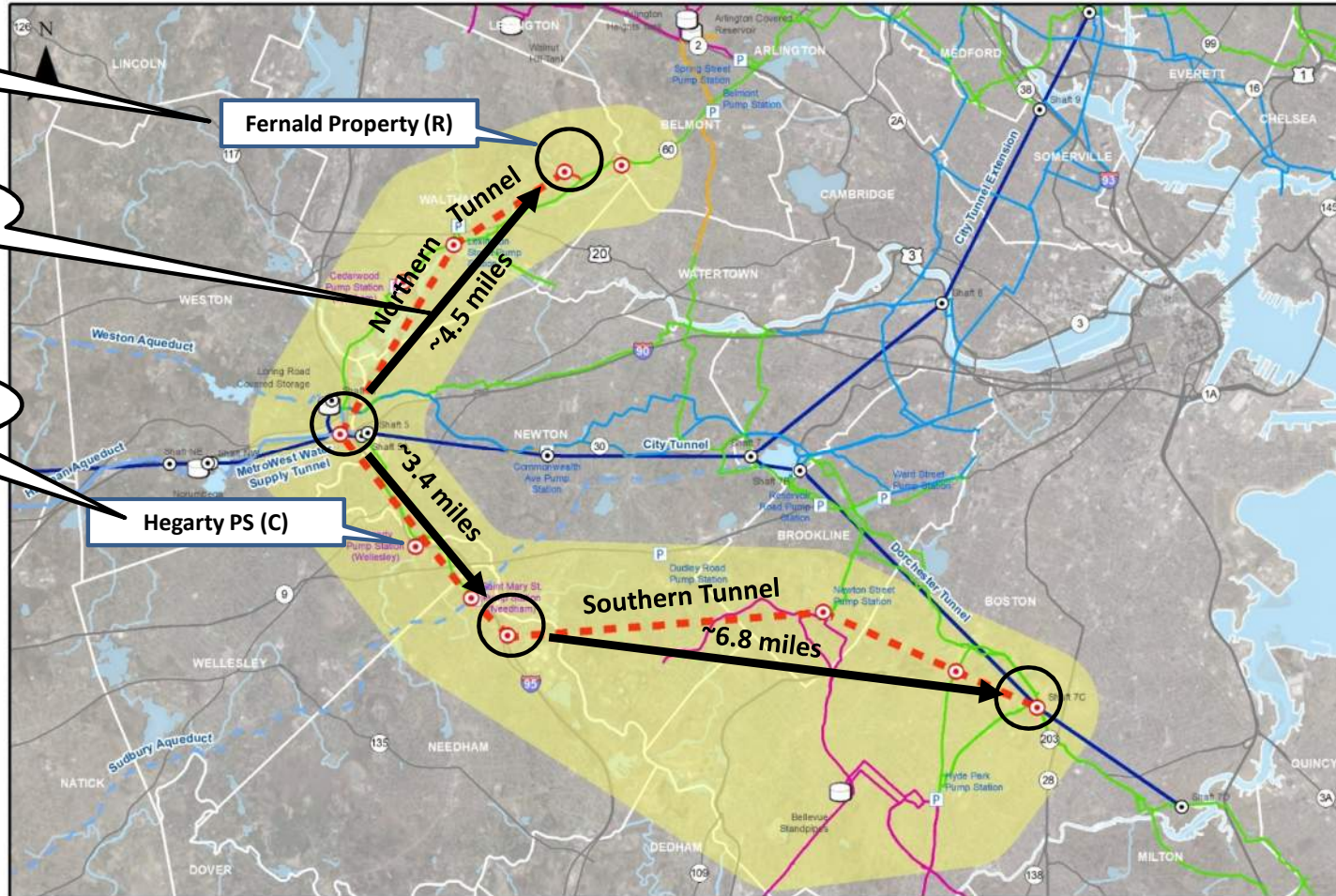


# What is an "alternative"

Shaft site and Function

Tunnel Direction and Length

Connection along a tunnel segment





# Preferred Alternative

## Key Locations

### Construction Shaft Sites

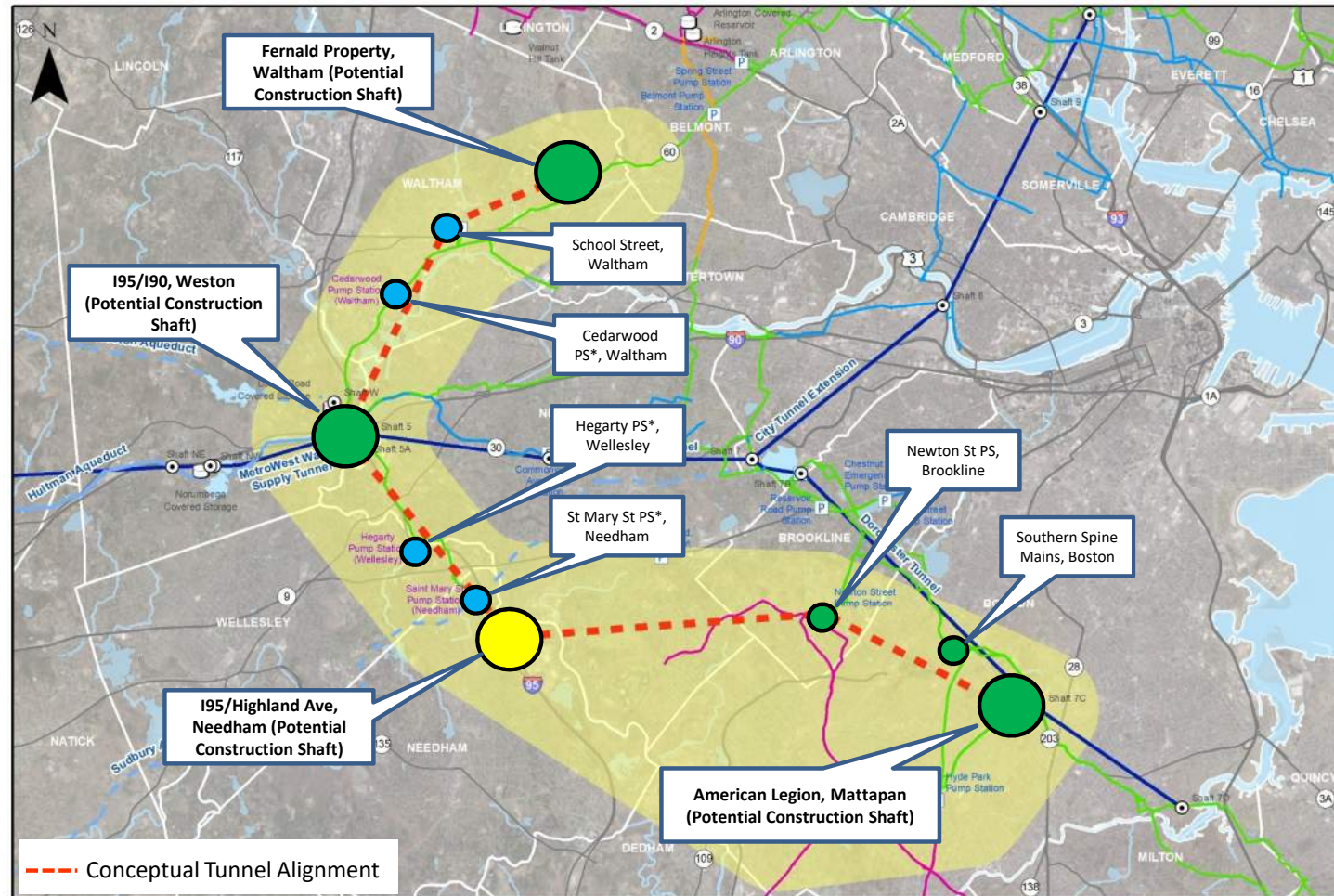
- Fernald Property, Waltham
- 190/195 Interchange, Weston
- Highland Ave/195 Interchange, Needham
- American Legion, Mattapan

### 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)



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## How We Assembled Alternatives and Narrowed the Selection

- Started with Two-Tunnel Concept (North and South Tunnels)
- > 30 alternatives:
  - Program study area, system hydraulics, connection points, possible shaft sites (undeveloped/suitable), link tunnel segments, etc.
- Narrowed to 10 alternatives: (discussed in Dec 2021)
  - Land availability, constructability, operations, environmental & social, reasonableness, etc. etc. etc.
- Reduce from 10 to 3 alternatives: (current discussion)
  - All 3 alternatives will be evaluated equally in the DEIR
- Select the preferred alternative: (future conversation)
  - Land availability, more constructability issues, contract packaging/interfaces, phasing, sequencing, schedule, in service, cost, etc.
  - Carried forward to preliminary design



# Alternatives Evaluation Process



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# Evaluation Criteria



## Constructability/ Engineering

- Availability of Utilities
- Ground Water discharge
- Flushing/Disinfection Dewatering
- Construction Dewatering
- Proximity to Highways
- Proximity to Faults
- Length of Tunnel
- Proximity to Sensitive Existing Infrastructure



## Land Availability

- Space and Right of Way for Construction
- Space and Right of Way for Permanent Facilities
- Precludes Other Beneficial Uses



## Environmental

- Wetlands
- State/Federal Listed Species
- Article 97
- Mass Contingency Plan



## Operations

- Flexibility of Operations
- Maintenance Provisions



## Social/Community

- Cultural Resources
- Community Impacts/  
Environmental Justice
- Traffic Disruption
- Commercial Disruption
- Construction Period  
Impacts from Air  
and Noise



## Cost

- Relative Construction Costs



## Schedule

- Timing to Achieve Beneficial Use
- Flexibility of Implementation

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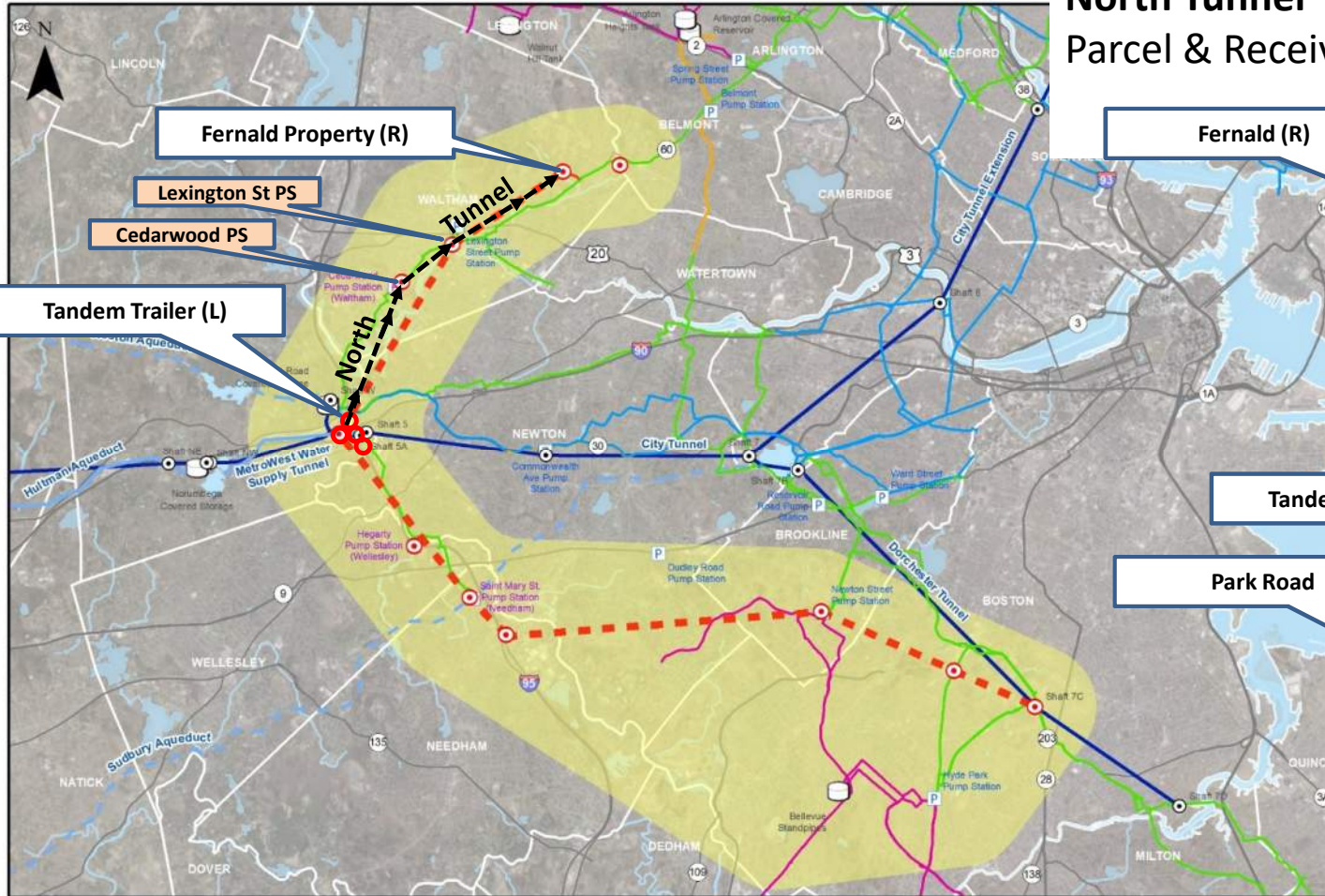


## Alternatives Evaluation

- 10 alternatives assembled based on:
  - Site function & suitability
  - Tunnel segment combinations
  - Social & environmental impacts
  - Land availability
  - Risk management & flexibility
- The 10 alternatives underwent an initial evaluation and were found to provide redundancy and were considered constructible.
- Let's drill down to understand how the 10 alternatives differ considering these evaluation criteria



# Alternative 1 North Tunnel



**North Tunnel – Launch from Tandem Trailer Parcel & Receive at Fernald Property**



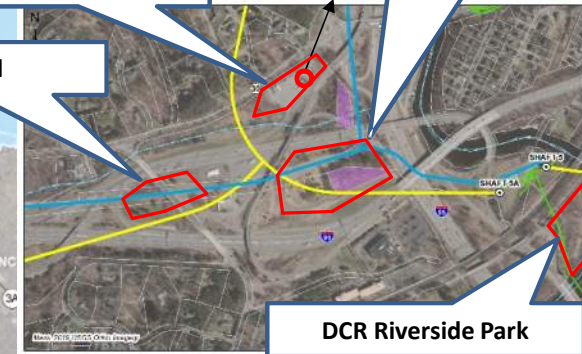
Fernald (R)

Fernald Property

Tandem Trailer (L)

Bifurcation

Park Road



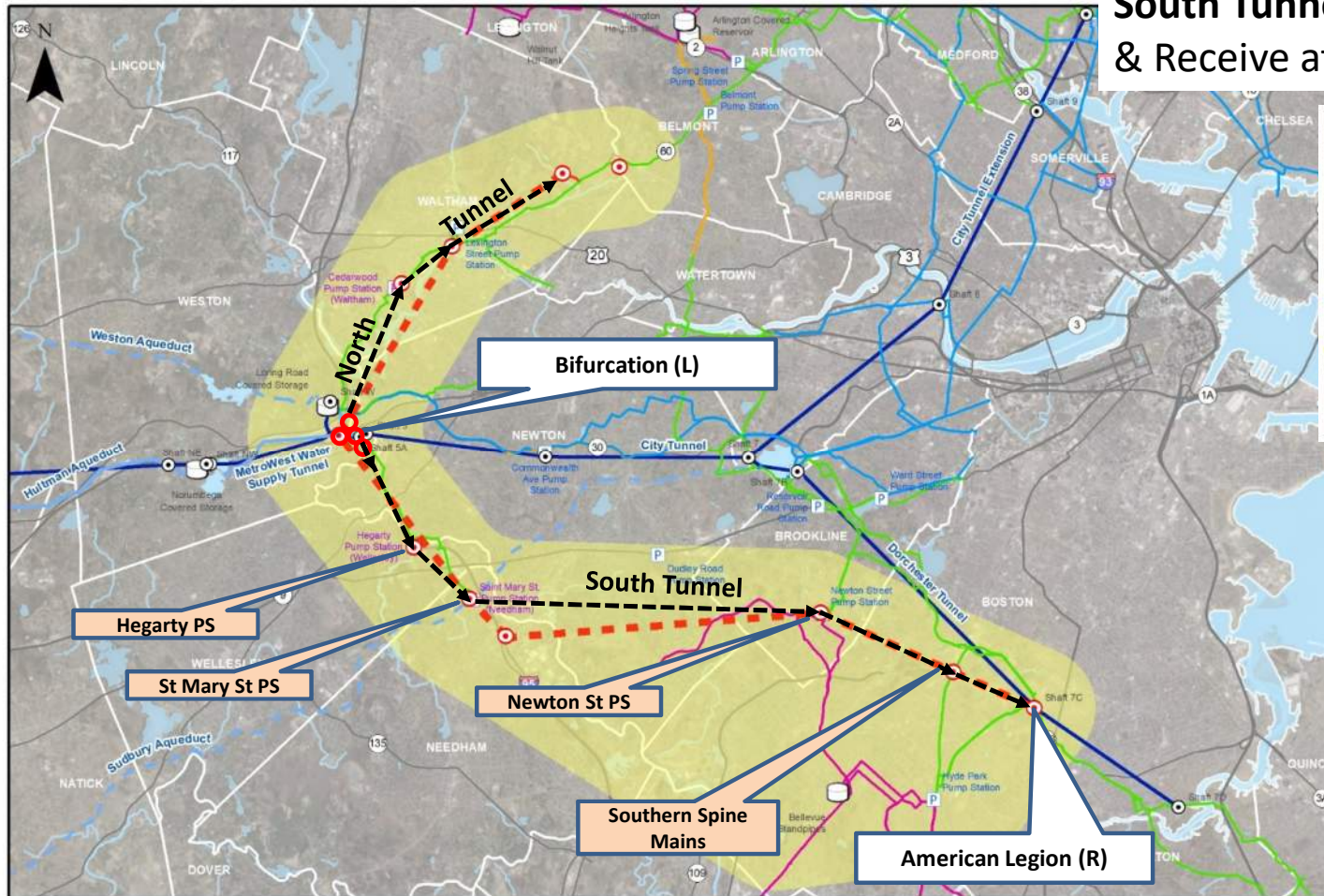
DCR Riverside Park

MassDOT Property

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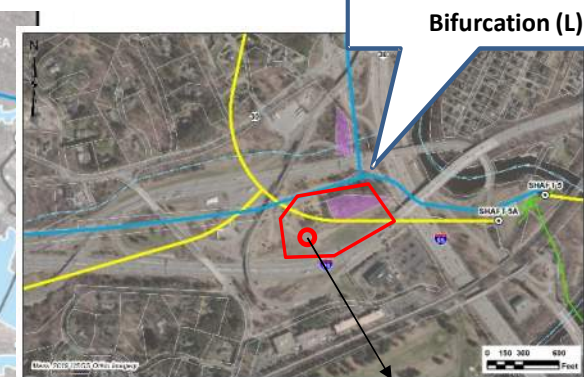


# Alternative 1 South Tunnel

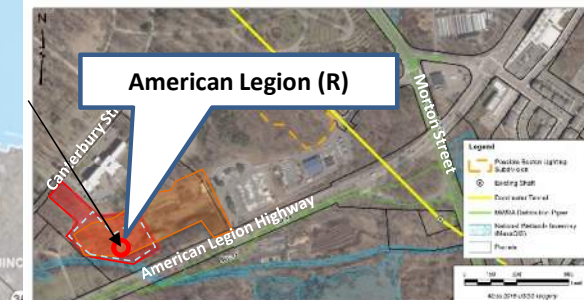


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## South Tunnels – Launch from Bifurcation & Receive at American Legion



MassDOT Property



DCR Property



## Alternatives Evaluation

- Recall the 10 alternatives are various combinations of shaft functions and tunnel segments
- Many use Tandem as a Launch Shaft and Fernald as a Receiving Shaft
- Many use I95/Highland Ave as a Launch and Receiving Shafts
- Let's walk through the summary of alternatives and point out some key tunnel sequence differentiators
- Then we'll give some examples of the bigger differences between some alternatives
- This leads to understanding how the 3 shortlisted alternatives were derived



# Summary of the Ten Alternatives

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8	Alternative 9	Alternative 10
Fernald Property	Fernald Property	Fernald Property	Fernald Property	Fernald Property	Fernald Property	Fernald Property	Fernald Property	Fernald Property	Fernald Property
↑	↑	↑	↑	↓	↑	↑	↑	↑	↑
Tandem Trailer	↑	Tandem Trailer	Tandem Trailer	Tandem Trailer	Tandem Trailer	Tandem Trailer	Tandem Trailer	Bifurcation	Park Road West
Bifurcation	Bifurcation	Bifurcation	Park Road West	Bifurcation	Bifurcation	Bifurcation	Riverside Park	Bifurcation	↑
↓	↑	↓	↑	↑	↓	↑	↑	↑	↑
	Highland Avenue NW	Highland Avenue NW	Highland Avenue NW	Highland Avenue NW	Highland Avenue NW	Highland Avenue NE	Highland Avenue NW	Highland Avenue NW	Highland Avenue NW
	Highland Avenue NE	Highland Avenue NE	Highland Avenue NE	Highland Avenue NE	Highland Avenue NE	Highland Avenue NE	Highland Avenue NE	Highland Avenue NE	Highland Avenue NE
	↓	↓	↓	↓	↑	↓	↓	↓	↓
American Legion	American Legion	American Legion	American Legion	American Legion	American Legion	American Legion	American Legion	American Legion	American Legion

↑ Denotes direction of tunnel mining

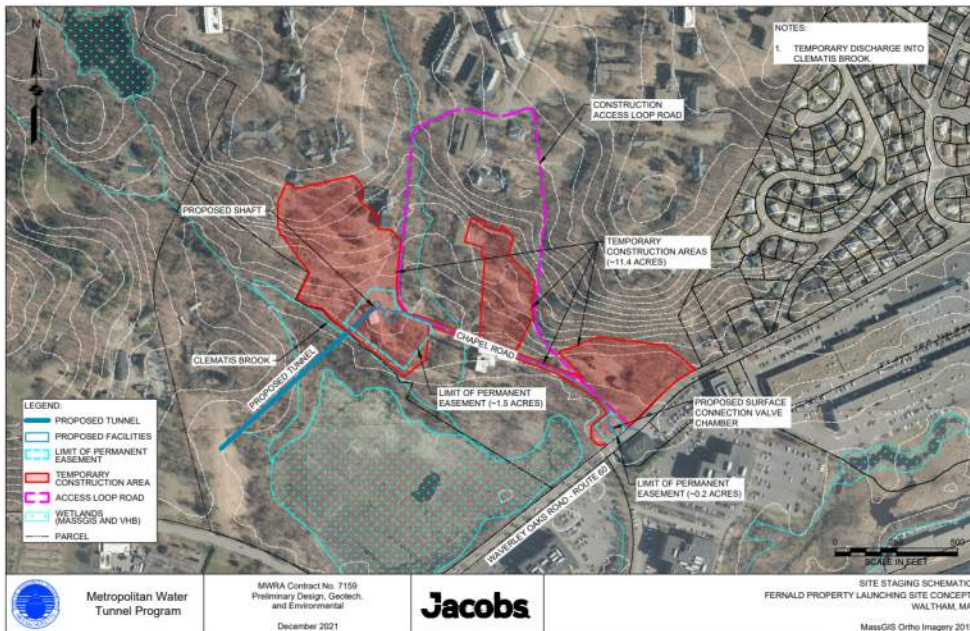
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# Evaluation Example – Northern Tunnel Between Fernald Property and I95/I90 Interchange

## Launch at Fernald Property Alternative 5



- ✓ Easy access to power for TBM
- ✗ Located in dense urban area with 14 sensitive receptors
- ✗ Approx. 7 miles to major highway for muck hauling (another 26 sensitive receptors)
- ✗ Contaminated site will require coordination with MassDEP
- ✗ Longest community impacts by construction duration

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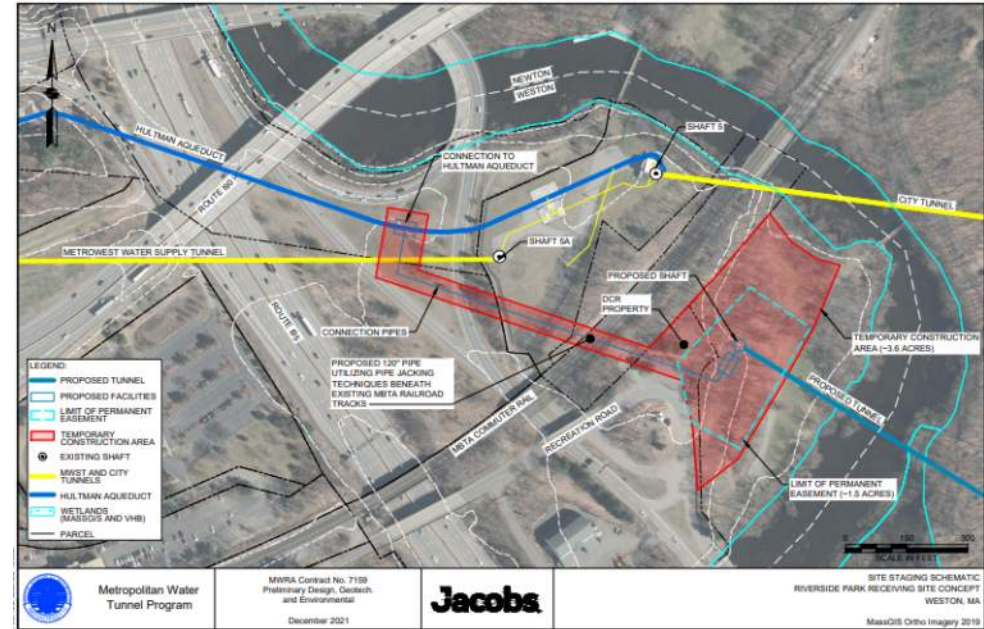
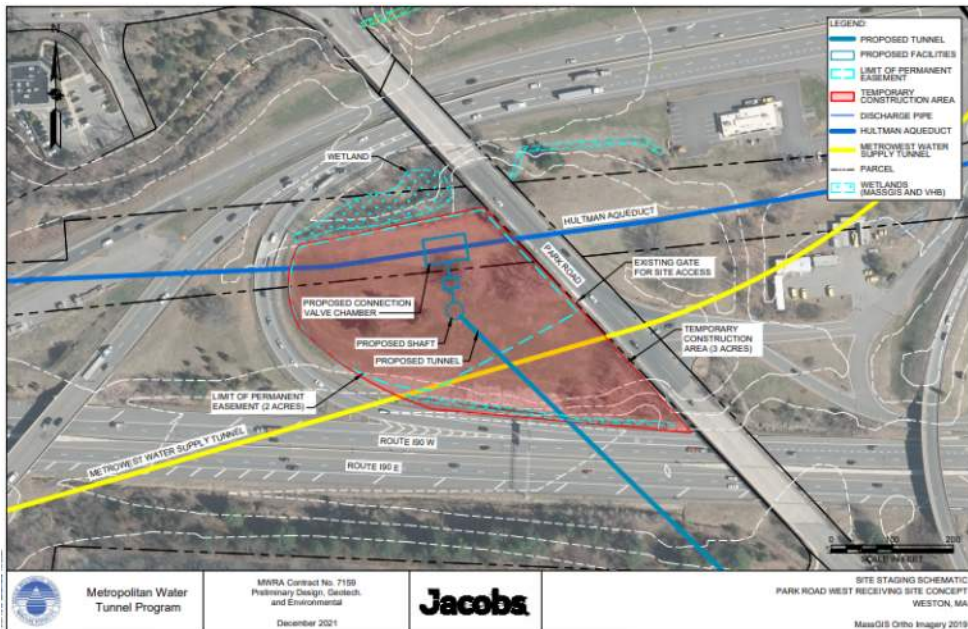


# Evaluation Example – Southern Tunnel Between Highland Avenue and I95/I90 Interchange

Receive at Park Road West  
Alternative 4

Vs

Receive at Riverside Park  
Alternative 8



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## Evaluation Example – Southern Tunnel Between Highland Avenue and I95/I90 Interchange

Receive at Park Road West

Alternative 4

- ✓ Immediately adjacent to the Hultman Aqueduct
- ✓ Property partially owned by Authority.
- ✓ Easily accessed by highway system
- ✗ Wetlands adjacent to site, construction impacts can be mitigated

**Vs**

Receive at Riverside Park

Alternative 8

- ✗ Active public passive recreation
- ✗ Construction would permanently disrupt park facilities
- ✗ Connection to Hultman Aqueduct requires crossing active MBTA rail
- ✓ Easy access to Charles River for construction dewatering

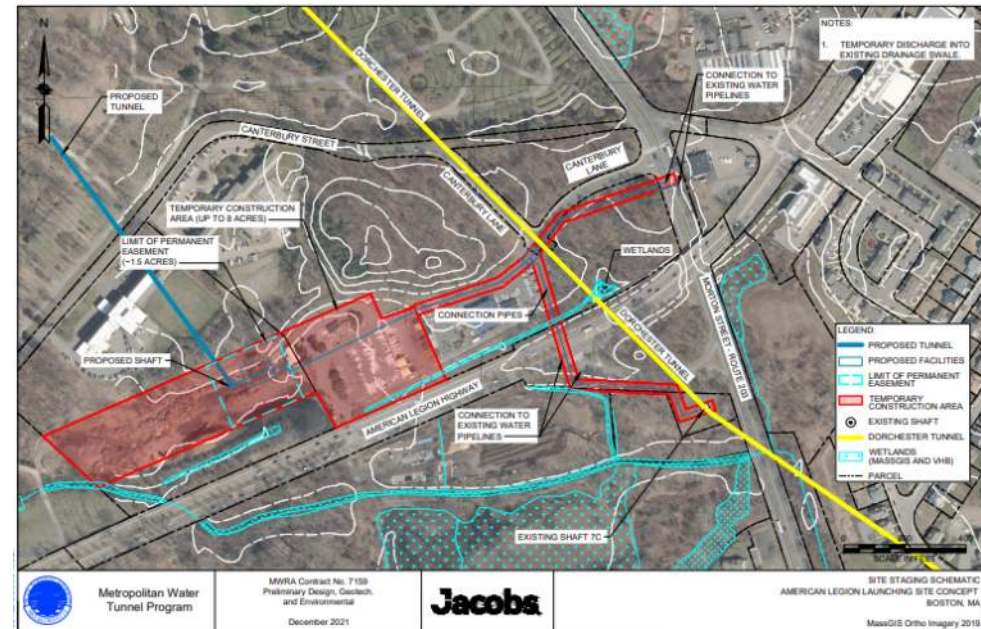
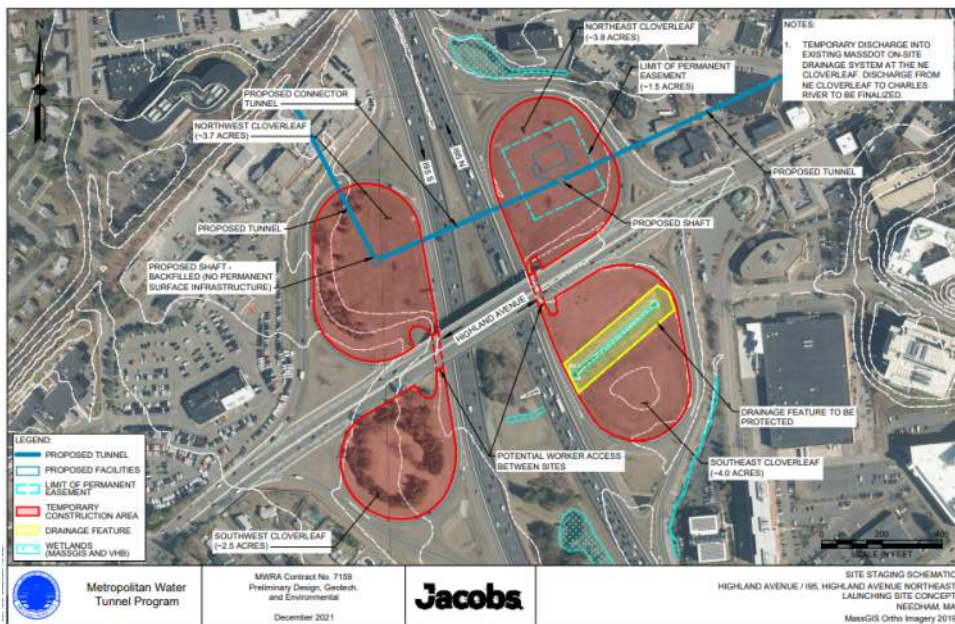


# Evaluation Example – Southern Tunnel Between Highland Avenue and American Legion Highway

Launching from Highland Avenue  
Alternatives 2, 3, 4, 5, 7, 8, 9, 10

Vs

Launching from American Legion Highway  
Alternative 6



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## Evaluation Example – Southern Tunnel Between Highland Avenue and American Legion Highway

### Launching from Highland Avenue

Alternatives 2, 3, 4, 5, 7, 8, 9, 10

- ✓ Property owned by MassDOT
- ✓ Convenient access to highway for muck hauling
- ✓ Relatively isolated from the community

### Launching from American Legion Highway

Alternative 6

- ✗ Larger land impact at DCR (Article 97)
- ✗ Electric power for TBM not feasible
- ✗ Approx. 7 miles to closest highway for muck hauling



# Alternatives Evaluation Process – Cont.

## Alternatives Comparison

Alternative	1	2	3	4	5	6	7	8	9	10
Tunnel Alignment (1)	TT>FE B>AL	NW>FE (B) NE>AL	TT>FE B>NW NE>AL	TT>FE NW>PRW NE>AL	FE>TT NW>B NE>AL	TT>FE B>NW AL>NE	TT>FE NE>B NE>AL	TT>FE NW>RP NE>AL	B>FE NW>B NE>AL	NW>FE (PRW) NE>AL
Constructability / Engineering	Yellow	Yellow	Green	Green	Green	Red	Green	Green	Yellow	Yellow
Land Availability	Yellow	Yellow	Yellow	Yellow	Red	Red	Yellow	Yellow	Yellow	Green
Environmental	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green
Social / Community	Red	Green	Yellow	Yellow	Red	Red	Yellow	Red	Yellow	Green
Operations	Red	Green	Green	Green	Green	Green	Green	Red	Green	Green
Cost (2)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Schedule (tunnel(s) in service)	Red	Yellow	Green	Green	Green	Green	Green	Green	Green	Yellow
Retain Alternative	N	N	Y	Y	N	N	N	N	N	Y

(1) Site Abbreviations: TT – Tandem Trailer; FE – Fernald Property; B – Bifurcation; NW – Highland Avenue Northwest; NE – Highland Avenue Northeast; AL – American Legion; RP – Riverside Park;

PRW – Park Road West; (B) or (PRW) indicates Large Connection Shaft in that tunnel segment: > indicates tunnel mining direction

(2) Construction cost only for the differential in capital construction costs among the alternatives.

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## Three Shortlisted Alternatives

The three shortlisted alternatives are (in no particular order):

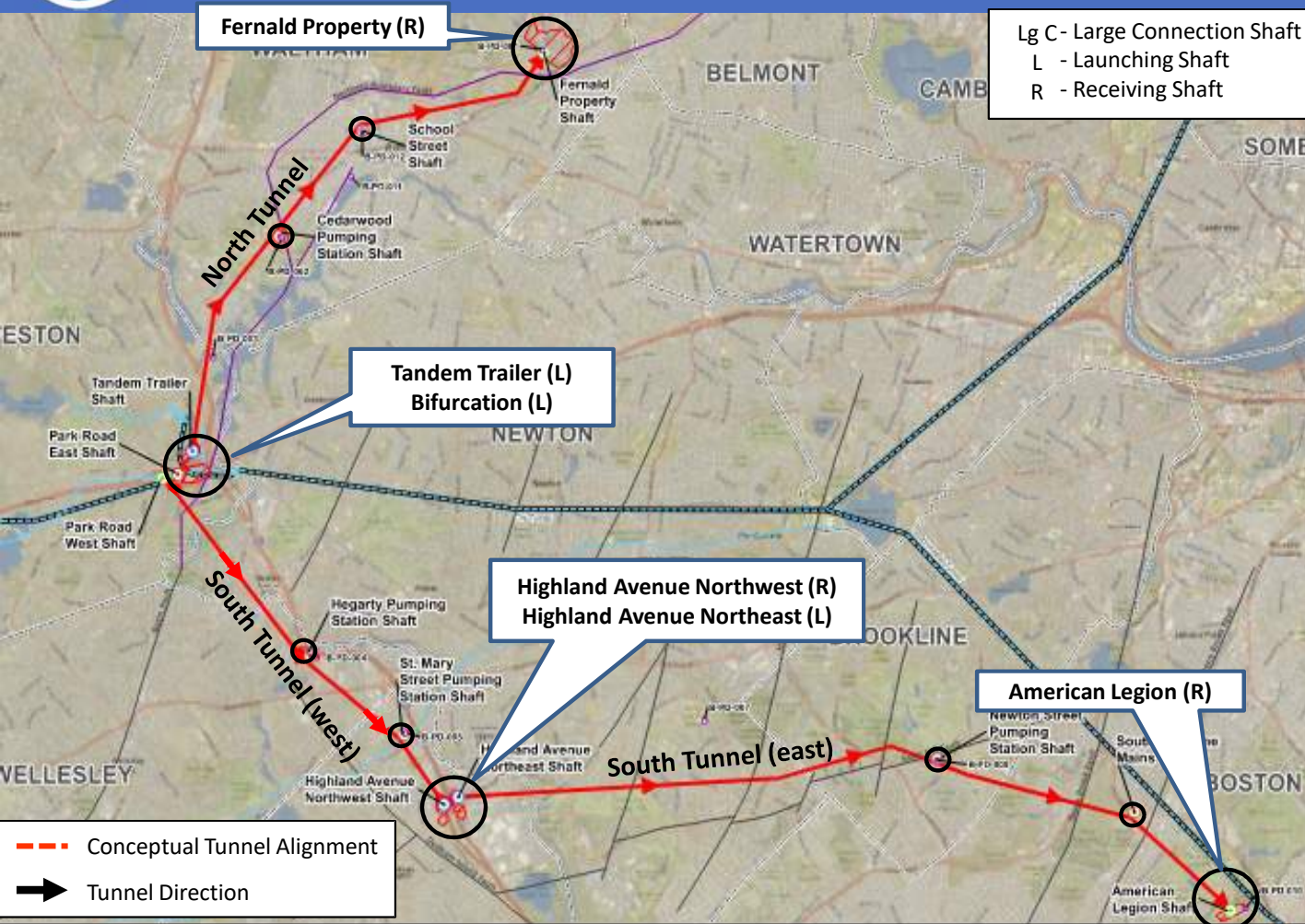
- **Alternative 3**
- **Alternative 4**
- **Alternative 10**



Conceptual for discussion only



# Shortlist - Alternative 3



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## Key Challenges

- Need to relocate Tandem Trailer parcel
- Heavily relies on MassDOT I-90/I-95 sites for two launching shaft sites
- Heavily relies on Bifurcation site which could be impacted by future MassDOT construction
- Alternative includes three launch sites, which may complicate contract packaging

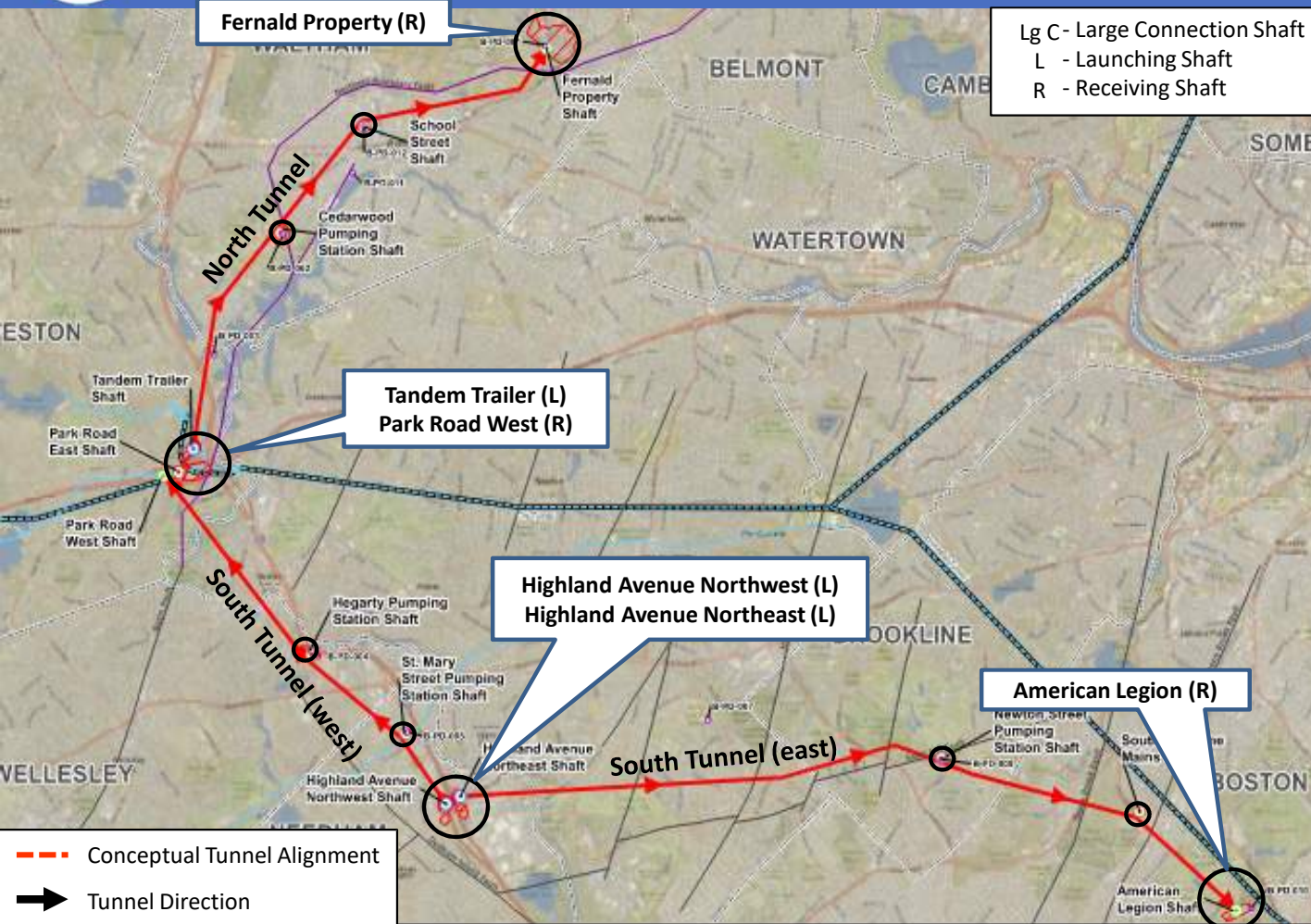
## Key Benefits

- Use of Tandem Trailer Parcel allows the north tunnel to start without impact from future MassDOT construction
- Highland Ave splits southern tunnel into shorter lengths
- Provides additional security by separating Hultman connections
- Earliest opportunity to put either north or south tunnel "in service"





# Shortlist – Alternative 4



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## Key Challenges

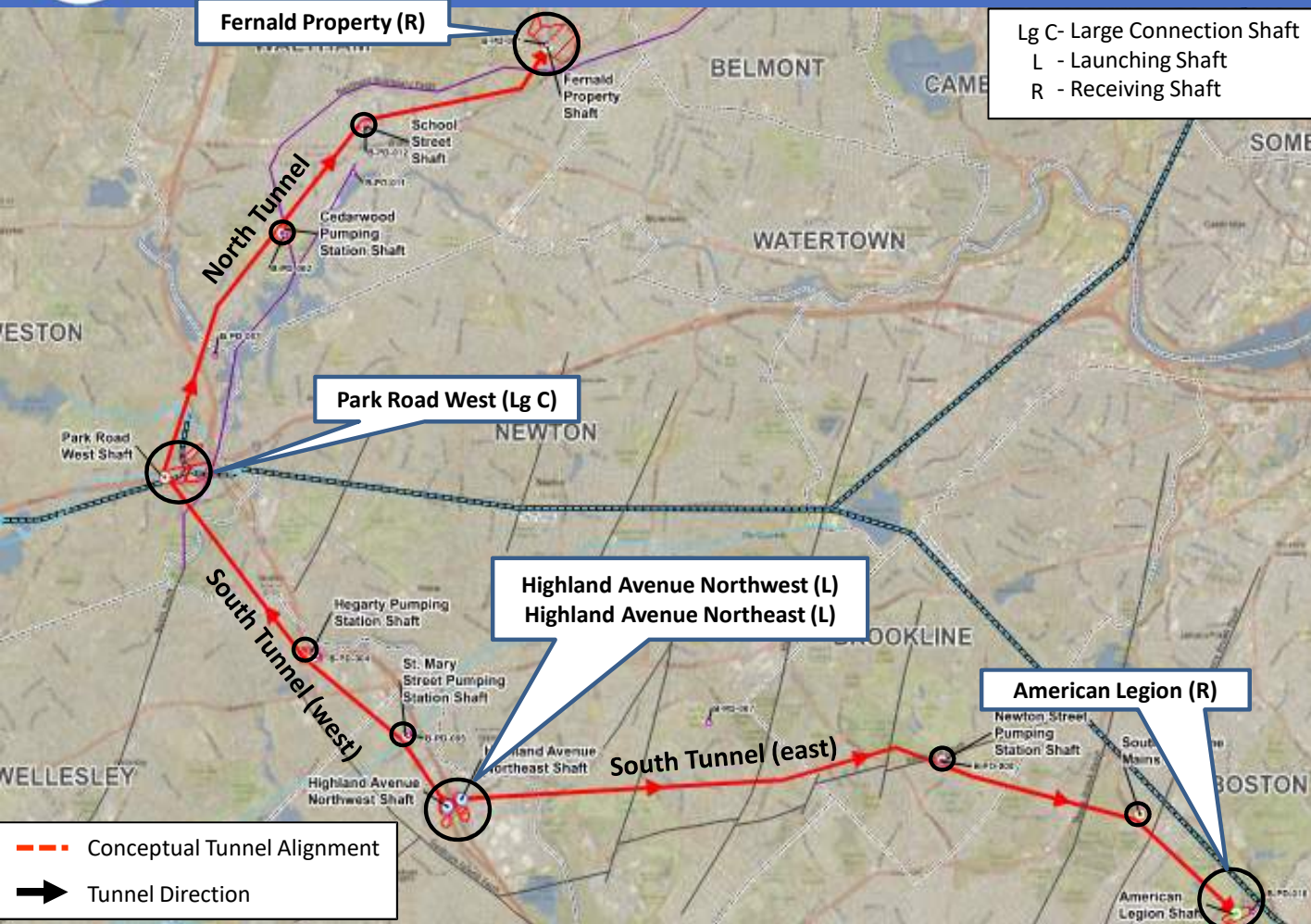
- Need to relocate Tandem Trailer parking

## Key Benefit

- Use of Tandem Trailer Parcel allows the North Tunnel to start without impact from future MassDOT construction.
- Substantially mitigates impact from MassDOT bridge project
- Provides *some* additional security by separating Hultman connections
- Highland Ave splits South Tunnel into shorter lengths.
- Contract packaging flexibility (2 or 3 packages)
- Earliest opportunity to put either north or south tunnel “in service”



# Shortlist - Alternative 10



Lg C - Large Connection Shaft  
 L - Launching Shaft  
 R - Receiving Shaft

### Key Challenges

- Latest “in service” of North or South Tunnel
- Two tunnel construction contracts. No option for 3 tunnel contract packages
- Relies on completion of both contract packages for South Tunnel to be “in service”
- Provides least separation between Hultman connections

### Key Benefit

- Do not need to relocate Tandem Trailer parking
- Substantially mitigates impact from MassDOT bridge project
- Least reliance on MassDOT I-90/I-95 interchange properties

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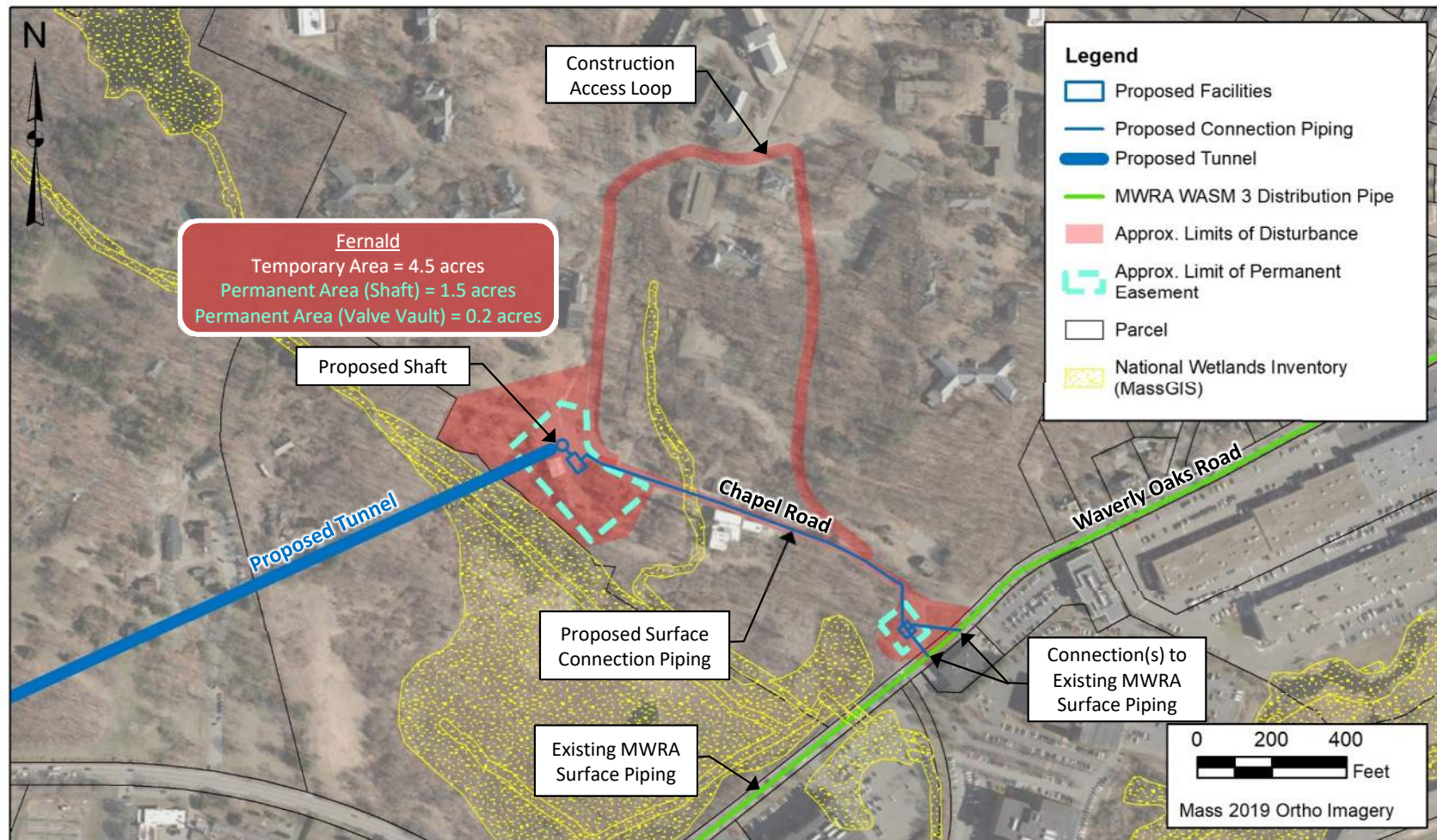
# Alignment Shortlist - Fernald Property

## Alternative 3, 4, and 10

- Receive at Fernald

## Site Characteristics:

- Owned by City of Waltham
- Wetlands Present
- Historic properties
- MCP sites
- Previously disturbed



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# Alignment Shortlist - I-90 / I-95 Interchange

## Alternative 3

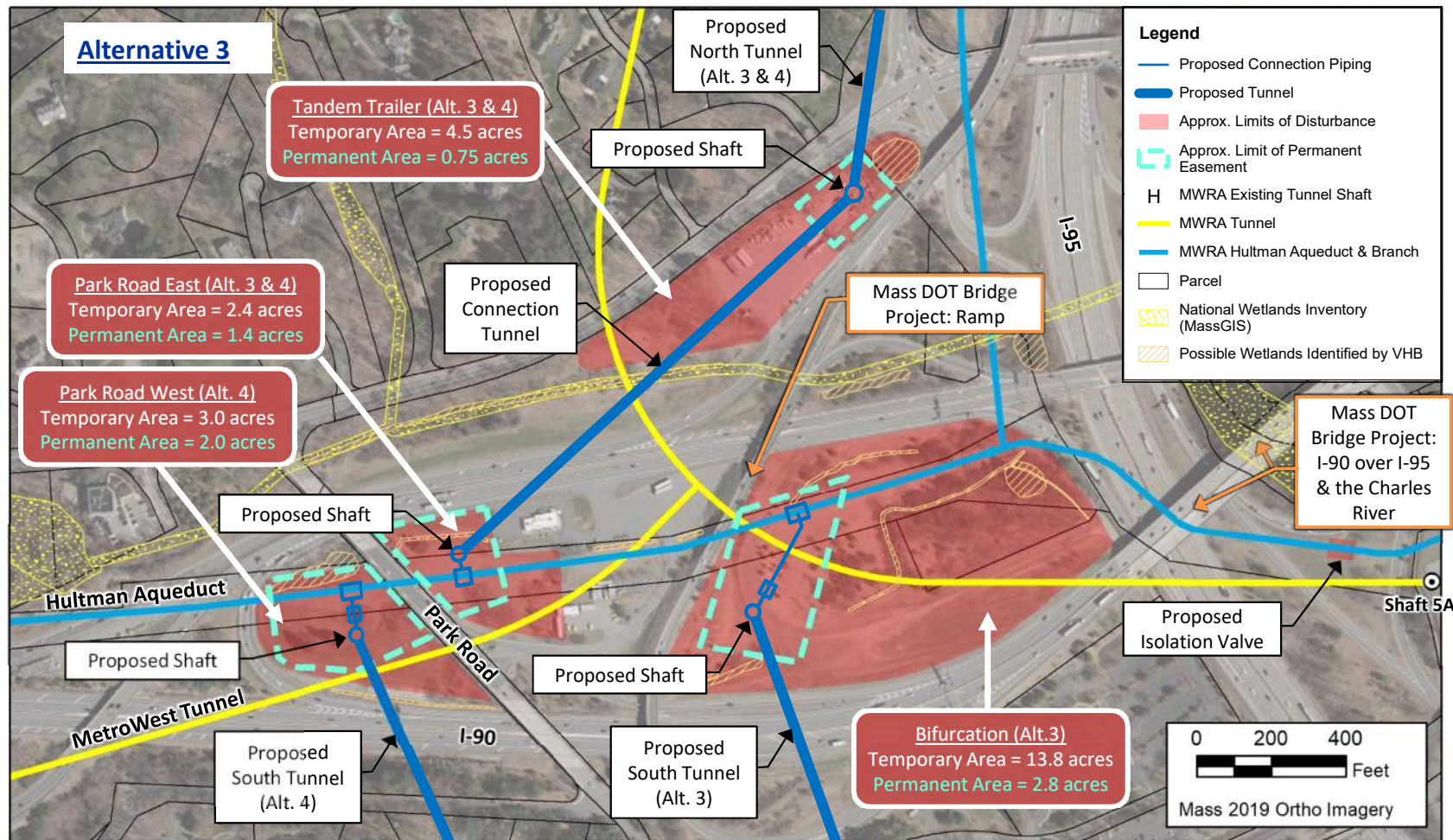
- Launch from Tandem Trailer with Connection at Park Road East
- Launch/Connection at Bifurcation

## Alternative 4

- Launch from Tandem Trailer with Connection at Park Road East
- Receive at Park Road West

## Site Characteristics:

- Owned by MassDOT
- Wetlands Present
- Previously disturbed, portions paved
- MWRA Hultman Aqueduct



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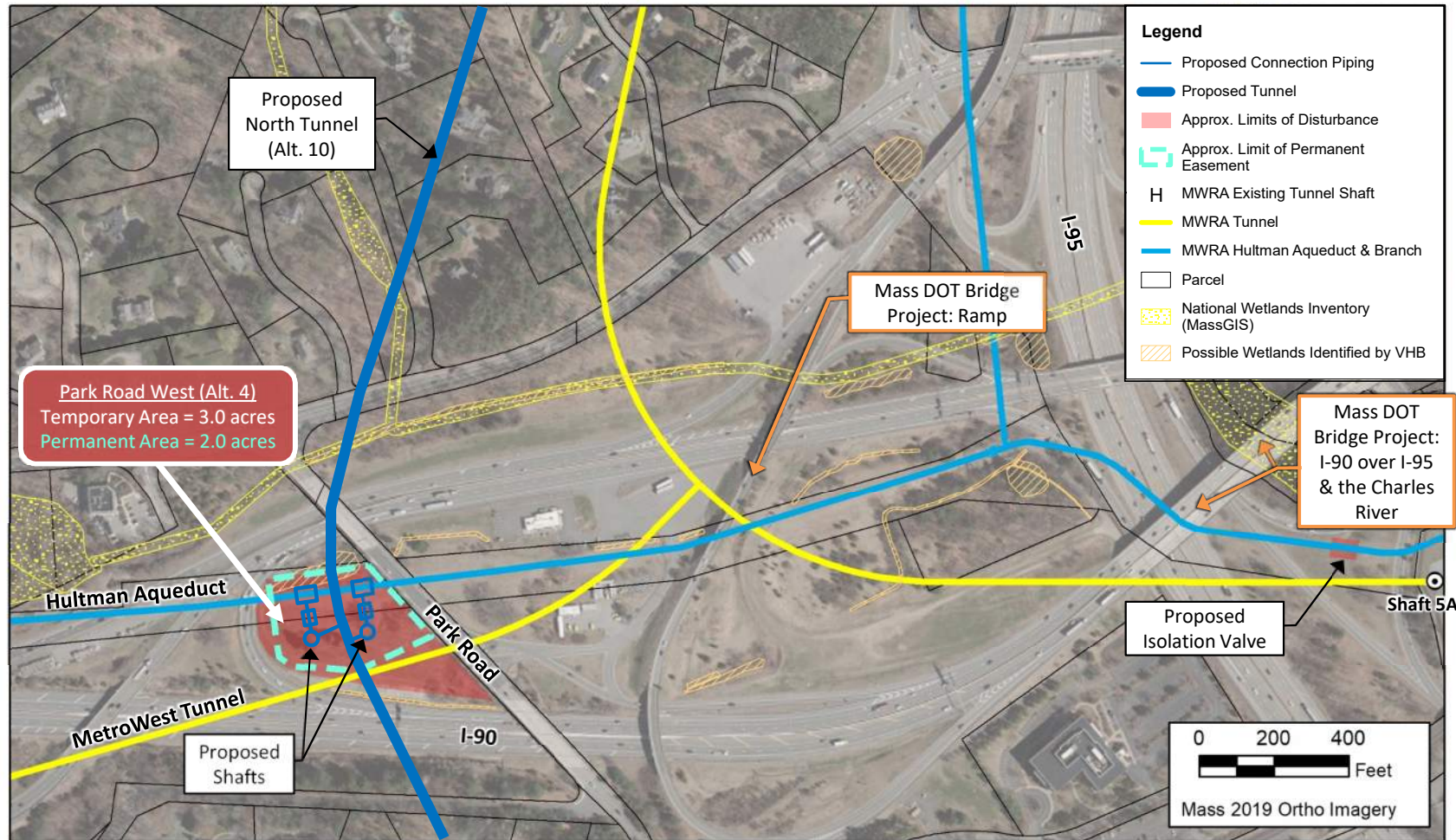
# Alignment Shortlist - I-90 / I-95 Interchange

## Alternative 10

- Launch from Highland Ave NW with Connection at Park Road East

## Site Characteristics:

- Owned by MassDOT
- Wetlands Present
- Previously disturbed, portions paved
- MWRA Hultman Aqueduct



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# Alignment Shortlist - Highland Avenue Northwest or Northeast (2 functions)

## Alternative 3

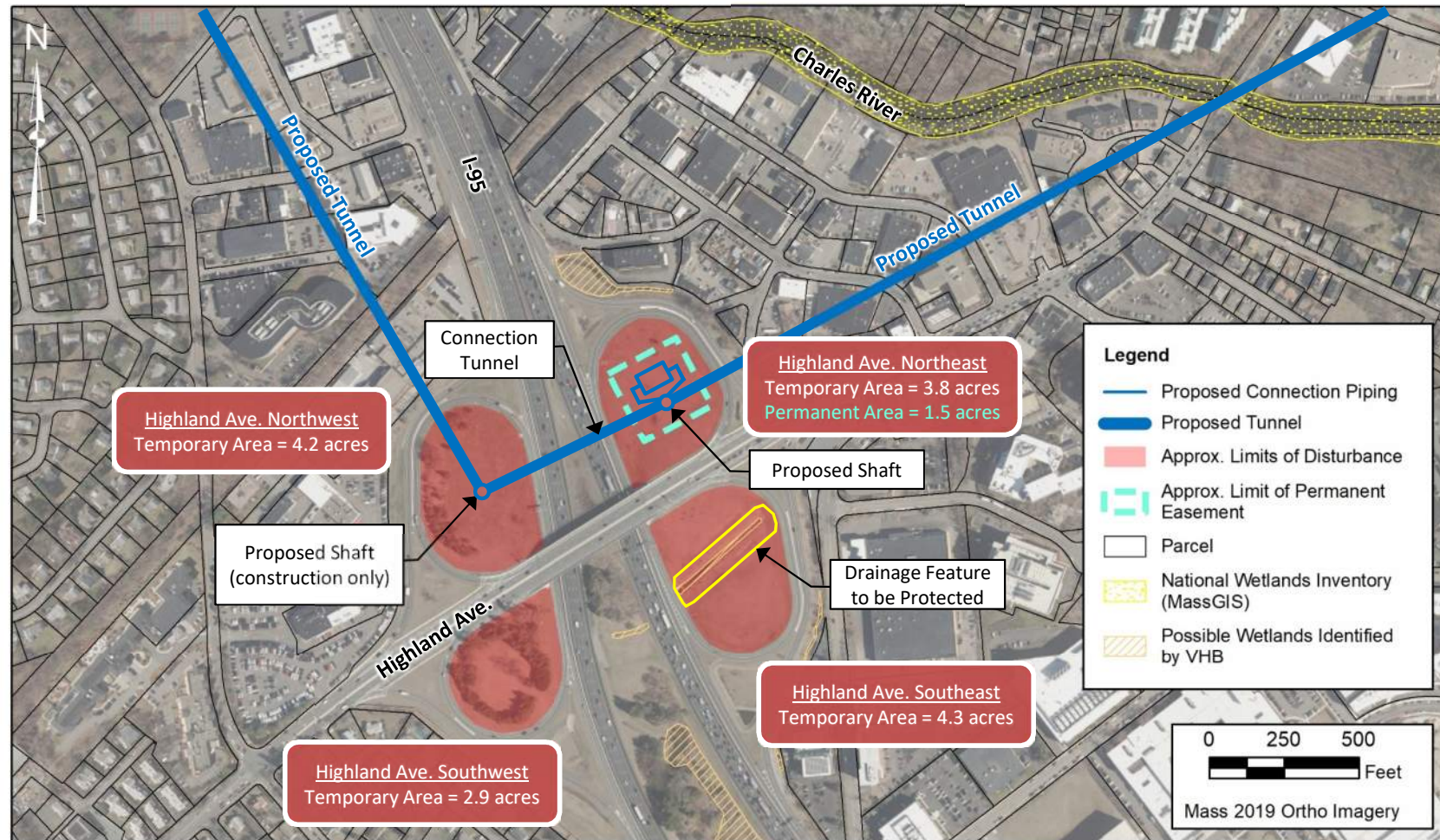
- Receive at Northwest Cloverleaf
- Launch from Northeast Cloverleaf

## Alternative 4 and 10

- Launch from Northwest Cloverleaf
- Launch from Northeast Cloverleaf

## Site Characteristics:

- Owned by MassDOT
- Wetlands Present
- Previously used for construction staging



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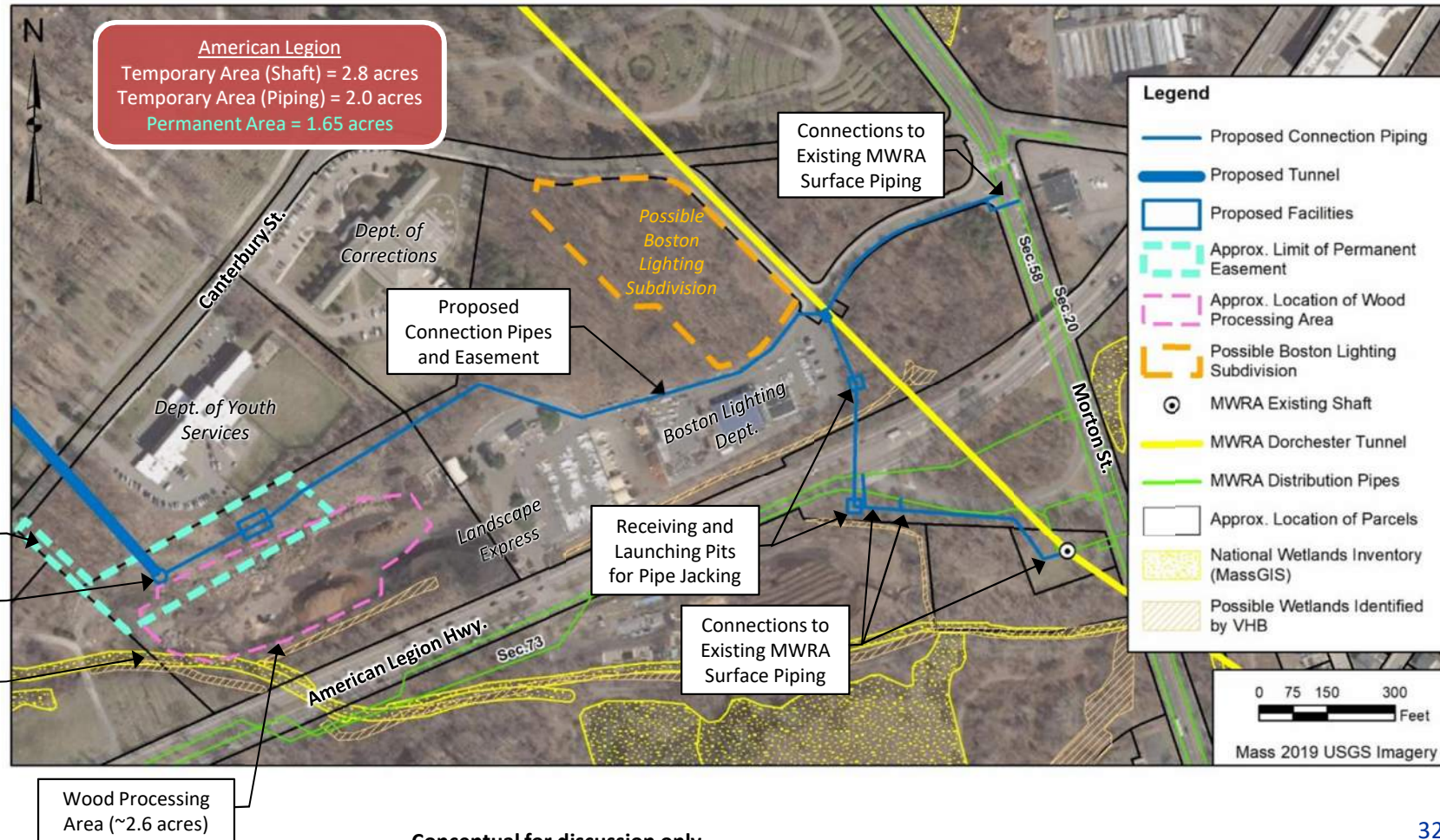
# Alignment Shortlist - American Legion

## Alternative 3, 4, and 10

- Receive at American Legion

## Site Characteristics:

- Owned by DCR and DYS
- Wetlands Present
- Article 97 Required
- Commercial business on site



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## Alignment Shortlist - Connection Shafts

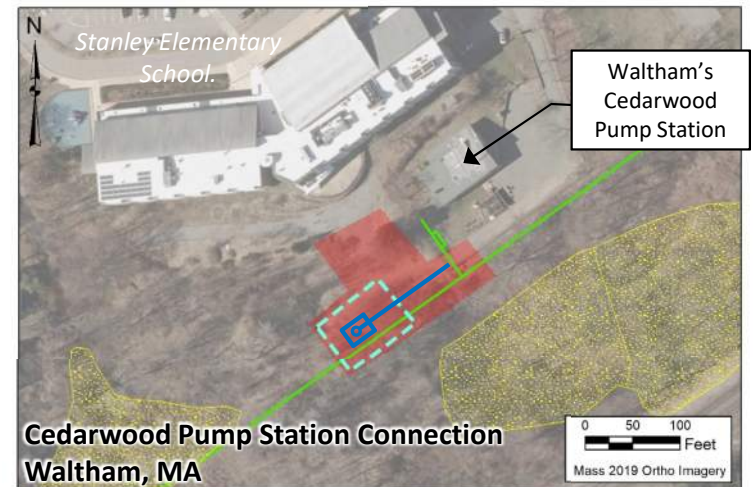
Common to All Alternatives

### Site Characteristics School Street:

- Owned by MWRA
- Previously a restaurant parking lot, all paved

### Site Characteristics Cedarwood PS:

- Owned by City of Waltham
- Wetlands Present
- Previously disturbed



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## Alignment Shortlist - Connection Shafts

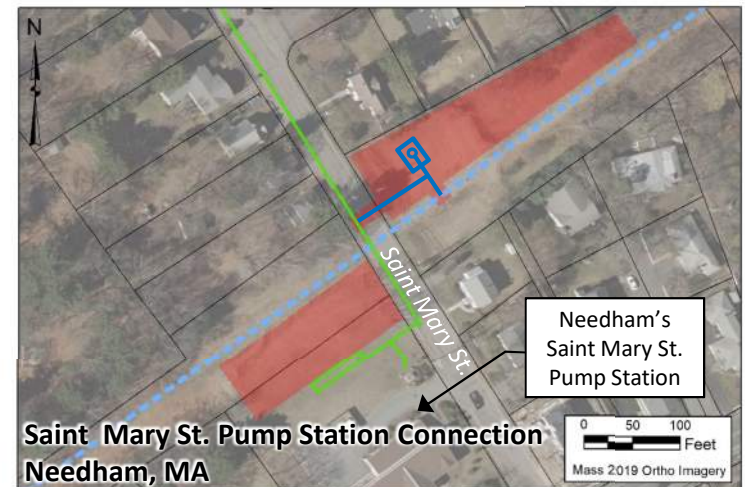
Common to All Alternatives

### Site Characteristics Hegarty PS:

- Owned by Town of Wellesley
- Potential Article 97
- Wetlands Present

### Site Characteristics St Mary Street PS:

- MWRA's Sudbury Aqueduct Easement
- Pump Station Owned by Town of Needham
- Previously disturbed



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# Alignment Shortlist - Connection Shafts

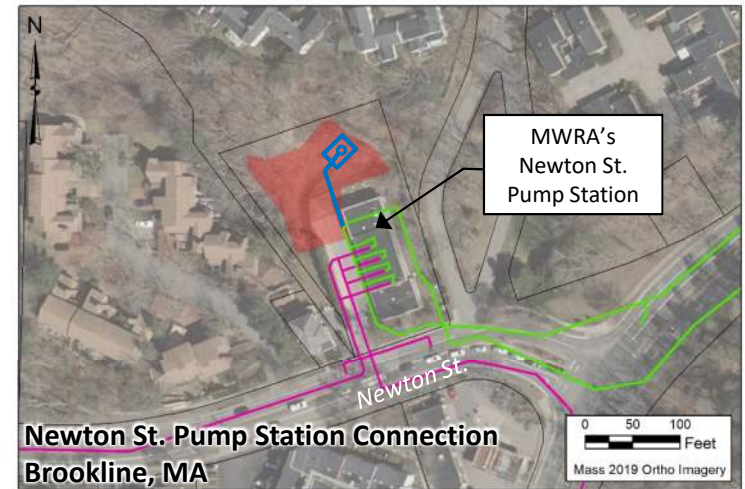
Common to All Alternatives

## Site Characteristics Newton Street PS:

- Owned by MWRA
- Existing pump station in operation

## Site Characteristics Southern Spine Mains:

- Controlled by Mass DPH
- Previously disturbed



Conceptual for discussion only



## Final Three Alternatives – Next Steps

Conceptual designs and construction phasing plans are being prepared for each shortlisted alternative. This will form the basis for the impact assessment in the DEIR.



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## Last Working Group - Next Steps Identified

- Rate each shortlisted alternative against the evaluation criteria
- Finalize selection of the 3 short listed alternatives to go into the DEIR
- Deeper dive into constructability, phasing, sequencing, schedule, costs, etc. on the 3 shortlisted alternatives
- Continue Stakeholder Outreach
  - i.e., MassDOT, DCR, DPH, Municipalities, Utilities, key abutters
- Agreement in principle on shaft sites with property owners
- Select the preferred alternative



## Fun Stuff

- Shaft site names
- Tunnel names
- Program Logo
- TBM names
- School Education Program
- ...
- ....
- .....
- .....
- Ground Breaking!



## Upcoming Meetings

- Summer 2022
  - Community outreach
  - Select the Preferred (and Two Backups)
- Future topics
  - Environmental Protection at Shaft Sites, Community Engagement Opportunities, Costs & Financing, Site Visits
  - Tell us what you want to hear about/discuss
- MWRA Program Team can provide individual briefings/presentations to your community/organization at any time. Just ask!



# Metropolitan Water Tunnel Program

- Contact Us
  - Carmine DeMaria, Community Relations Coordinator
  - 617-305-5725
  - [Carmine.DeMaria@mwra.com](mailto:Carmine.DeMaria@mwra.com)
  - [Tunnels.info@mwra.com](mailto:Tunnels.info@mwra.com)
- <https://www.mwra.com/mwtp.html>
  - Meeting notices, agendas, presentations, minutes



## Questions/Comments?



Thank you for your  
continued partnership!