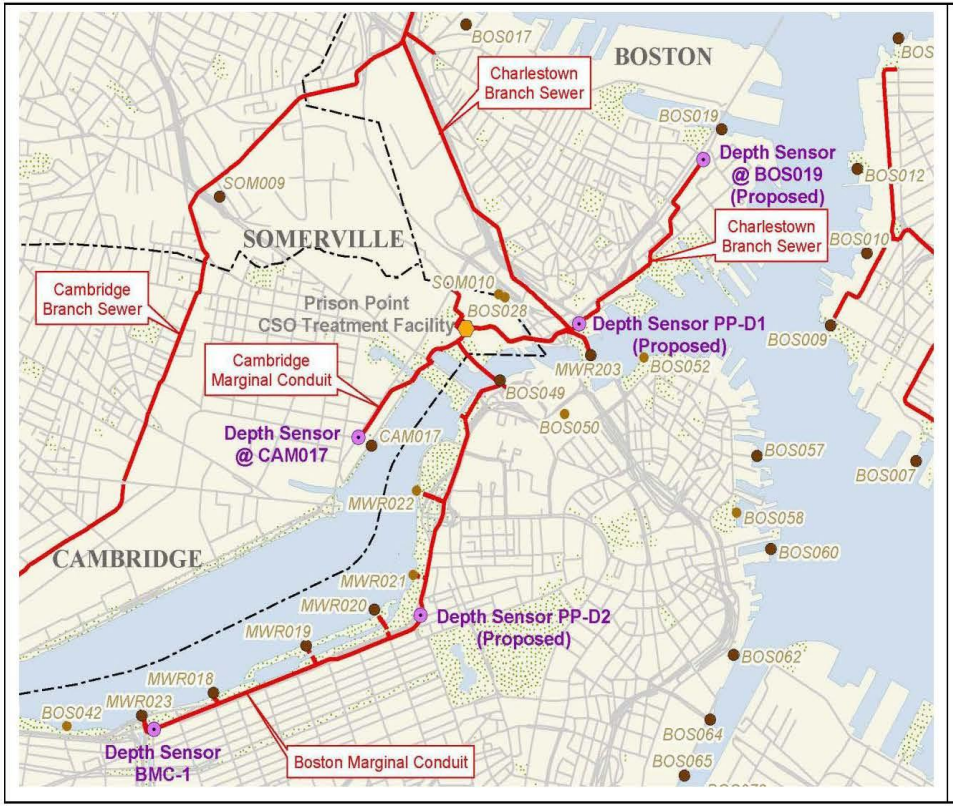
Prison Point CSO Facility Improvements

Contract 7359

July 13, 2016

Contract 7359 – Prison Point CSO Facility Improvements

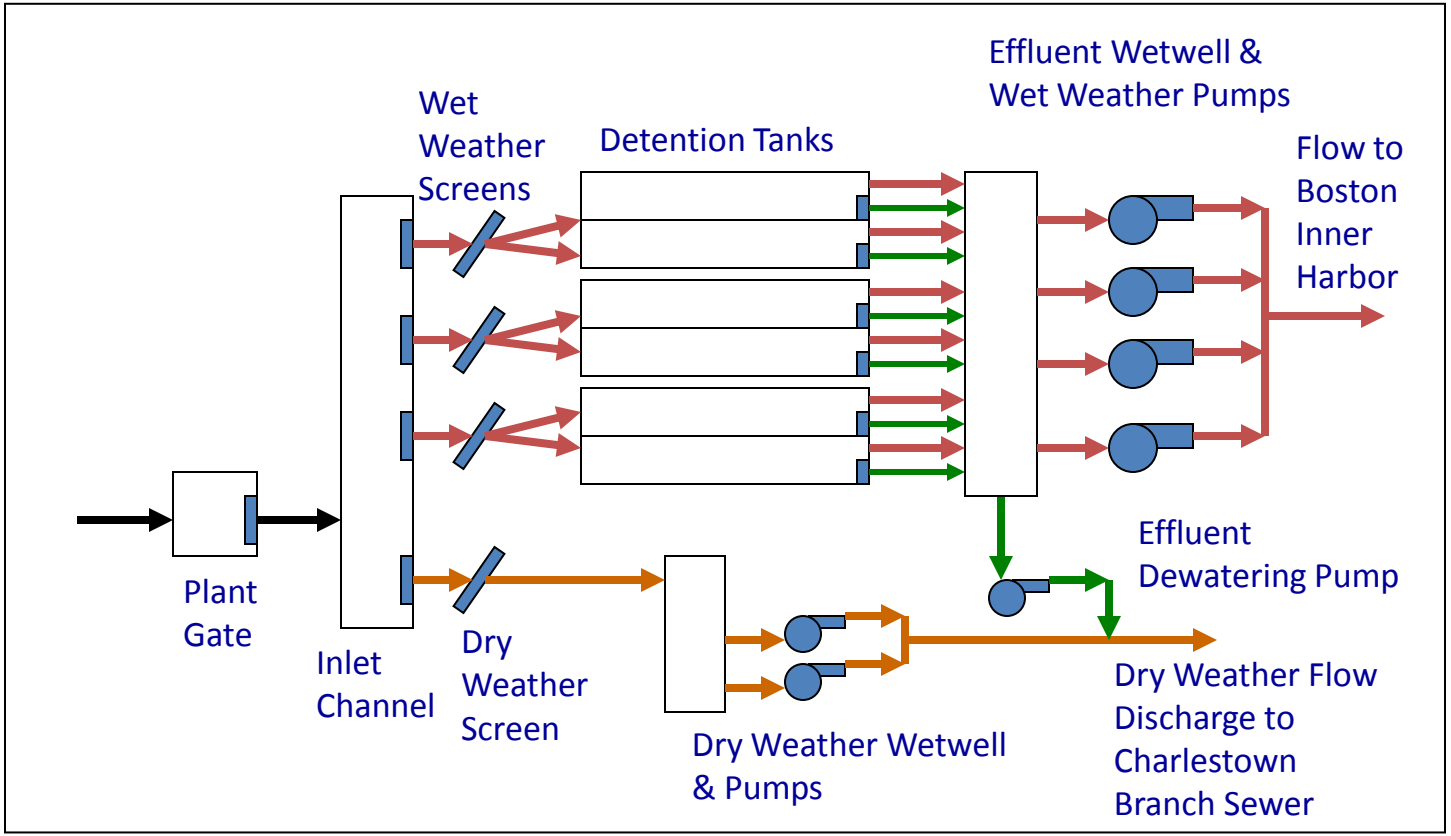
Prison Point CSO Facility – Activations and Volume



Treated Discharges to Boston Inner Harbor (Outfall MWR203)

	Typical Rainfall Year	
	Activations	Discharge Volume (million gallons)
1980's	33	512
2015	18	280
2020	17	243

Process Flow Diagram



2012 Planning Report

- Existing conditions assessment
- Facility in need of renovations
- Recommended upgrades based on:
  - Age of facility
  - Condition of equipment, systems and structures
  - Compliance with applicable building codes

Diesel Engine Powering
Wet Weather Pump

Process/Mechanical Upgrades

Replace following equipment due to age:

- Dry weather pumps
- Detention tank dewatering pump
- Influent and effluent sluice gates
- Mechanical bar screens, conveyor system and grinder
- Post-chlorination sample pumps

Dry Weather and Dewatering Pumps

Mechanical Bar Screens

Wet Weather Pump

Safety, Security, Electrical and Instrumentation Upgrades

- Replace gas monitoring equipment and emergency lighting
- Replace underground fuel storage tank
- Replace electrical switchgear and motor control center
- Repair deteriorated concrete
- Install energy efficient windows, vents and doors
- Upgrade electrical system to be code compliant
- Install second electrical service to facility
- Replace instrumentation PLC, level element sensors and transmitters

Motor Control Center

Programmable Logic Controller (PLC)

Safety, Security, Electrical and Instrumentation Upgrades

Conveyor Belt System and Table

Leaking Chemical Tank

Contract 7359 Award

- Provides design, construction administration and resident engineer services
- Two proposals received
- Selection committee recommends award to Arcadis, U.S., Inc.
- Not–to-exceed amount of $2,838,370

Contract Schedule

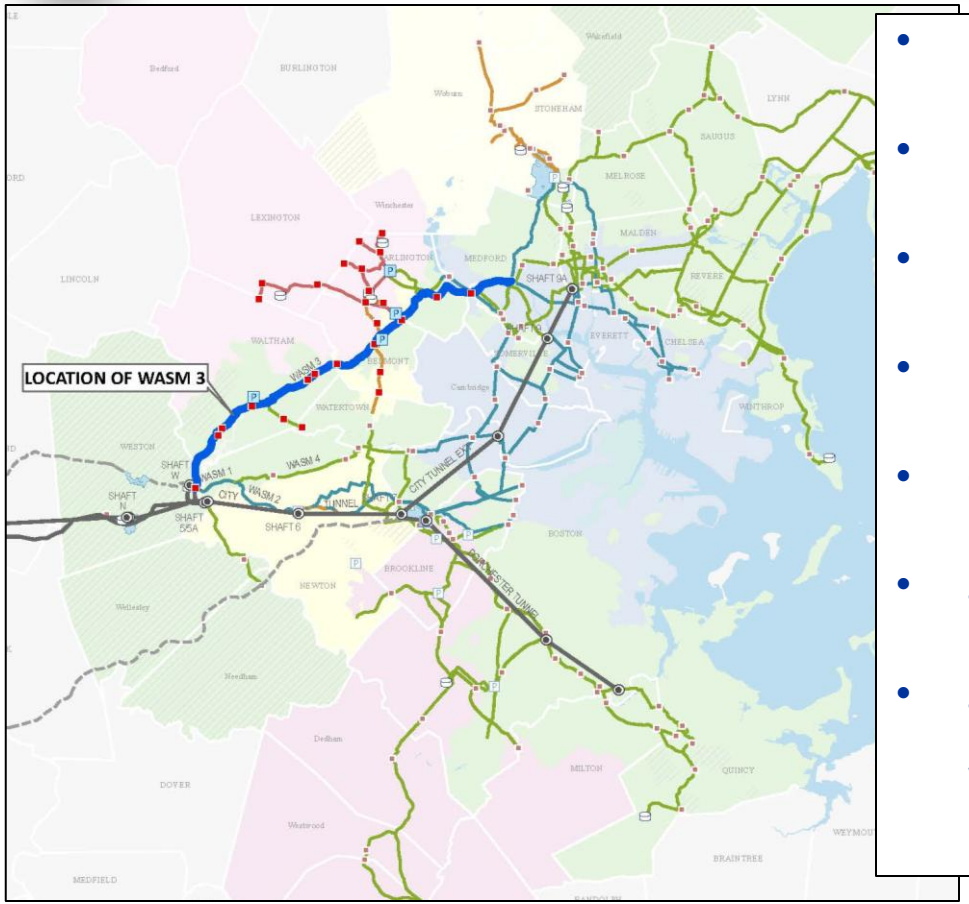
- Award: July 2016
- Design: August 2016 – January 2018
- Construction to Begin: July 2018
- Substantial Completion: July 2020

Weston Aqueduct Supply Main 3

Project Update

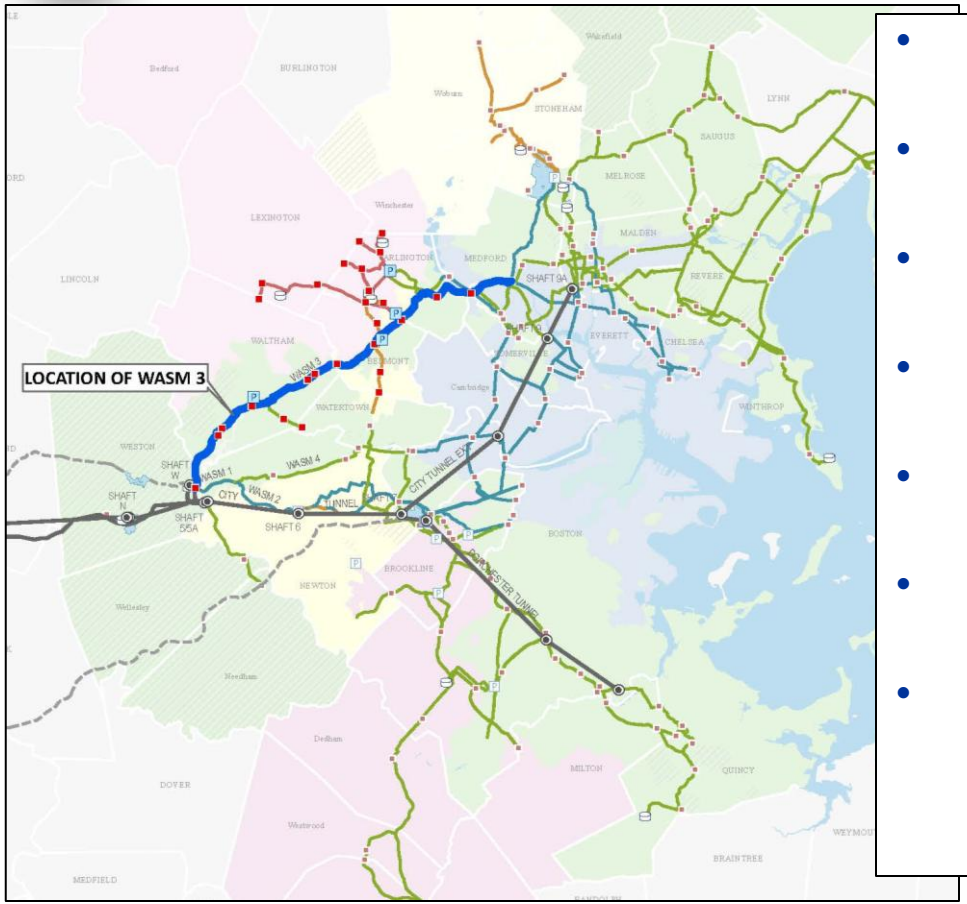
July 13, 2016

WASM 3 Location



- 10 miles long, from Weston to Medford
- 6.6 miles of 60-inch
- 3.4 miles 56-inch, unlined steel pipe
- Installed in 1926, 1927 and 1933
- Carries an average day demand of 18 MGD
- Supplies 250,000 customers
- Supplies Waltham, Belmont, Arlington, Lexington, Watertown, Bedford and Winchester

WASM 3 Location



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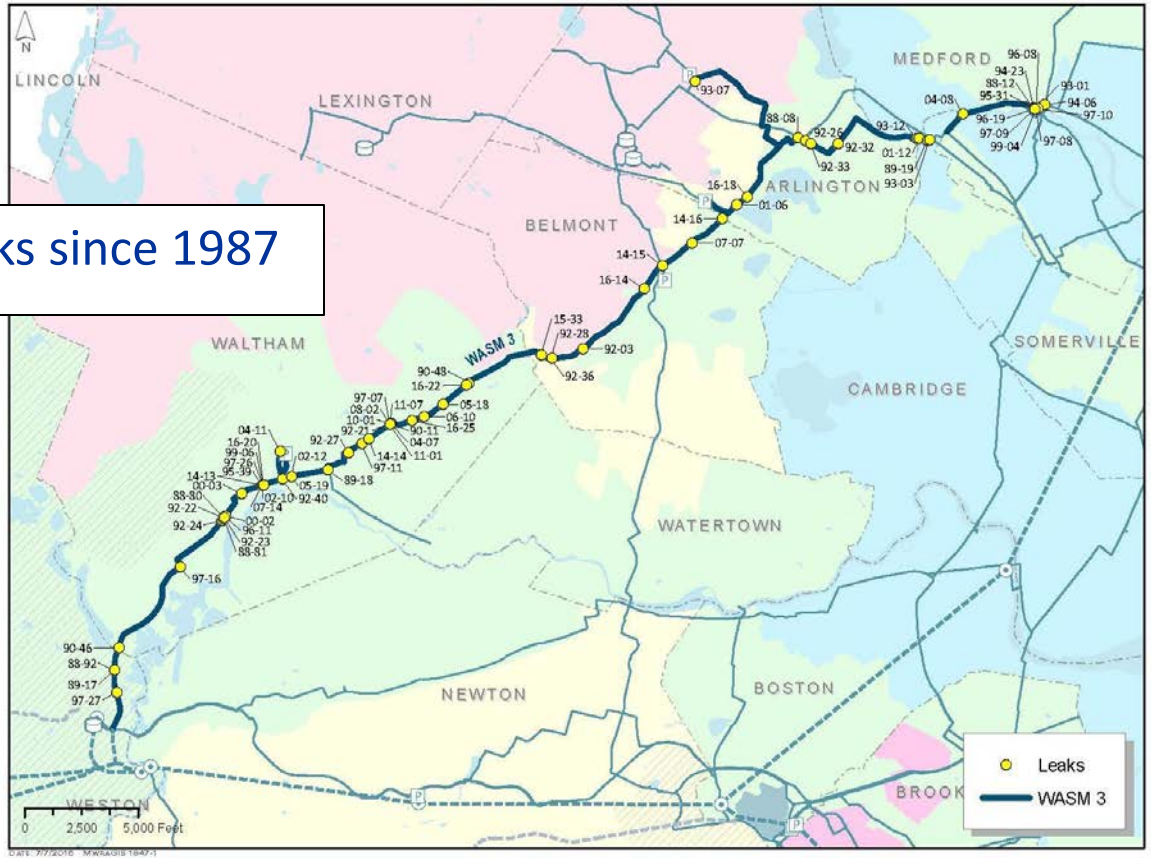
- Supplies 250,000 customers
- Supplies Waltham, Belmont, Arlington, Lexington, Watertown, Bedford and Winchester

WASM 3

- No Existing Redundancy for WASM 3
  - One of the Remaining Largest Single Points of Failure
  - Significant Service Impacts If a Major Break/Leak
  - WASM 3 Necessary Future Component of Any Long-Term Redundancy Option

WASM 3 Leaks

- 72 leaks since 1987



WASM 3 Leak Repairs

WASM 3 Leak Repair

WASM 3 Leak Repair

WASM 3 Baseline Component

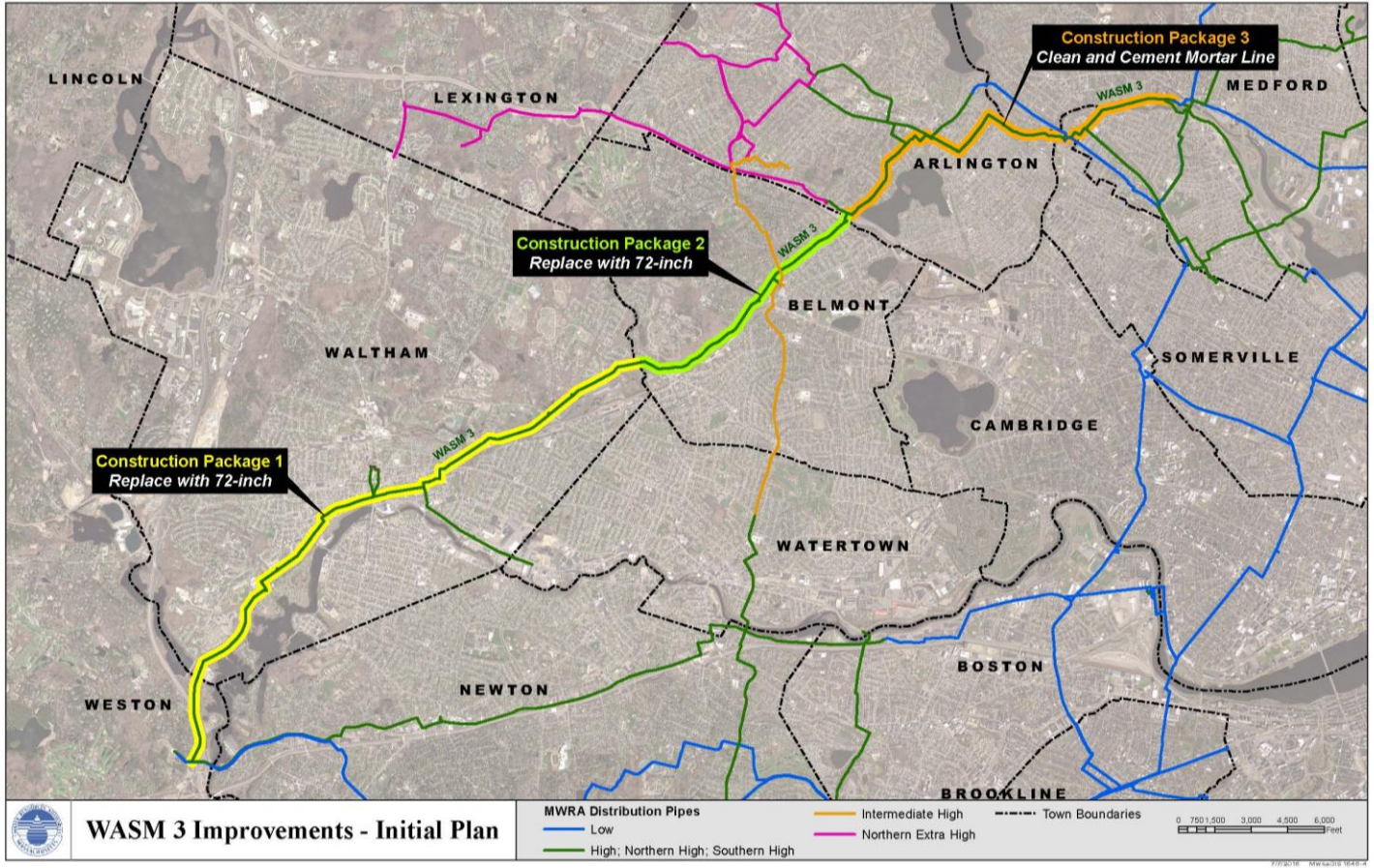
- If a Tunnel Option is Selected for City Tunnel/City Tunnel Extension Redundancy - WASM 3 will be Rehabilitated

- If No Tunnel Option Selected (Initial Plan) - WASM 3 will be Replaced with Larger Diameter Pipe

WASM 3 Project Initial Plan

- Initial Plan – Incorporate into Redundancy Program
  - Replace two thirds of pipe with larger 72-inch pipe
  - Rehabilitate one third of pipe length

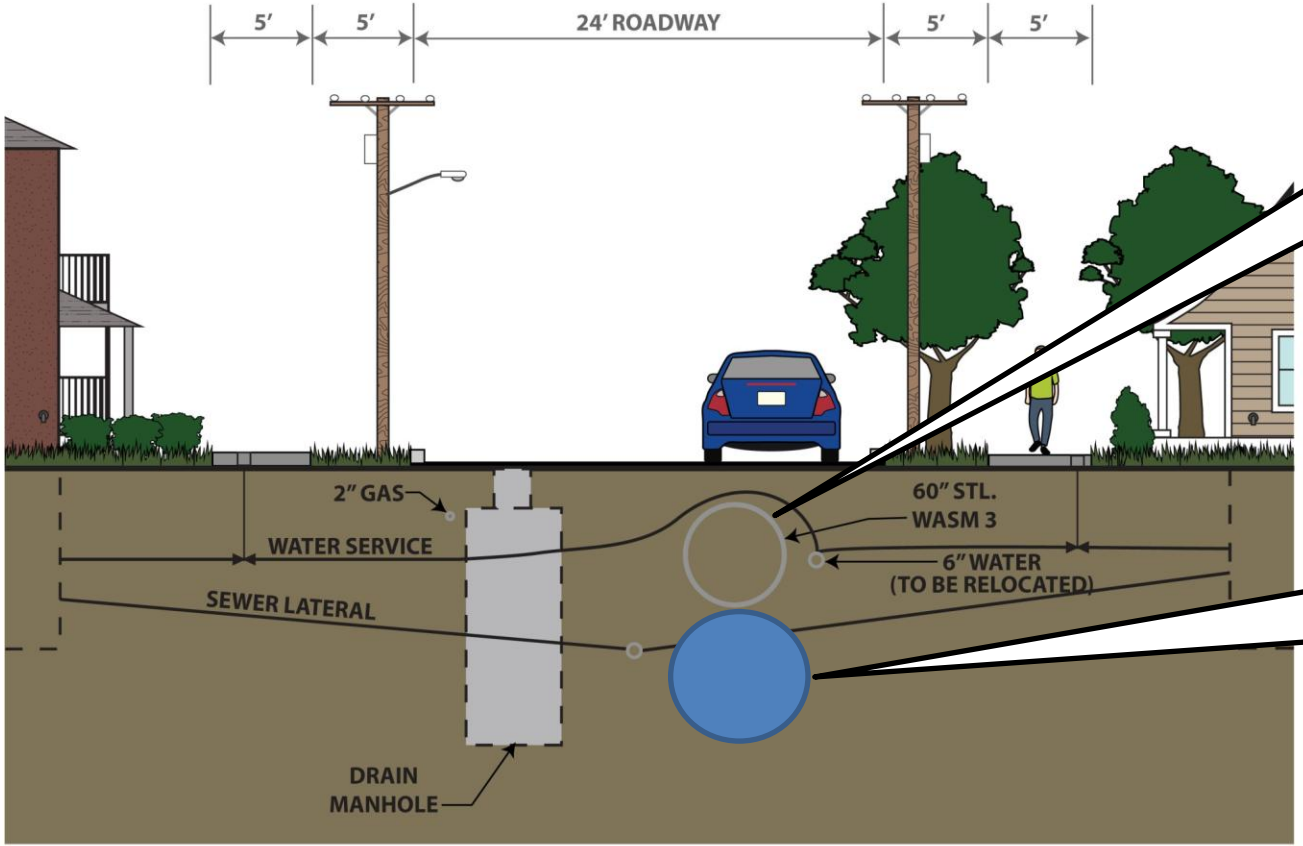
Initial Plan



WASM 3 Project Initial Plan

- Based upon preliminary design - construction feasibility questionable
  - Dense urban areas
  - Congested streets
  - Multiple utilities/extensive utility relocation
  - Street closures/traffic detours
  - Significant public impacts

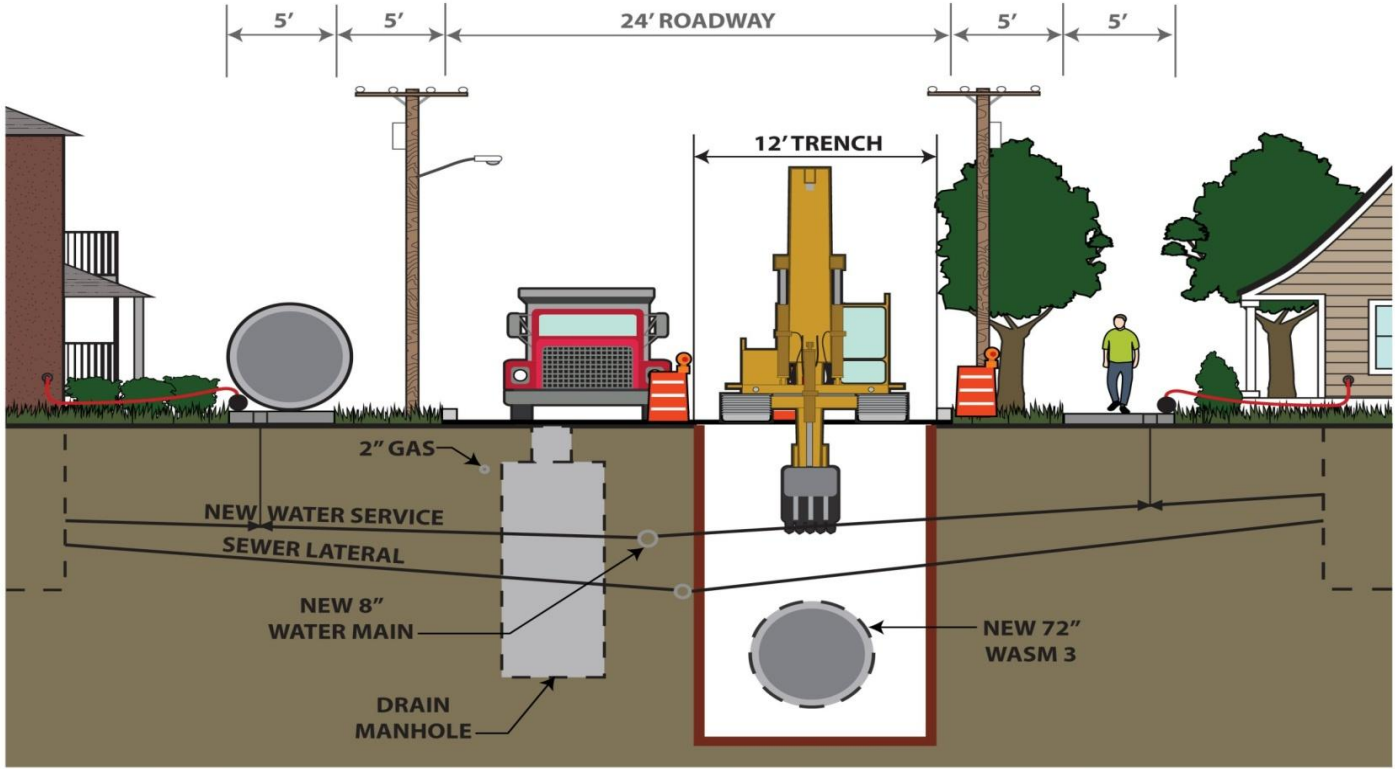
New Pipe Will Be Larger And Deeper



Existing Pipeline is shallow with only 2 to 3 feet of cover

New Pipeline is larger (72”) and requires min. cover of 5 feet

Open Cut Construction



WASM 3 Potential Rehabilitation

- If any northern metropolitan tunnel alternative chosen:
  - 60-inch WASM 3 could be internally rehabilitated with limited pipe replacement
  - Rehabilitation consist of internal cleaning and lining or slip lining
  - Construction impacts considerably less compared to larger pipe diameter (72-inch) open cut replacement

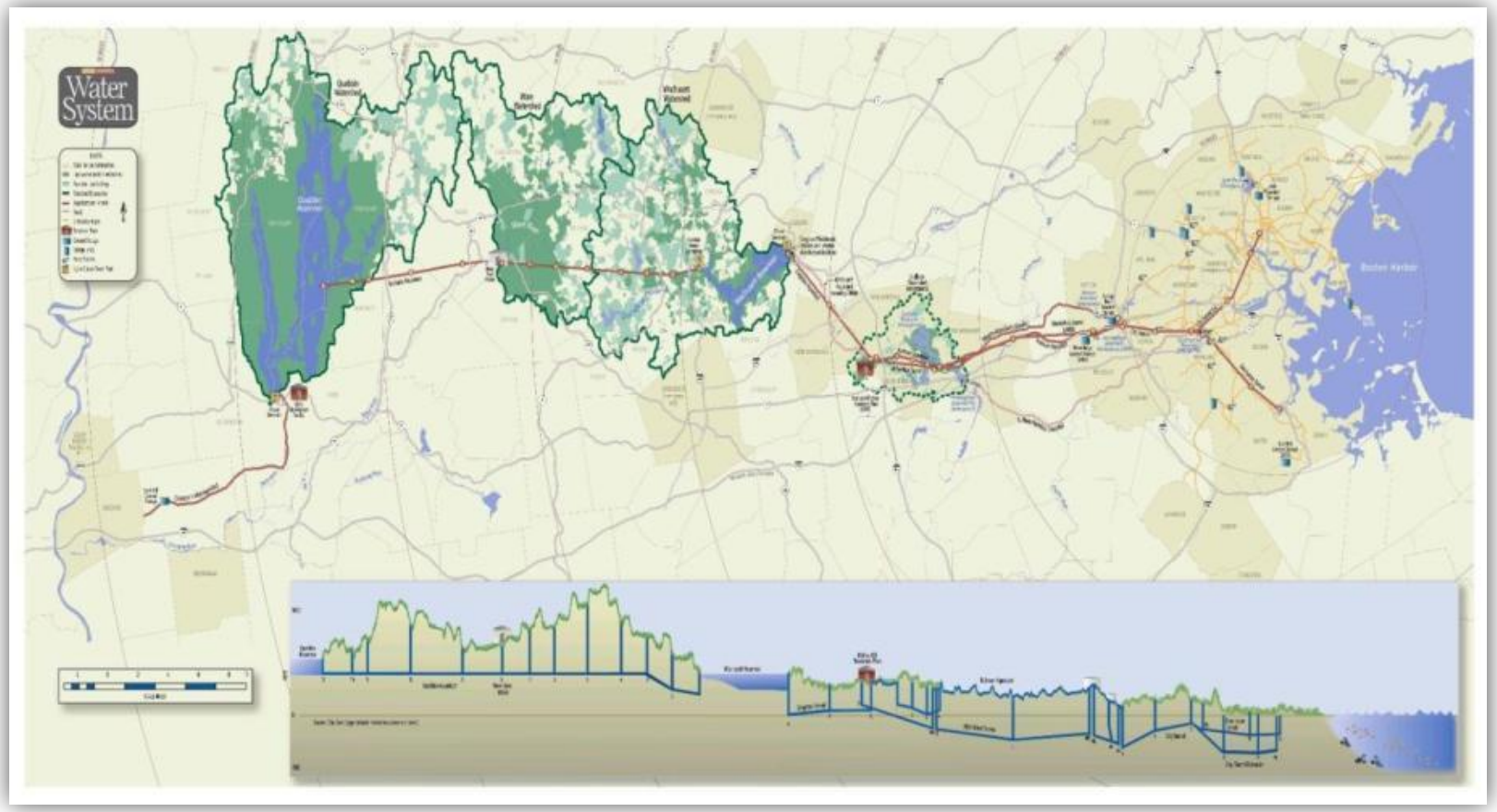
WASM 3 Summary

- Functional reliable WASM 3 necessary
- Alternatives require either 72-inch replacement or 60-inch rehabilitation
- Baseline component of all alternatives to be presented to board with metropolitan redundancy briefing

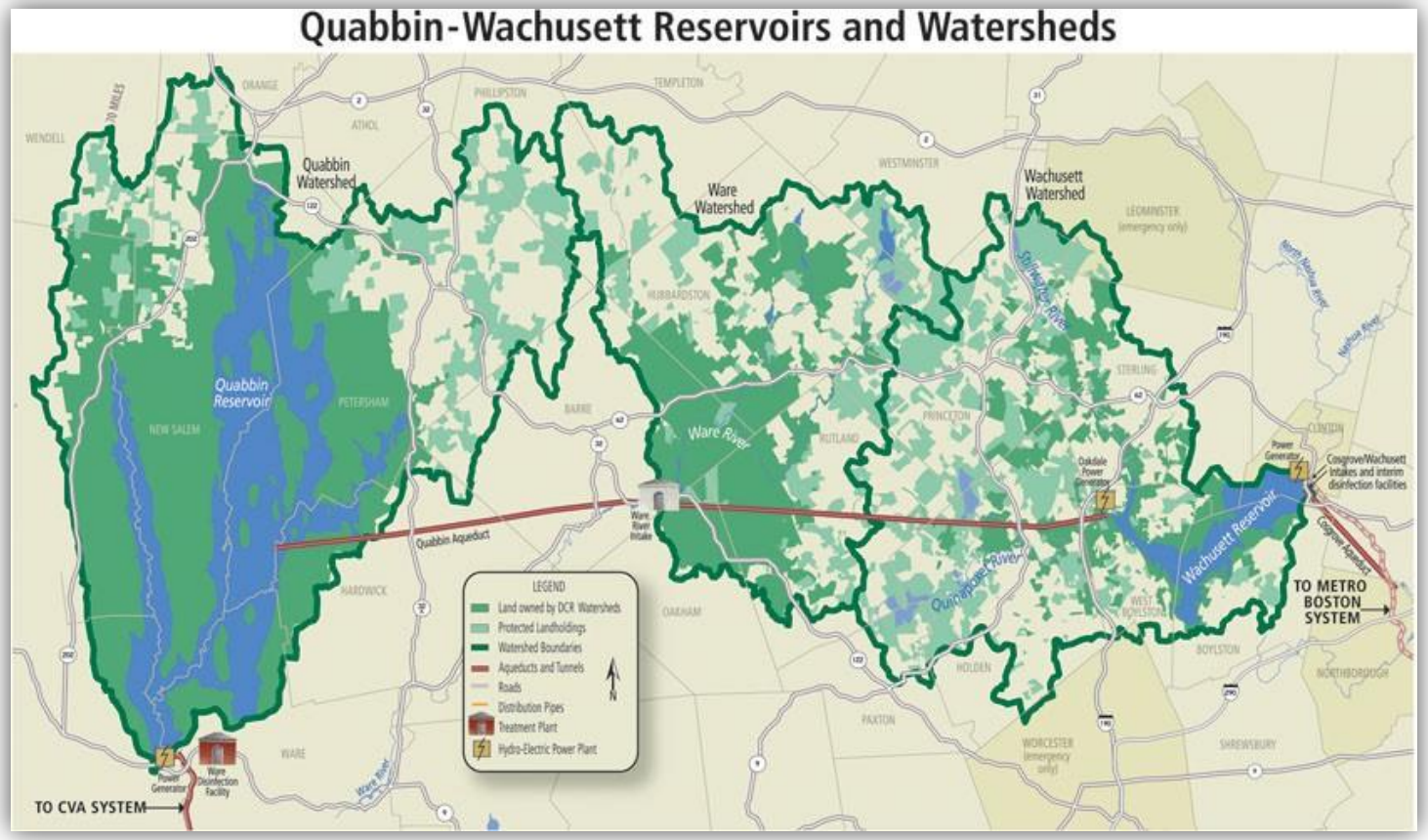
Overview of DCR/MWRA Source Water Protection Program

July 13, 2016

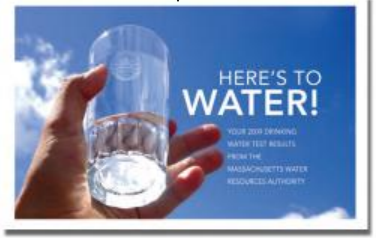
Quabbin-Ware-Wachusett Watersheds as Part of MWRA Water System



Quabbin-Ware-Wachusett Watersheds as Part of MWRA Water System



Watershed Protection – Step 1



Forest Filtered Water Supply

Organization – Agency Intersections

Advisory

- Watershed Advisory Committees
- WSCAC
- MWRA Advisory Board

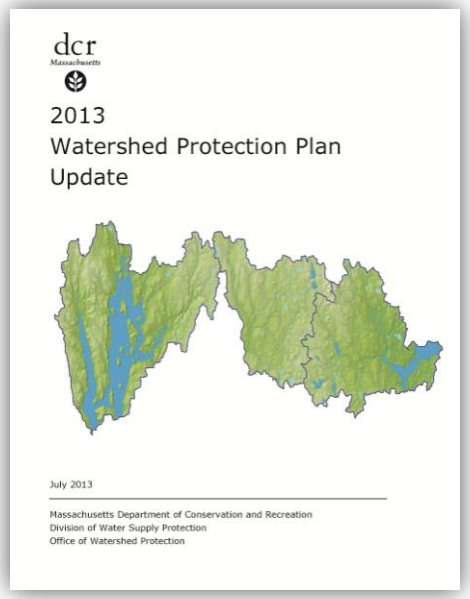
US Army Corps of Engineers

DCR/MWRA Watershed, Reservoir and Water Supply Management

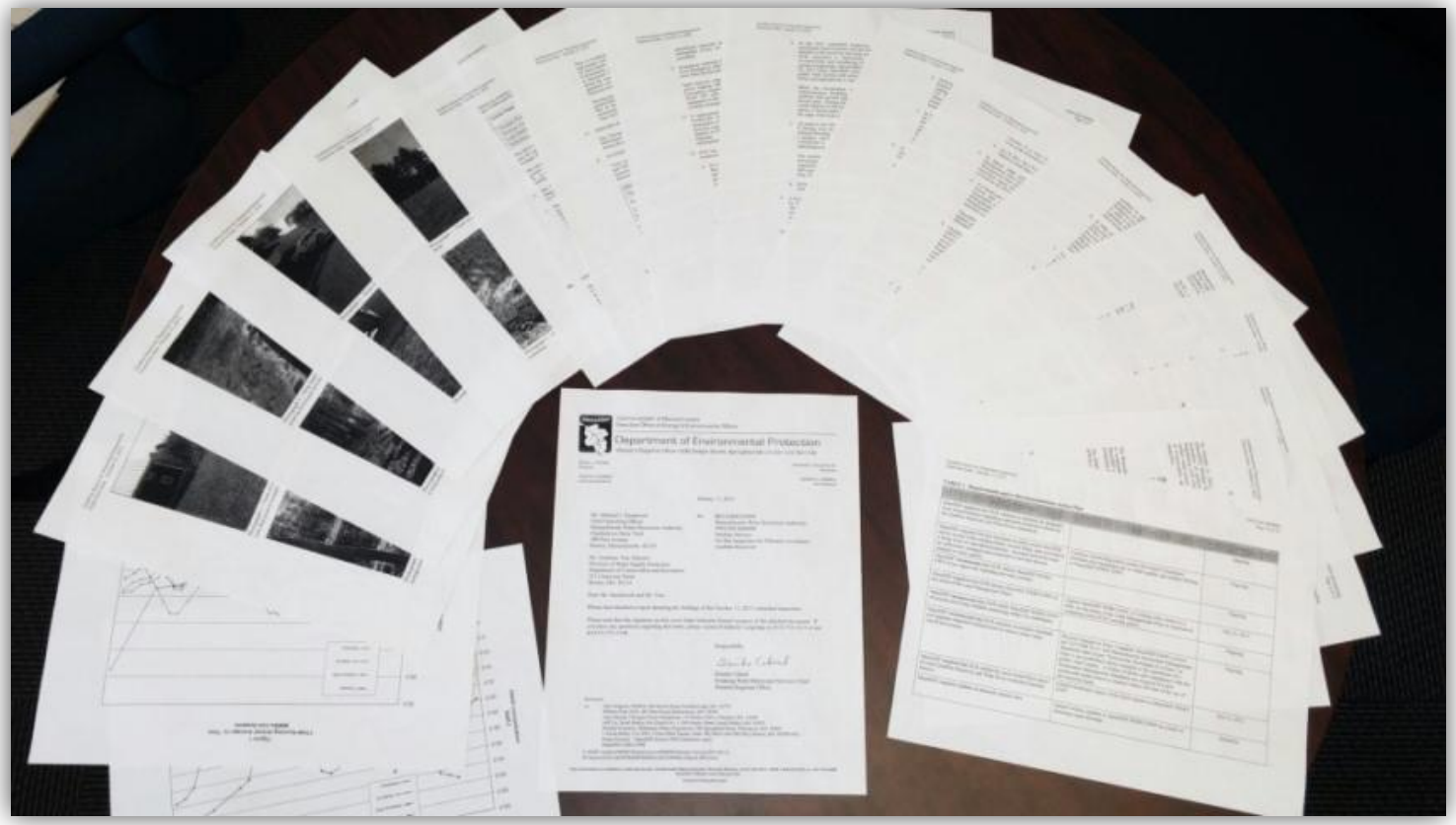
- DCR-DWSP manages the watersheds and reservior Source Water Protection Program. DWSP owns 100,000+ acres.
- DCR and MWRA have operational agreements under MOU for operations of reservoirs and many other components of system management
- MWRA pays for DWSP through Trust ($16m operations, $8m PILOT) plus $1-$2m a year in DWSP watershed land acquisitions and new capital project costs.
- Watershed and Source Protection are the foundation of MWRA's high quality unfiltered water supply.

Organization – Watershed Management Planning

Watershed Protection Plans: 5 years [*Revised 2013; next revision 2018]*
Access Plans: 5-10 years [*Next revision: Quabbin*]
Land Management Plans: 10 years [*Entire system revision in process*]
Other Reports/Studies: Water Quality (annual); Gulls; Invasives



DEP Regulatory Oversight – Annual Inspections and Required Actions, Reports by DCR + MWRA



DCR Watershed Protection Plan - Assessment of Contamination Threats

DCR Watershed System Wide Assessment of Importance of Potential Contaminant Sources for Watershed Program Planning

	Active Supplies			*Emergency Supply*	
Source	**Quabbin**	**Ware**	**Wachusett**	**Sudbury**	**System – Wide**
Wildlife	High	Low	High	Low	Low
Public Access/ Recreation	High	Medium	Medium	Medium	Medium
Timber Harvesting	Low	Low	Low	Low	Low
Wastewater	Medium	Medium	Medium	Low	Lower
Highways/ Railways/ ROW	Medium	Low; High during transfer	High/ High/ Low	Medium	Medium
Agriculture	Low	Low	Low	Low	Lowest
Construction	Low	Medium to High	Medium	Low	Lower
Commercial/ Industrial/ Governmental Sites	Low	Low	Low to Medium	Low	Lower
Residential Sites	Low	Medium	Low to Medium	Low	Lower
Solid Waste Facilities	Low	Low	Low	Low	Lowest
Future Growth	Low	Medium to High	Medium	Low	Lowest
Climate Change	Medium	Low	Low	Low	Lowest

DCR Watershed Protection Plan - Goals and Programs

DWSP Watershed Protection Programs

Goal	DWSP Watershed Protection Programs	Quabbin, Ware River, Wachusett	Sudbury
Protect land through ownership or agreement.	Land Procurement	✓	
	Land Preservation	✓	
Manage DWSP-owned properties to protect and enhance water quality, and provide stewardship of natural resources.	Land Management	✓	✓
	Wildlife Management	✓	✓
	Public Access Management	✓	✓
	Watershed Security	✓	✓
	Infrastructure	✓	✓
Work with watershed communities to foster watershed protection principles on land in private ownership.	Watershed Protection Act	✓	
	Technical Assistance and Community Outreach	✓	
	Interpretive Services	✓	✓
Monitor to identify potential or existing water quality problems.	Water Quality Monitoring	✓	✓
	Environmental Quality Assessments	✓	
	Emergency Response	✓	✓

Trust Annual Workplan and Progress Tracking

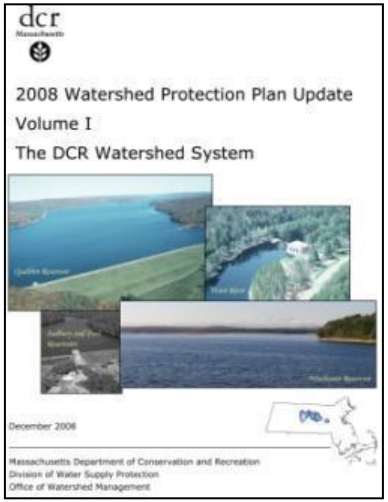
- Example of Annual Report
- Each Watershed has over 100 Tasks

Task #	Task Description	Lead	Product	% Complete	Comments
44	Continue ongoing communication and coordination with local state, and federal emergency responders; coordinate with MWRA on all security issues. Submit weekly incident summaries to MWRA.	WR	Ranger logs	100%	On-going, as needed. DCR participated in regional ER group.
45	Assess Wachusett Dam, spillways, and dikes monthly. Forward all significant issues to the Regional Director and the MWRA. Coordinate with MWRA on biannual dam safety inspections for compliance with 302 CMR 10.00.	CE	Inspection logs and reports, summary reports	100%	On-going.
46	Assess Sudbury system Dams, Spillways, and dikes monthly. Forward all significant issues to the Regional Director and the MWRA.	CE	Inspection logs and reports, summary reports	100%	On-going.
47	Implement Wachusett Dam /Dike maintenance plan to improve condition of structures.	CE	Inspection reports, summary reports	100%	Limb clearing; new mowing schedules.
48	Provide supervision, coordination, oversight, and technical support or assistance for all engineering, construction, and renovation work in Section.	CE	Inspections, records of construction and maintenance operations	100%	Ongoing. Work included Gate 2 work, Boat Cove ramp, North and South Dike vegetation removal, and Gate 30 roadway relocation.
49	Maintain records regarding reservoir and facility construction and maintenance operations.	CE	Misc. records	100%	On-going, as needed.
50	Develop maintenance/assessment plan for smaller, confirmed DCR dams in Wachusett watershed.	CE	Plan	100%	Plan developed.
51	Monitor condition of River Rd. (Lower Rd.), Clinton.	CE	Inspection log	100%	On-going.
52	Develop Emergency Action Plans for smaller, confirmed DCR dams in Wachusett watershed.	CE	Plan	100%	On-going.
53	Work with MA Riverways to develop plan for re-integrating Edwards Pond into the stream community. File all necessary permits. Remove dam, contingent on permit approvals.	CE	Plan	100%	Project halted due to sediment "contamination" concerns (natural/background levels exceed state/federal dredge disposal concentrations) and costs.
54	Complete 2-5 miles of roadway repairs per year.	WM	Work completion	100%	Drainage work on Gate 28 road as well as maintenance of culverts and ditches.
55	Continue to clean buildings, pickup trash, recycle paper products, and perform routine building repairs when needed.	WM	Work completion	100%	On-going, as needed.

Why Land Acquisition?

- The management and maintenance of watershed lands in a natural condition is paramount to the continuous supply of pure water
- The finest drinking waters in the world are a product of the natural filtering processes of a forested landscape
- The replication of these natural processes using infrastructure-based treatment and filtration is inferior to, and more expensive than, the incomparable benefits derived from watershed land protection

Watershed Protection Planning



Land Procurement and *Land Preservation* Programs are major control program for 8 out of the 12 identified sources of pollutants to the watershed system.

4 overarching concepts guiding DWSP watershed management:

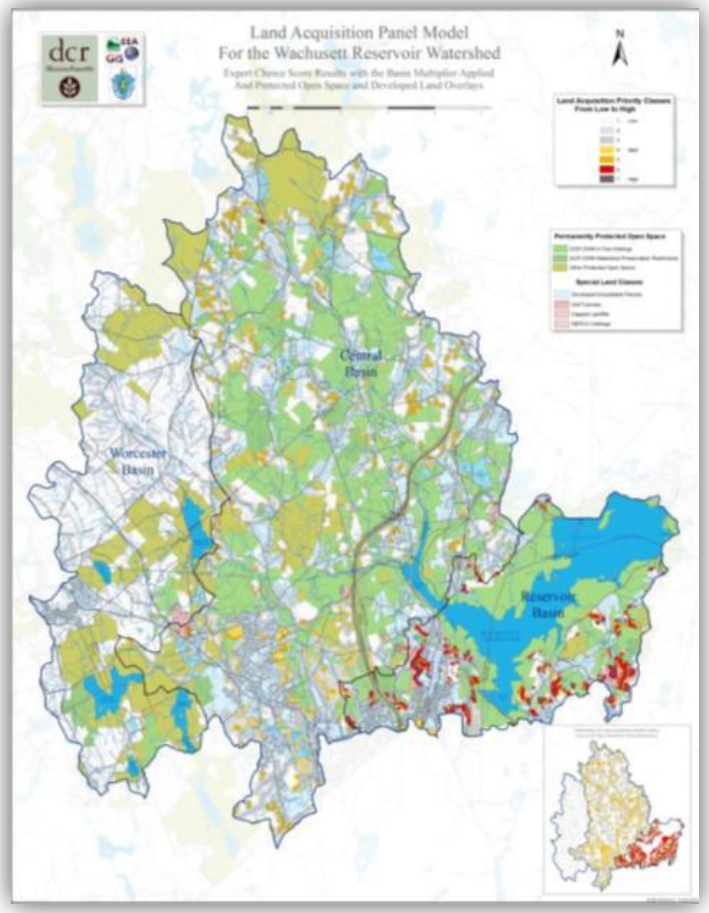
1. ***Protect the most sensitive areas of the watershed through ownership or agreements with land owners.***
2. Manage DWSP-owned properties to protect water quality and provide stewardship of natural resources.
3. Work with watershed communities to protect water resources while accommodating community needs.
4. Monitor to identify potential or existing water quality problems.

	Control Program or Measure													
Source	**Land Procurement**	**Land Preservation**	**Land Management**	**Wildlife Management**	**Public Access Management**	**Watershed Security**	**Infrastructure**	**Watershed Protection Act**	**Technical Assistance & Community Outreach**	**Interpretive Services**	**Water Quality Monitoring**	**Environmental Quality Assessment**	**Emergency Response**
Wildlife			●	●	●						●	●	
Public Access/ Recreation			●	●	●	●	●			●	●	●	
Timber Harvesting			●				●				●	●	●
Wastewater	●	●						●		●	●	●	
Roadways/ Railways/ ROWs											●	●	●
Agriculture	●	●						●	●		●	●	
Construction	●	●						●	●	●	●	●	
Commercial, Industrial, and Governmental Sites	●	●						●	●	●	●	●	●
Residential Sites	●	●						●	●	●	●	●	
Solid Waste Facilities	●	●						●		●	●	●	
Future Growth	●	●	●	●	●			●	●	●	●	●	
Climate Change	●	●									●	●	●

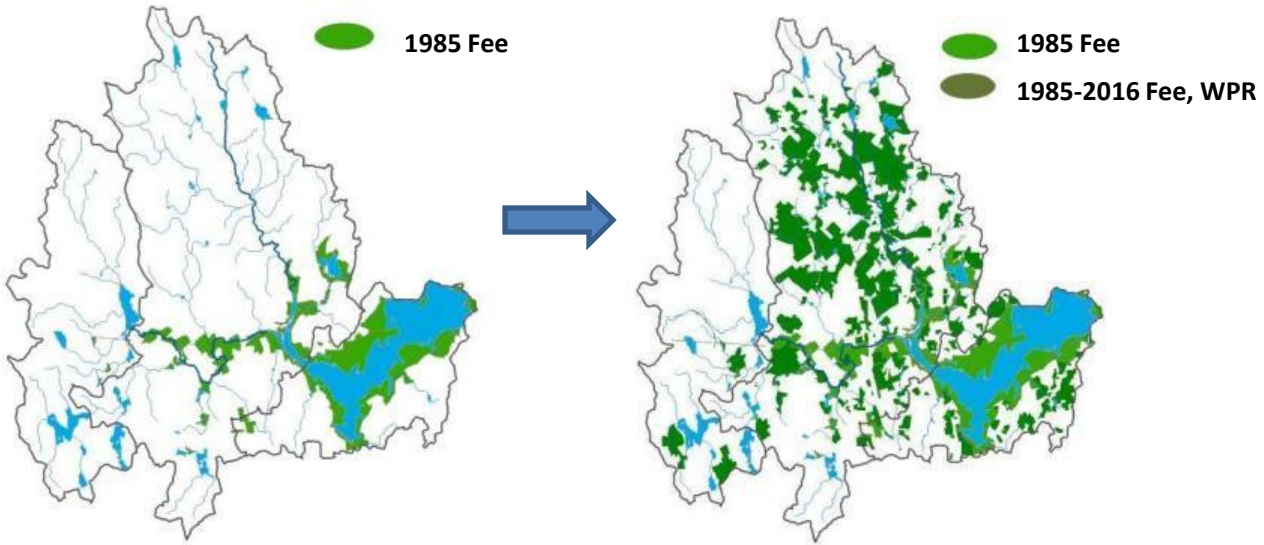
Scientific Method for Targeting Acquisitions in Wachusett Watershed

- Land Acquisition Panel formed in 1993
- DCR and MWRA scientists, planners, engineers, and foresters utilized “Expert Choice” analysis of land use factors in Wachusett watershed to determine water quality protection priorities.
- LAP has very high standards, rejects many possible projects
- GIS used to rate every parcel of land
- Method has been duplicated across country
- Process minimizes subjective elements (e.g. beauty, views) and removes outside pressures

Wachusett Land Acquisition Panel Model



Watershed Land Acquisition 1985 - 2016



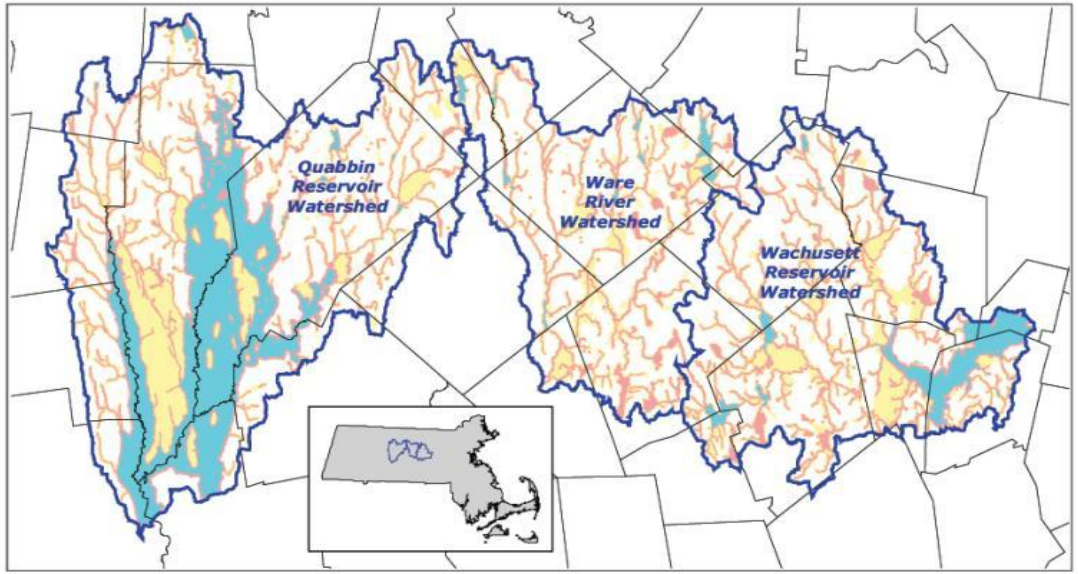
- 7.9% owned
- 5,600 acres almost all around Reservoir

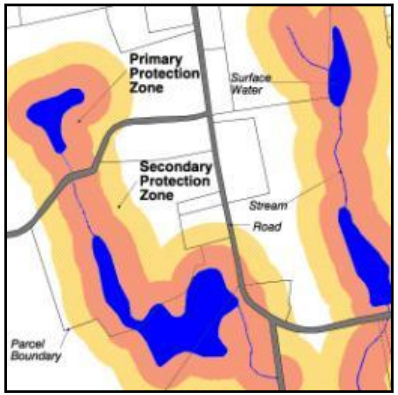
+ 2 main tribs

- Little buffer

- 28.4% owned/restricted
- 360+ acquisitions
- 20,123 acres with more substantial tributary buffers and large forested blocks

Regulations – Watershed Protection Act





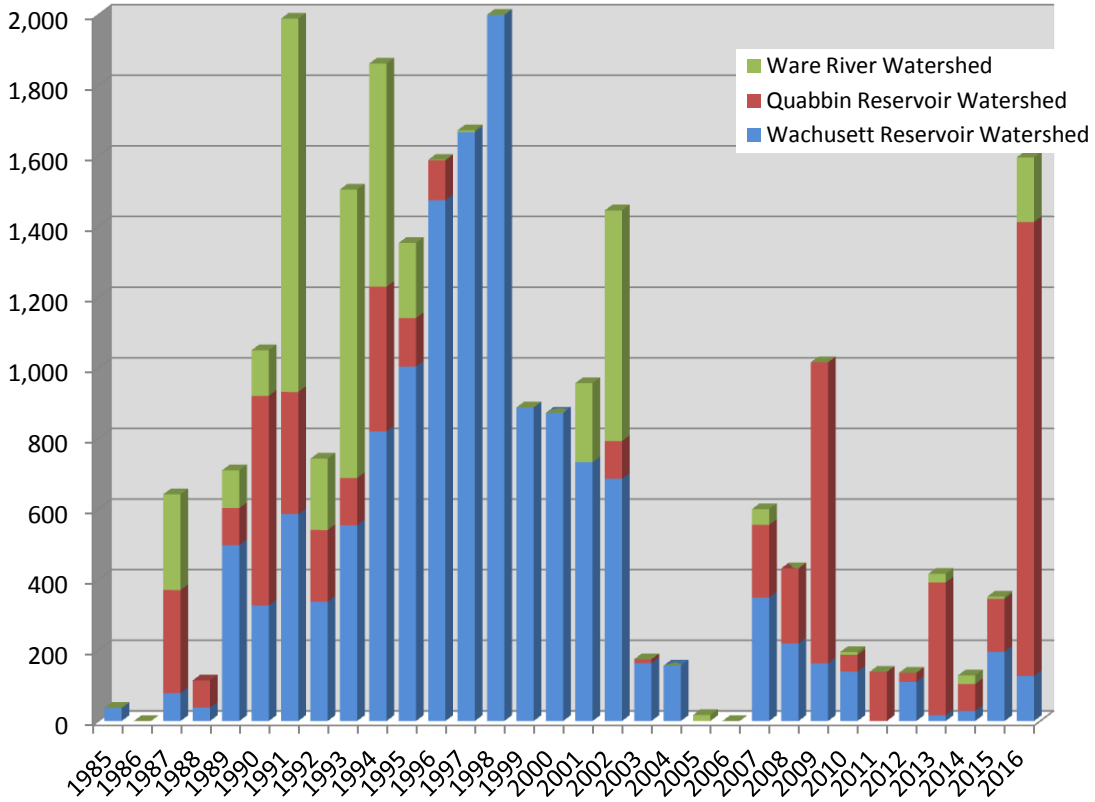
- Towns with affected parcels: 22
- Approximate number of affected parcels: 8,200
- Approximate area regulated: 28,000 acres
  (13,000/46% Primary; 15,000/54% Secondary)
- Percent of watersheds regulated: 12%
  (8% of Quabbin; 13% of Ware; 17% of Wachusett)

- It has pro-actively limited the water quality impacts of many projects
- As intended by the legislature, it has not been a barrier to growth in the region

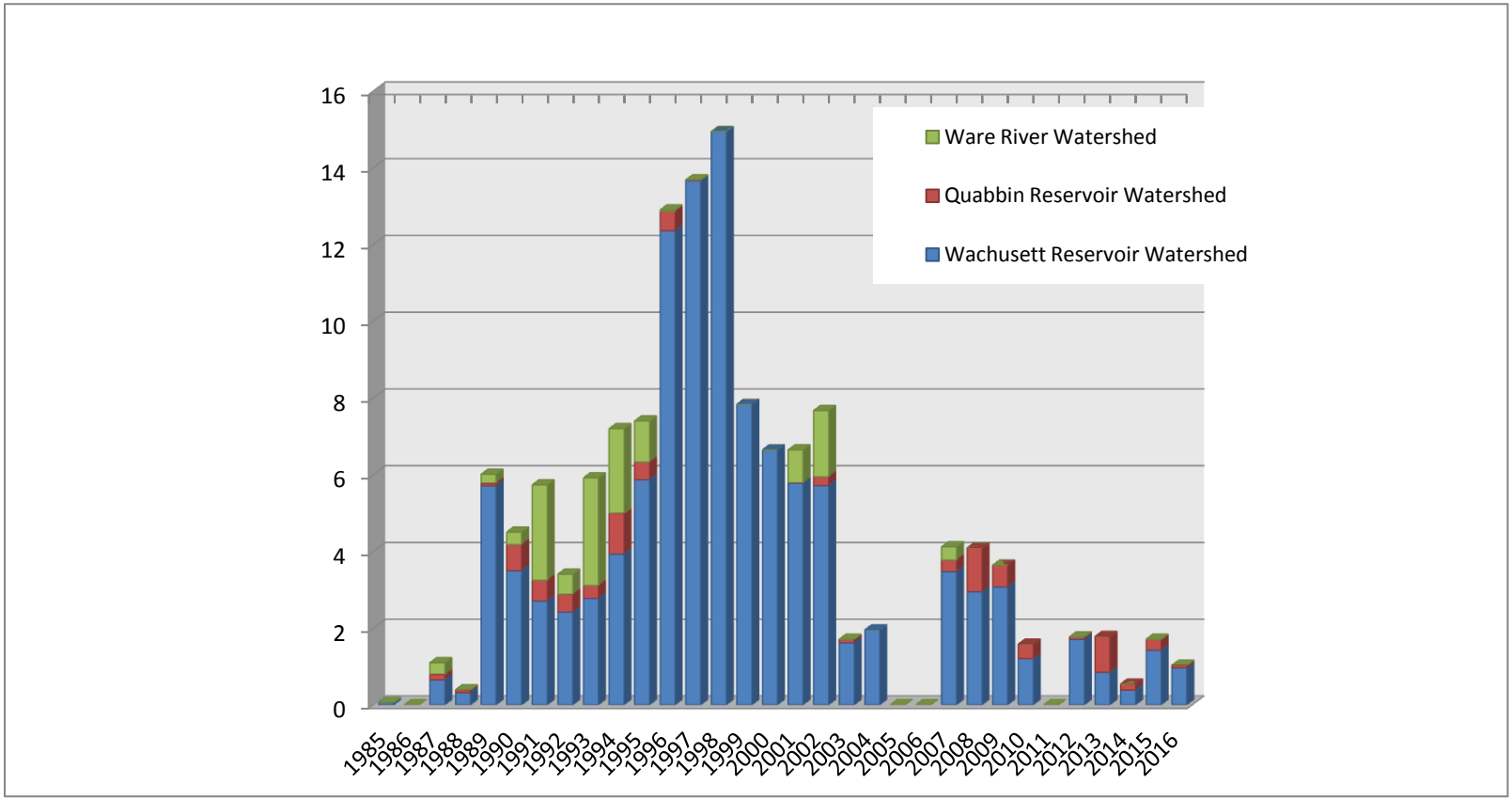
Purpose of Land Acquisition – Keep Watershed Forests and Fields

Bear Hill – Rutland Development

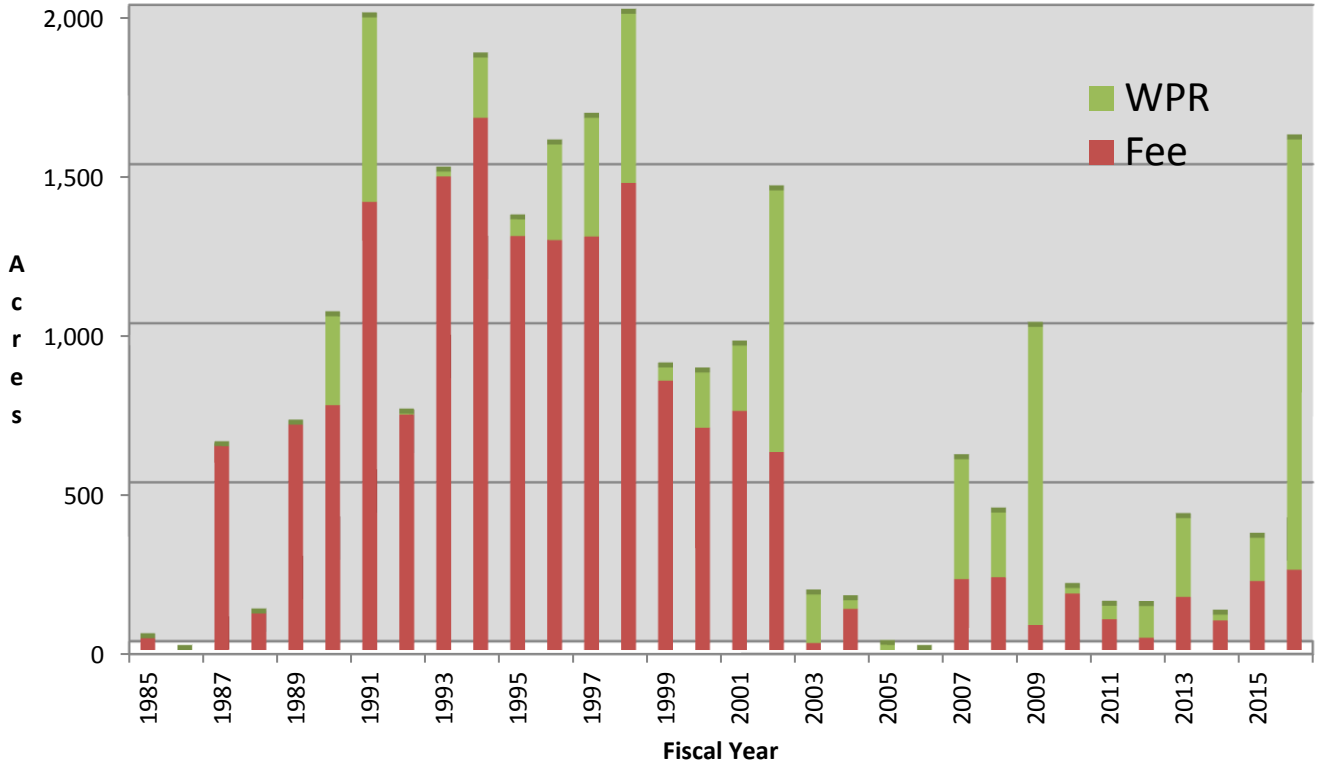
DCR Watershed Land Acquisition 1985 - 2016: Acres a Year by Watershed



DCR Watershed Land Acquisition 1985 - 2016: Spending by Year by Watershed

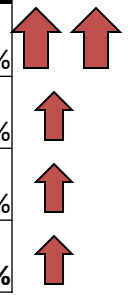


DCR Watershed Land Acquisition 1985 - 2016: Fee & WPR Breakdown



Protected Lands in DCR/MWRA Watershed System - 2016

Percentage of Protected Land by Watershed 1985-2016				
Watershed	DCR % watershed 1985	DCR % watershed 2016	Other Protected Lands % watershed	Total Protected
Wachusett	8%	28%	18%	46%
Ware	31%	38%	12%	50%
Quabbin	54%	60%	16%	66%
Total	**34%**	**45%**	**16%**	**51%**



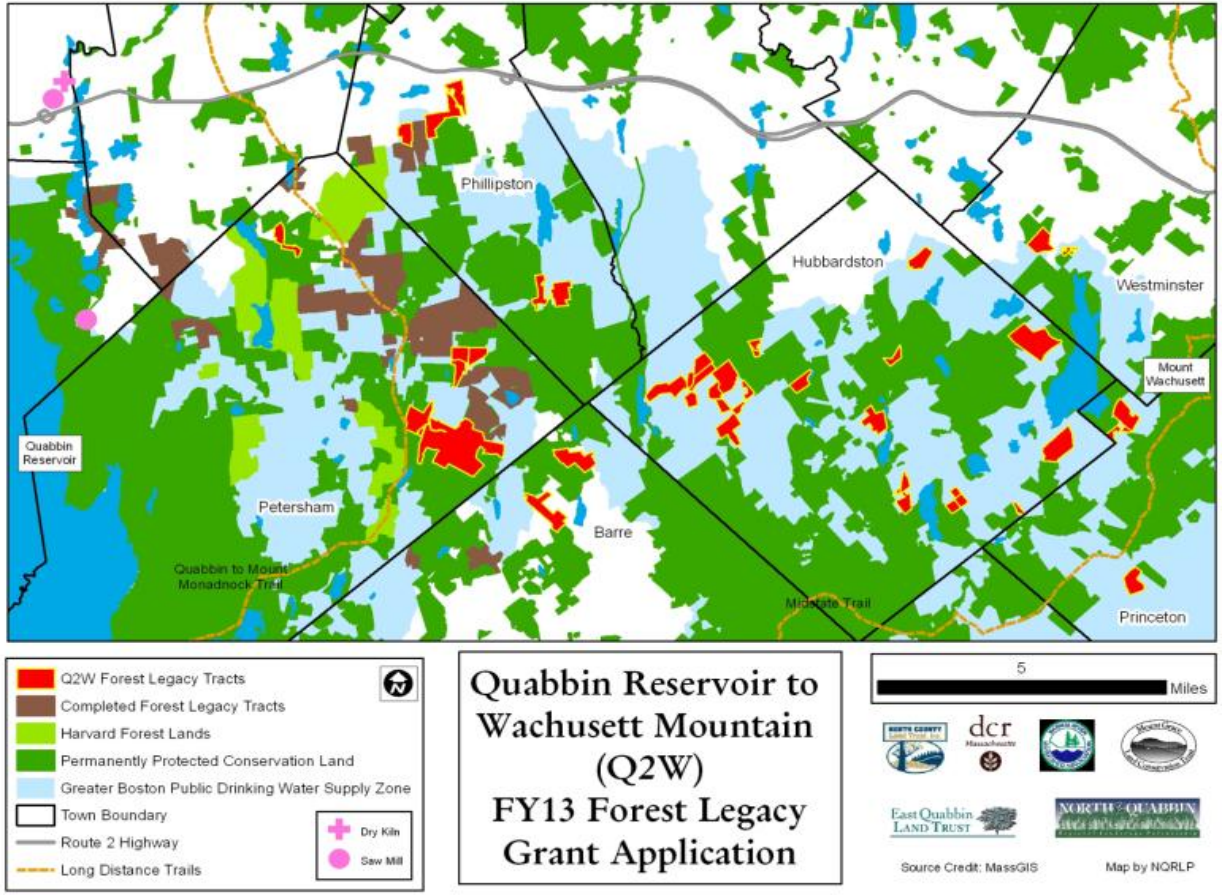
Land Acquisition Strategy FY14-18

- Continue to allocate $1-$1.5 million annually for the period of FY14-18.
- Bring additional opportunities of critical nature to the MWRA Board's attention.
- Continue focus on acquisition by WPR where possible.
- Utilize the LAP Wachusett Model to identify high rated parcels for acquisition.

Use of Non-MWRA Funds

- Gifts and Bargain Sales
  (Federal Deductions and State Tax Credits)
- Collaboration with Non-Profits, Municipalities
- USDA's Forest Legacy Program
- Municipal Acquisitions

"Q2W" Forest Legacy Application



Milestones Reached

- Over 520 parcels acquired
- Over 24,800 additional acres protected via fee and WPR acquisitions
- Over 7,000 acres in WPRs acquired
- Over $136 million spent
- Wachusett watershed acquisitions played large role in successful filtration avoidance decision by federal courts
- Program is a national model in science-based acquisition targeting and use of GIS

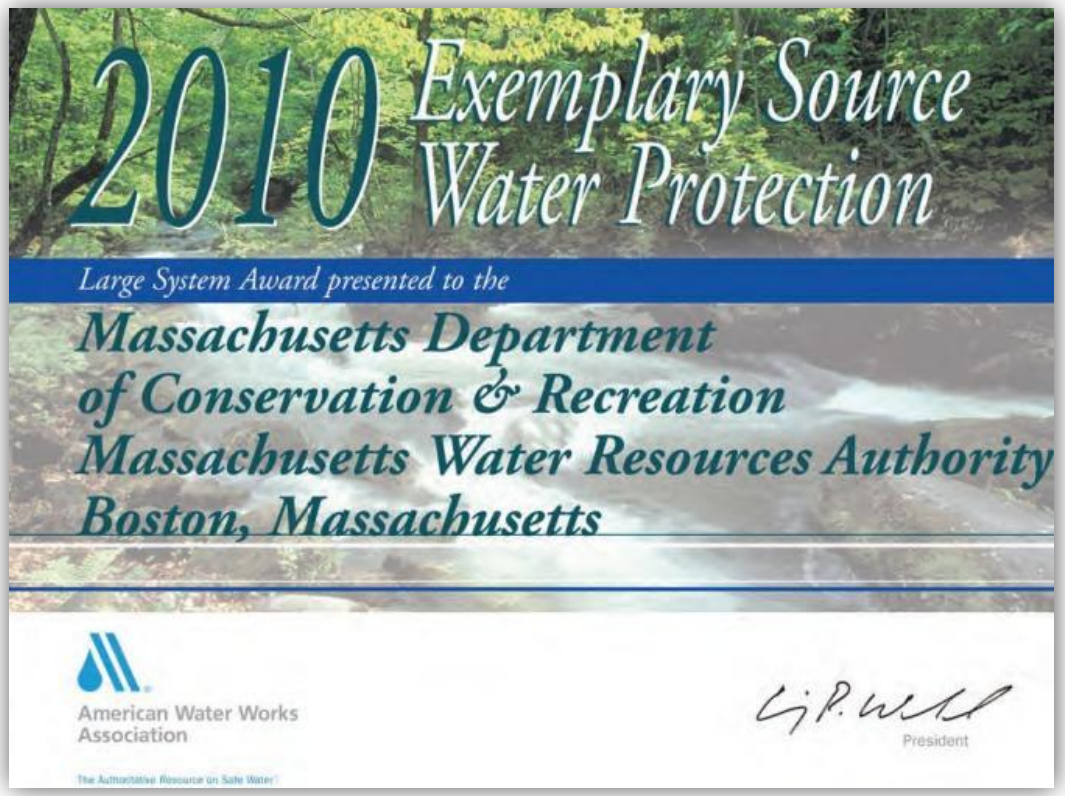
Goodale Property – West Boylston, Wachusett Watershed (14 acres)

Haddad Property – Wendell, Quabbin Watershed (70 acres)

Selden Property – Petersham, Quabbin Watershed (287 acres)

Tashjian Property – West Boylston, Wachusett Watershed (29 acres)

Program Recognition



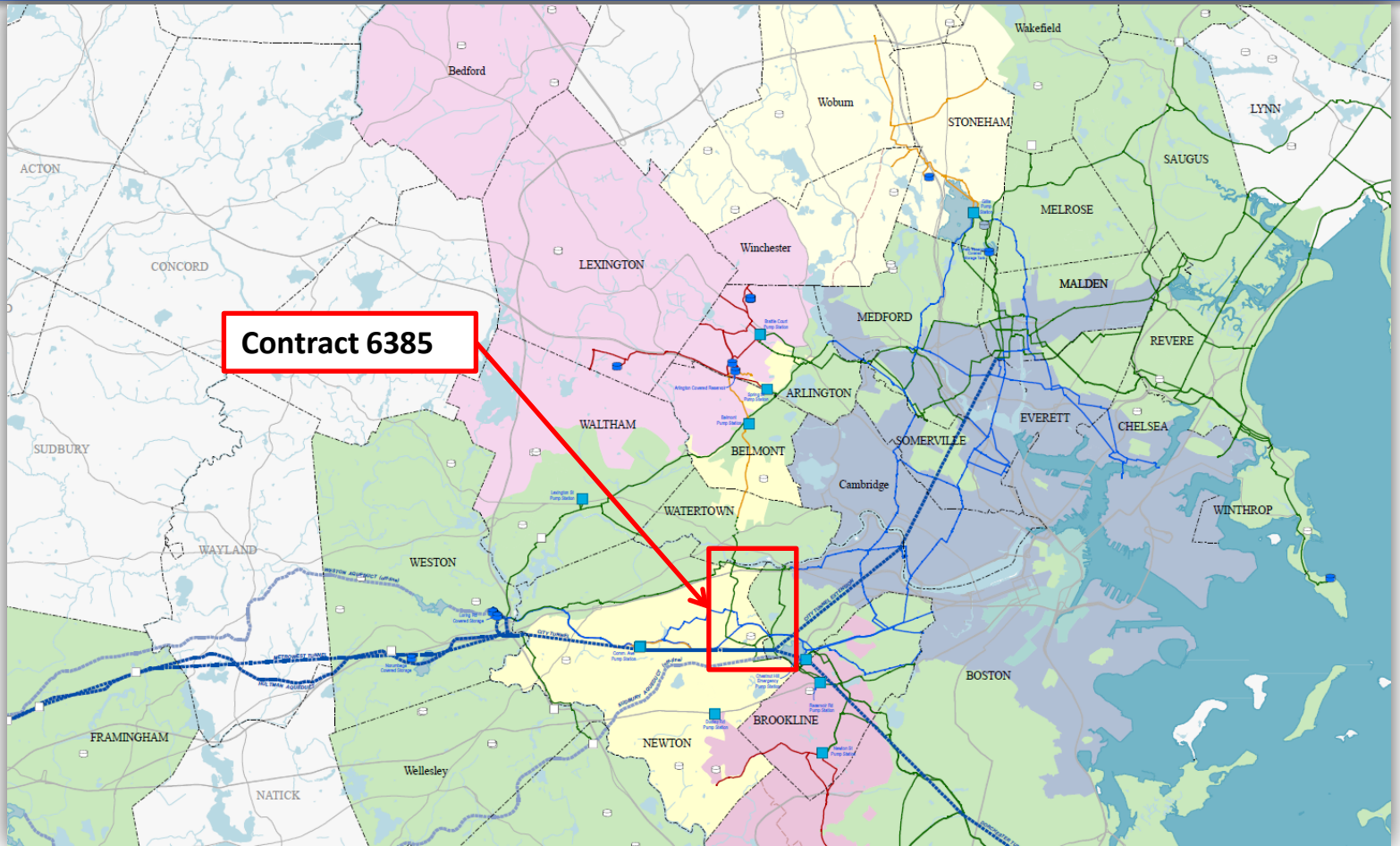
+ 2016 DEP Source Water Protection Award – Wachusett Reservoir

Rehabilitation of Sections 23, 24 and 47 Water Mains

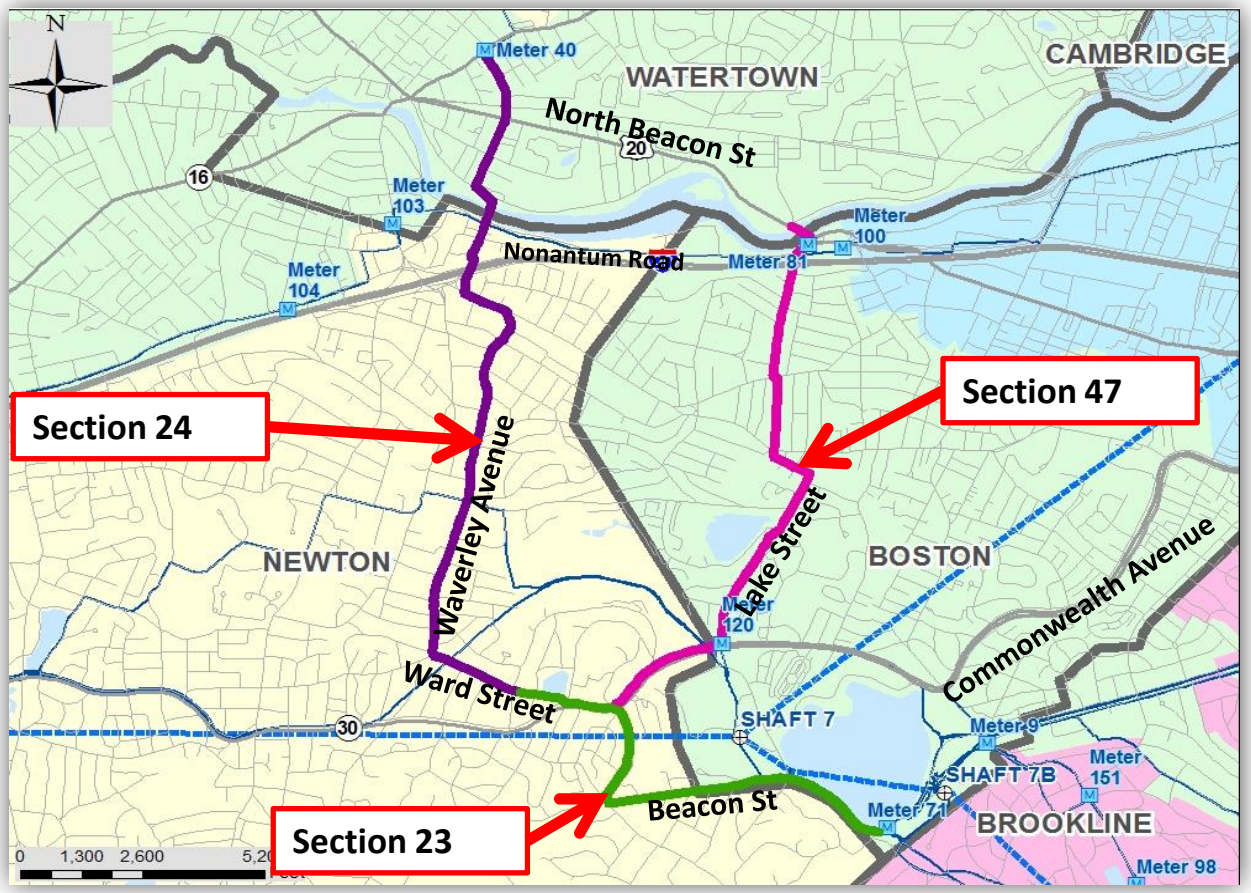
Contract 6385

July 13, 2016

Water Distribution System



Contract 6385 Location Map



Background

- Section 23:
  - 119-year-old
  - 36-inch diameter cast iron pipe
  - 8,700 LF
- Section 24:
  - 119 year-old
  - 20-inch cast iron main
  - 11,800 LF
- Section 47:
  - 98 year-old
  - 20-inch cast iron main
  - 10,150 LF

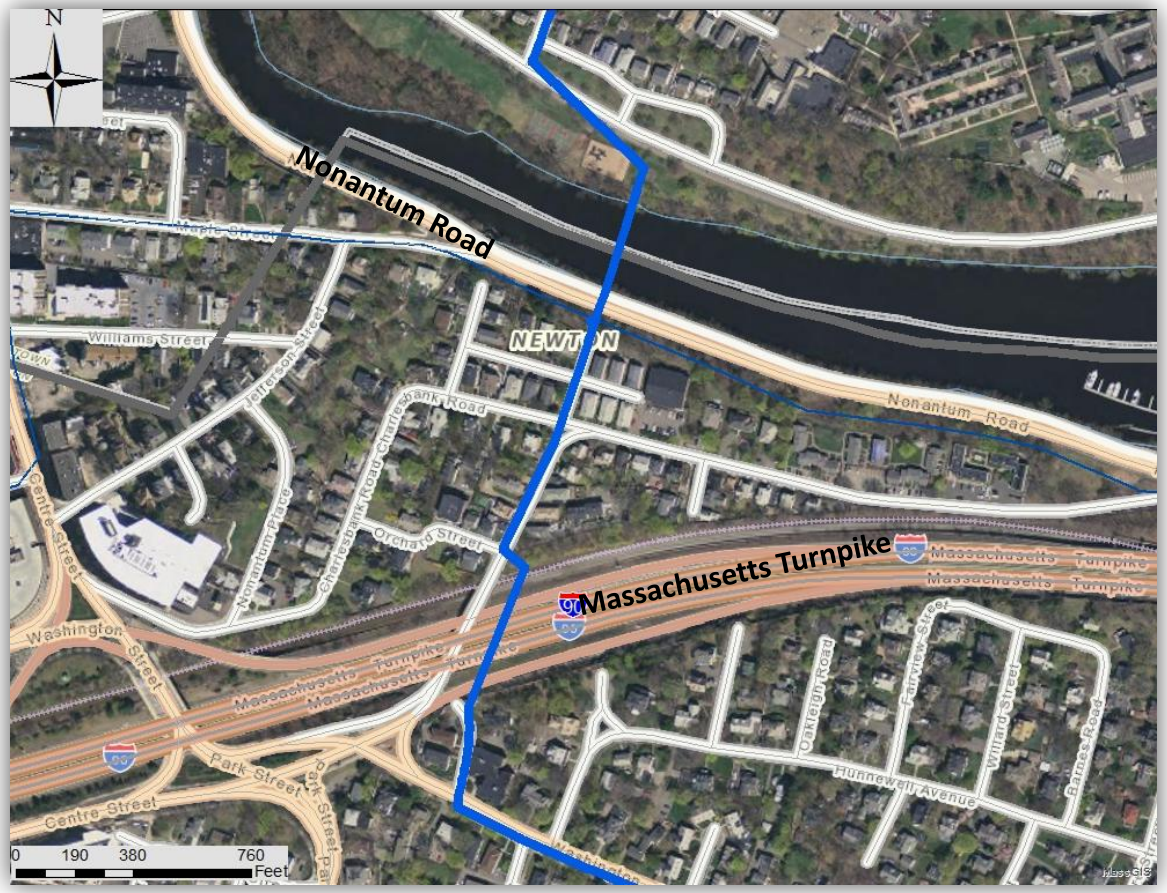
Project Goals

- Improve water system hydraulics and operating deficiencies
- Extend the useful life of pipelines

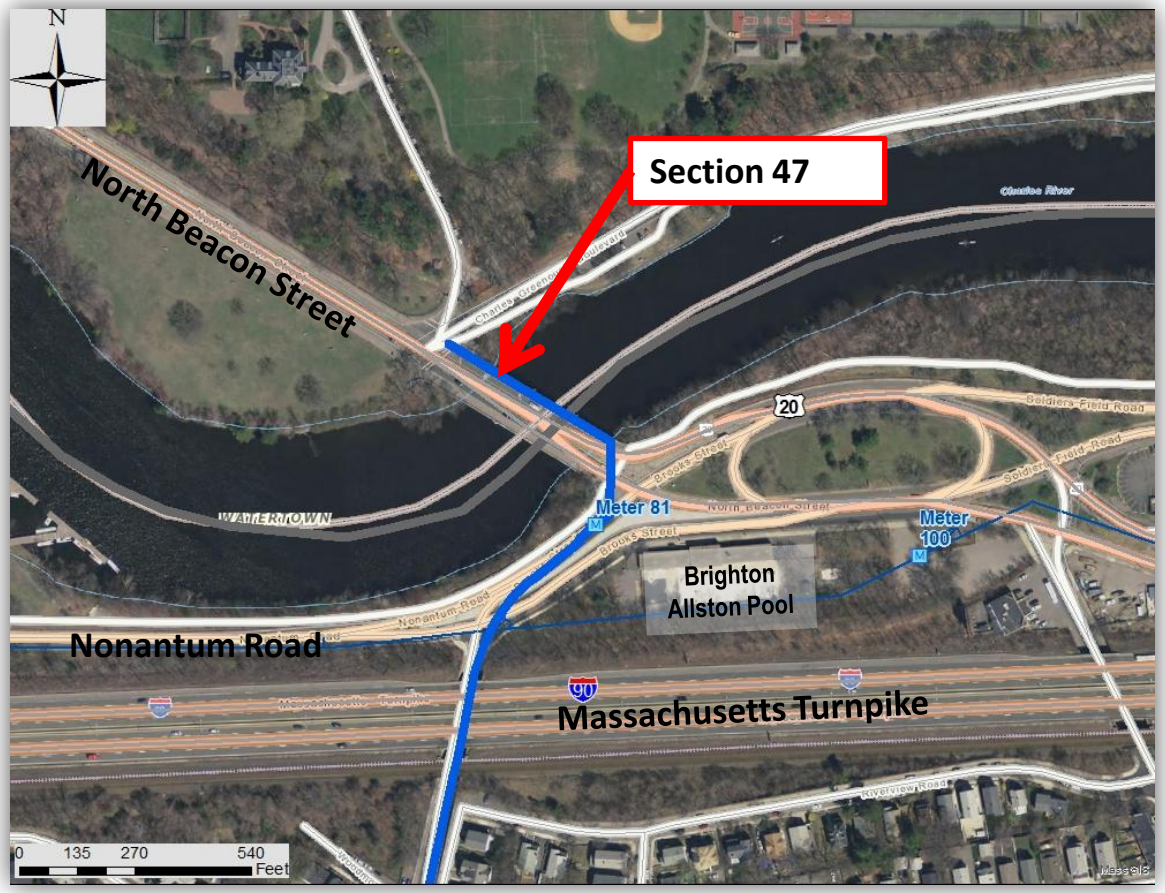
Tuberculated pipe

Cement mortar lined pipe

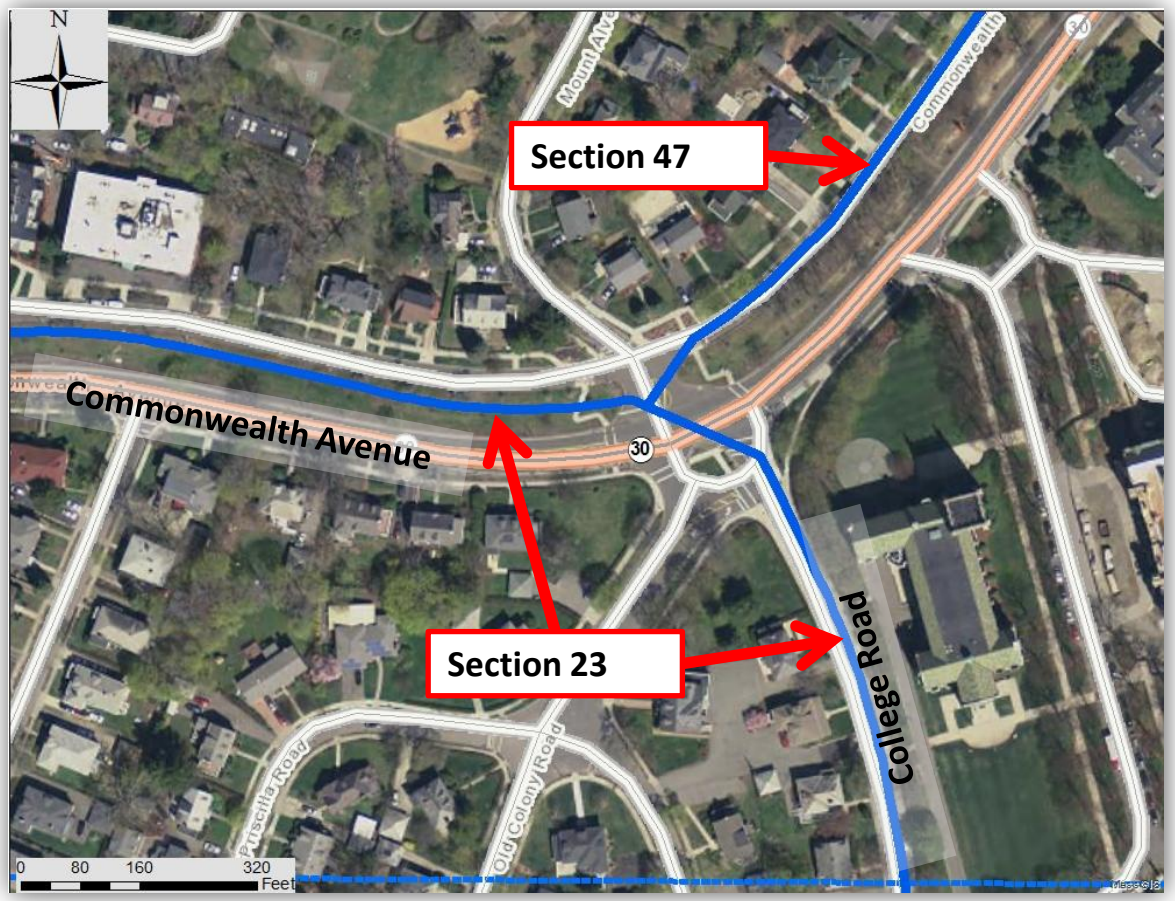
Section 24 – Major Crossings



Section 47 – Brooks St and North Beacon St, Boston and Watertown



Sections 23 and 47 Interconnection – Commonwealth Ave at College Rd, Newton



Contract 6385

- Provides design, engineering services during construction and resident engineering/inspection services
- Two proposals received
- Selection committee recommends award to Green International Affiliates, Inc.
- Not-to-exceed amount of $3,506,868

Contract Schedule

- Notice-to-Proceed: August 2016
- Construction: August 2018
- Substantial Completion: July 2021