Massachusetts Bay Transportation Authority

Bus Facilities Modernization Program

Erik J. Stoothoff, MBTA Chief Engineer

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Overview of Facility Program

1. The MBTA has a deferred investment need to address the condition and capacity of the bus maintenance facility network
2. We have a need to act with urgency to:
   - Meet the functional need of our current bus network
   - Address the working conditions within our garage infrastructure
   - Expand our infrastructure to facilitate network-wide modernization and redesign
3. We need to prepare our infrastructure for future fleet electrification and other modern technologies
4. Each facility needs investment
5. Near term action is necessary while the entire strategy is developed
6. Multiple projects will be executed concurrently and include the committed $25M annual investment in our bus maintenance facilities

Bus Facility Policy and Principles

- Prioritize safety and health
- Increase fleet reliability and resiliency
- Minimize operating and maintenance costs of the bus system
  - Minimize the use of small and specialty garages
  - Minimize Deadhead miles
- Build overall capacity and capability to exceed existing, and meet future demand and technology
- Bring facilities to a state of good repair in **13 years** while:
  - Enabling facilities to continue supporting revenue fleet
  - Ensuring facilities accommodate a modernized fleet
    - › Each facility will be designed to accommodate **future electrification** of bus fleet
    - › Each facility will maximize **indoor fleet storage**
- Minimize impact on current bus system operations
- The program will be a phased approach: End-state quantity and location of facilities is not known yet, but will develop over time along with other MBTA, MassDOT, and Municipal initiatives

FOCUS 40
The 2040 Investment Plan for the MBTA

Better Bus Project
Making transit better together

Bus Network Redesign

MBTA Bus Facilities Modernization Program (Recap from March 4, 2019)

- **MBTA's Bus Garage Infrastructure consists of 10 Maintenance Garages, including Everett Heavy Maintenance**

- **MBTA Garages have a bus capacity ranging from 28 to 254**
- **Current Facilities Status**
  - At or beyond capacity
  - Average age 54 years
  - Some functionally obsolete (e.g. capacity, ceiling heights, door heights)
- **Action: Develop an executable bus facility modernization/replacement program**
  - Locations/Permitting
  - Emerging Propulsion Technologies
  - Battery Charging
  - Utility Requirements
  - Bus Storage
  - Maintenance Improvements

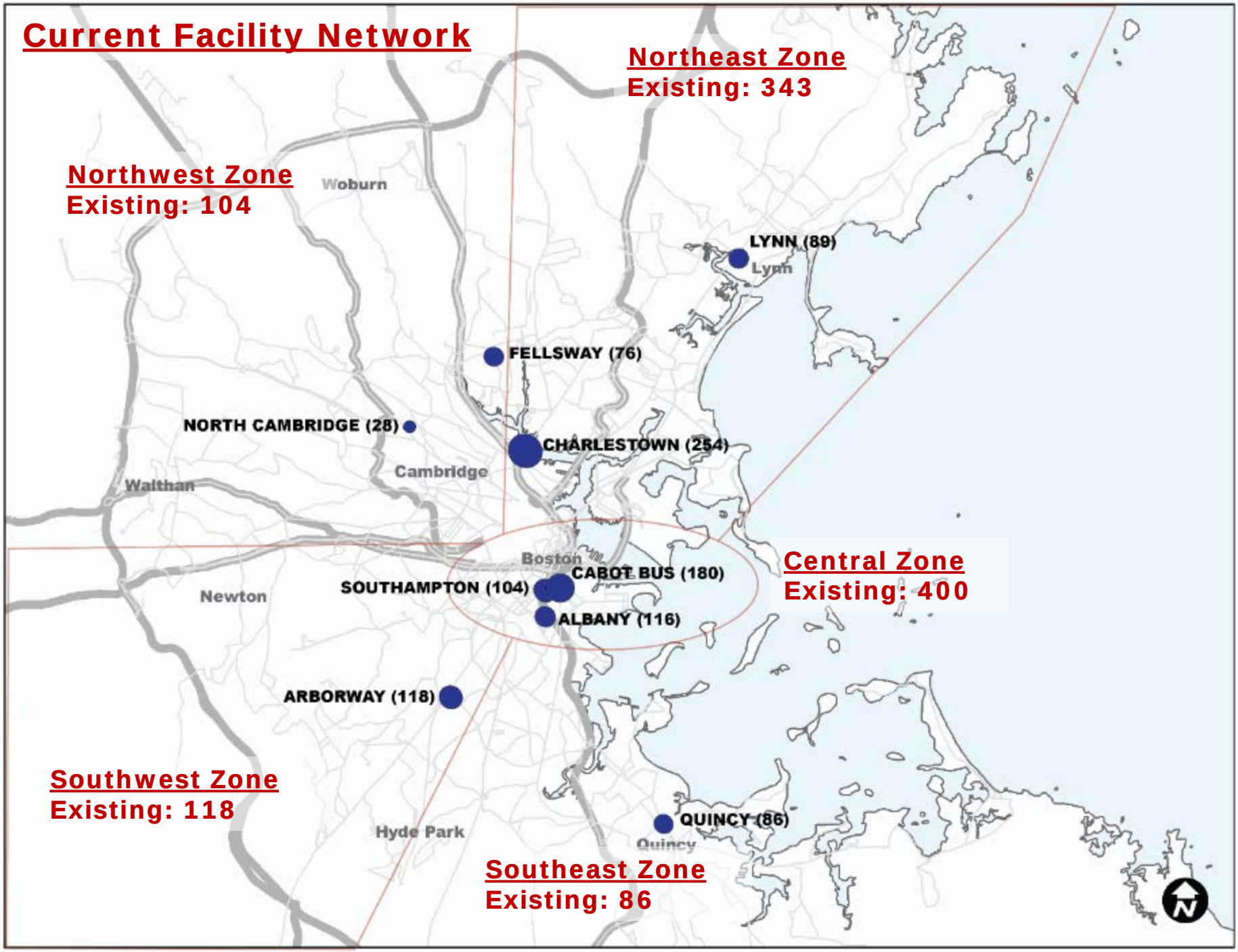
All garages are near or above capacity, and are beyond their useful life or are functionally obsolete.

Intent is to re-use all facility sites that can support the future plan

Bus Maintenance Facilities - Over Capacity

Facility	Year Built	Bus Count	Maint. Capacity*	% of Maint. Capacity	Storage Capacity	% Storage Capacity	Condition Rating
Albany Street	1941	116	35	333%	116	100%	2.7
Arborway	2004	118	52	226%	118	100%	3.1
Cabot	1975	180	104	172%	160	111%	2.8
Charlestown	1975	254	157	162%	310	82%	2.5
Everett Heavy Maintenance	1947	-	-	-	-	-	2.6
Fellsway	1925	76	52	146%	74	102%	2.4
Lynn	1936	89	87	102%	99	90%	2.7
North Cambridge	1979	28	35	80%	32	88%	3.2
Quincy	1930	86	70	124%	90	95%	2.4
Southampton	2002	104	76	137%	101	103%	3.6

*Based on prior study ratio of 8.7 buses per maintenance bay (40-foot buses)


Current Facility Network
Northeast Zone
Existing: 343
Northwest Zone
Existing: 104
Woburn
LYNN (89)
Lynn
FELLSWAY (76)
NORTH CAMBRIDGE (28)
CHARLESTOWN (254)
Cambridge
Waltham
Boston
CABOT BUS (180)
SOUTHAMPTON (104)
Newton
ALBANY (116)
Central Zone
Existing: 400
ARBORWAY (118)
Southwest Zone
Existing: 118
Hyde Park
QUINCY (86)
Quincy
Southeast Zone
Existing: 86
N

Future Bus Facility Capacity

The optimal fleet size is difficult to predict at this time:

- Ongoing transportation initiatives; Better Bus Project and Network Redesign are not yet completed
- The intent is to maximize facility capacity and flexibility for fleet type at each site until the work is complete to develop the target size of the MBTA bus fleet
- Municipal partnerships w/ dedicated bus lanes, queue jumps, and signal priority will influence fleet needs
- Replacement of diesel buses with battery electric buses is not currently a 1 for 1. Additional replacement vehicles are necessary due to:
  - Travel range
  - Refuel/Recharge time
  - Energy consumption due to HVAC

Current working target necessary for progressing the planning for maintenance

- **For planning purposes, assume an the need to support an increasing fleet size**
- **Subject to further refinement following Network Redesign, Better Bus Project, and Bus technology advancements**

Bus Facility Modernization Strategy

Strategy: Develop a sequence of investments to address the need

1. Prioritize garage construction to meet the needs of the fleet and workforce
   - Most urgent needs are at the Quincy and Albany facilities
   - Expand capacity at Southampton facility
   - Current fleet of trolley buses are beyond their useful life: Consider alternatives for conversion of North Cambridge facility to support a Battery Electric Bus fleet. Added benefit is the elimination of overhead catenary system (OCS) infrastructure.
2. Build additional capacity throughout the Modernization Program
   - To provide capacity (swing space) to carry out the Modernization program
   - To create the capacity for future growth
   - Build appropriate regionalization of facilities
3. Address past commitments
4. Accelerate facility modernization through alternative procurement methods such as Design Build contracting
5. Incorporate future bus fleet conversion to battery electric technology in facility designs
6. Engage in community outreach
7. Engage Real Estate team in developing strategy for land planning and acquisitions
8. Engage design community to develop standards for future facilities, and full program

Bus Facility Modernization Strategy: Alignment with Fleet Procurements

Desire is to move bus procurement schedule to a more steady-state 100+ buses per year

- Simplifies bus commissioning
- Offers a more predictable and manageable fleet life-cycle maintenance program

Challenge is sustaining the Quincy and Albany bus operations during the facility replacement timeline

- Replacement of 192 40 ft. ECD buses will begin this summer, when complete, the average fleet age will decrease to 6.2 years old, and the average age of non-electric buses drops to 5.6 years old.
- The 11 and 13 year old fleets of 40 ft. Diesel buses are the only buses that can be serviced by the Albany and Quincy Garage due to height restrictions
- The 11 and 13 year old fleets cannot be replaced until the Albany and Quincy Garages are replaced with facilities that can support modern buses

Current Fleet Consists of:

Fleet size = 1017, Average Age = 9 years

Non-Electric Fleet size = 957, Average Age = 8.6 years

Only buses that fit in Albany and Quincy

Fleet Type	40 ft. CNG	40 ft. Diesel Hybrid	60 ft. Diesel Hybrid	40 ft. Diesel Hybrid	60 ft. Diesel Hybrid	40 ft. Diesel	40 ft. Diesel	40 ft. Emissions Cont. Diesel	60 ft. Duel Mode Articulated	40 ft. Electric Trolley Bus
Quantity	175	150	45	60	25	155	155	192	32	28
Age	3	3	3	5	9	11	13	15	15	15
Bus Height	11'-1"	10'-10"	10'-10"	10'-10"	10'-8"	10'-3"	10'-3"	10'-6"	11'-3"	11'-10"

Most Urgent Needs: Quincy Garage Replacement

- Functionally Obsolete – The existing building structure cannot be rehabilitated to meet MBTA needs
- Critical height restrictions: Unable to accommodate any new buses being purchased
- Inefficient work space configuration and site layout
- Other areas of concern are:
  - Condition of floors
  - Deterioration of roof and walls
- Current Capacity is 90 buses, need to increase capacity to approx. 130 to 150 buses
- Supports the oldest buses in the MBTA fleet, which are due to be replaced starting in 2022
- Need to explore nearby alternative locations and real estate opportunities for future redevelopment of current site

Most Urgent Need: Albany Garage Replacement

- Functionally Obsolete – The existing building structure cannot be rehabilitated to meet MBTA needs
- Critical height restrictions: Unable to accommodate any new buses being purchased
- Inefficient work space configuration and site layout
- Other areas of concern are:
  - Condition of floors
  - Deterioration of roof and walls
- Current Capacity is 116 buses, need to increase capacity to approx. 130 buses
- Supports the oldest buses in the MBTA fleet, which are due to be replaced starting in 2022
- Need to explore nearby alternative locations and real estate opportunities for future redevelopment of current site

Option: Southampton Garage Expansion

- Southampton facility currently operating over capacity – built for 76 buses, now supporting over 100
- Need to expand to approximately double the existing usage
- Expansion would allow for an increase to the number of 60-foot buses in operation
- Provides capacity (swing space) to facilitate investments in other garages
- Provides for flexibility to maintain future vehicle technology

Option: North Cambridge Garage Conversion to Battery Electric Facility

- Upgrades required to support upcoming replacement of Electric Trolley Buses with battery buses
- Would allow removal of overhead catenary
- Many alternatives to be considered for the conversion to battery electric bus technology
  1. Convert current service to diesel buses while BEB facility is constructed
  2. Move maintenance of ETBs to Southampton and build outdoor temporary BEB storage and Charging station on maintenance building land
  3. Build separate BEB capable facility, then replace ETBs with BEBs, decommission, and build new BEB facility

Modernization Program Plan

Phase 1 (0-5 Years)

- Increase Capacity by 150+ ***(consistent with current capacity target)***
- Expand capacity at Southampton
- Address needs at Albany Street and Quincy Garages
- Modernize North Cambridge Garage to support battery electric service

Phase 2 (2-10 Years)

- Increase Capacity by 50+ ***(subject to further fleet size study)***
- Determine strategy for Arborway and Cabot Garages
- Identify location for garage for expanded Silver Line fleet

Phase 3 (10-15 Years)

- Increase Capacity by as needed
- Determine strategy for Fellsway and Charlestown garages
- Determine strategy for potential additional garages

Site Selection Criteria
Property Size. Must be able to accommodate anticipated fleet size
Limits dead-head miles/Proximate to bus network
Internal site circulation suited for buses
Circulation to and from the site.
Consistency with existing land use and zoning
Environmental constraints
Property availability
Tenant Relocation

Thank You