Developing Strategies for the MBTA to Expand Service with Constrained Resources

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Thredbo 2015
Motivation for Increased Private Sector Involvement

- Parts of Boston are growing and will require increased transit service
- MBTA is constrained by funding, equipment, and facilities

→ Triple Transit, Bicycle, Walking Mode Share BY 2030
Land Use Development

- Prudential Center constructed, and now has over 3,800 parking spaces
- State Street Bank building constructed, and now has only 237 parking spaces
- Boston City Hall constructed
- John Hancock Tower constructed, adjacent garage now has over 2,000 parking spaces
- Longwood Medical Area expands from 26,000 – 45,000 employees with 4m SQFT of new development
- "15m SQFT of office development in city"
- Seaport District adds 11m SQFT of development
- Additional 17m SQFT of development planned in Seaport District by 2035

- Cambridge Redevelopment Authority contracts expected 1.5m SQFT of development in Kendall
- USDOT releases 11 acres of Transportation Systems Center land to Cambridge
- Continuous development in Kendall Square area
- Land transferred from NASA to USDOT for Transportation Systems Center (Volpe Center)
- Additional development in Kendall of 4 million SQFT from 2000-2010
- An additional 8.5m SQFT of development expected by 2030 in Kendall Square
MBTA Ridership Growth

Notes:
1) Total for rapid transit, trackless trolley, streetcar, and bus.
2) Total for rapid transit and surface lines.
3) In 2000, listed ridership for rapid transit, trackless trolley, and bus is 306,629,800.
4) Total for rapid transit, trackless trolley, and bus.
5) This is not limited as above, so includes commuter rail, paratransit, etc.
## MBTA Directly Operated Bus Service Trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Vehicles Operating in Maximum Service</th>
<th>Vehicle Revenue-Miles</th>
<th>Vehicle Revenue-Hours</th>
<th>Unlinked Passenger Trips</th>
<th>Passenger Miles Traveled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>776</td>
<td>22,723,426</td>
<td>2,241,692</td>
<td>95,096,574</td>
<td>217,961,347</td>
</tr>
<tr>
<td>2002</td>
<td>799</td>
<td>24,773,399</td>
<td>2,366,154</td>
<td>110,725,884</td>
<td>275,690,451</td>
</tr>
<tr>
<td>2012</td>
<td>789</td>
<td>24,184,591</td>
<td>2,422,811</td>
<td>118,618,285</td>
<td>305,909,089</td>
</tr>
</tbody>
</table>

### Percent Change

<table>
<thead>
<tr>
<th>Period</th>
<th>Vehicles Operating in Maximum Service</th>
<th>Vehicle Revenue-Miles</th>
<th>Vehicle Revenue-Hours</th>
<th>Unlinked Passenger Trips</th>
<th>Passenger Miles Traveled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992-2002</td>
<td>3.0%</td>
<td>9.0%</td>
<td>5.6%</td>
<td>16.4%</td>
<td>26.5%</td>
</tr>
<tr>
<td>2002-2012</td>
<td>-1.3%</td>
<td>-2.4%</td>
<td>2.4%</td>
<td>7.1%</td>
<td>11.0%</td>
</tr>
</tbody>
</table>

Data is from the National Transit Database, Data Series TS2.1 – Service Data and Operating Expenses Time-Series by Mode
Constraints Limiting System Growth

- Types of constraints, with MBTA examples
  - Infrastructure
    - Example: Bus maintenance and storage facilities
  - Equipment
    - Example: Aging bus fleet with marginal growth opportunities
    - Example: Limited to use of full-size buses
  - Institutional
    - Example: Pacheco Law and labor relations
    - Example: Limited contributions of municipalities and employers
  - Financial
    - Example: Identified underfunding yet possibility of decrease
Contracting with Existing Private Route

- Increasing service through existing private operators:
  - Increasing public access to existing private routes
    - Example: M2 Shuttle, EZRide
  - Expansion of private routes
    - Example: Sullivan - Lechmere - Kendall - Kenmore route
  - Consolidation of private routes
    - Example: Seaport District

- Benefits: Removing service gaps and/or improving frequencies and crowding levels without having the capacity to increase agency-operated service
Opportunity: Increasing Public Access to Existing Privately Operated Routes

- Example: MASCO M2 Shuttle
- Purpose: Fill service gaps and alleviate overcrowding on MBTA services
- Currently ~ 2% public ridership
- Public access requires purchasing tickets at specified locations at fares well above MBTA bus fares
- Technology (and integration) possible using simple Charlie Card Reader on vehicles
- Other similar opportunities (e.g., EZRide Shuttle)

Opportunity: Private Route Expansion

- Example: Sullivan - Lechmere - Kendall - Kenmore route

- Purpose: Link the rail network in a rapidly growing area while supplementing proposed GLX mitigation measures

- Pacheco Law should not apply

- Existing operator (EZRide) in place for portion of route

Route Implementation: Phased Operations

### Period Time

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Non-Overlapping</th>
<th>Headway</th>
<th>Non-Overlapping</th>
<th>Change in Operating Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New Route</td>
<td>Lechmere - Kendall</td>
<td>EZRide</td>
<td>Daily</td>
</tr>
<tr>
<td>Morning</td>
<td>6:20 AM - 10:50 AM</td>
<td>20</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Midday</td>
<td>10:44 AM - 3:00 PM</td>
<td>18</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Evening</td>
<td>3:00 PM - 8:00 PM</td>
<td>24</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>6:20 AM - 8:00 PM</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Four Buses on New Route

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Non-Overlapping</th>
<th>Headway</th>
<th>Non-Overlapping</th>
<th>Change in Operating Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New Route</td>
<td>Lechmere - Kendall</td>
<td>EZRide</td>
<td>Daily</td>
</tr>
<tr>
<td>Morning</td>
<td>6:20 AM - 10:50 AM</td>
<td>12</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Midday</td>
<td>10:44 AM - 3:00 PM</td>
<td>11</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>Evening</td>
<td>3:00 PM - 8:00 PM</td>
<td>14</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>6:20 AM - 8:00 PM</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Seven Buses on New Route
路线实施：完整运营

- 与雇主合作，与查理河TMA讨论资金服务
  - 例如，如果MassDOT提供公交车，雇主可能愿意承担日常运营成本

<table>
<thead>
<tr>
<th>时期</th>
<th>时间</th>
<th>频率</th>
<th>需要的公交车数</th>
<th>日常运营成本</th>
<th>年度运营成本</th>
</tr>
</thead>
<tbody>
<tr>
<td>早高峰</td>
<td>5:30 AM - 6:30 AM</td>
<td>15</td>
<td>5</td>
<td>$475</td>
<td>$118,750</td>
</tr>
<tr>
<td>AM高峰</td>
<td>6:30 AM - 9:00 AM</td>
<td>10</td>
<td>8</td>
<td>$1,900</td>
<td>$475,000</td>
</tr>
<tr>
<td>中午</td>
<td>9:00 AM - 3:30 PM</td>
<td>10</td>
<td>8</td>
<td>$4,940</td>
<td>$1,235,000</td>
</tr>
<tr>
<td>PM高峰</td>
<td>3:30 PM - 6:30 PM</td>
<td>10</td>
<td>10</td>
<td>$2,850</td>
<td>$712,500</td>
</tr>
<tr>
<td>晚上</td>
<td>6:30 PM - 8:00 PM</td>
<td>10</td>
<td>8</td>
<td>$1,140</td>
<td>$285,000</td>
</tr>
<tr>
<td>夜间</td>
<td>8:00 PM - 12:40 AM</td>
<td>20</td>
<td>4</td>
<td>$1,773</td>
<td>$443,333</td>
</tr>
<tr>
<td>总计</td>
<td>5:30 AM - 12:40 AM</td>
<td>10 - 20</td>
<td>10</td>
<td>$13,078</td>
<td>$3,269,583</td>
</tr>
</tbody>
</table>

- 与雇主合作，查理河TMA讨论资金服务
  - 例如，如果MassDOT提供公交车，雇主可能愿意承担日常运营成本
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Pressure to Expand: Seaport District

Exhibit ES-4: Existing and Forecasted Person-Trips by Mode

Trips to/from/within the Waterfront are expected to grow by 63% from 2013-2035.

Source: South Boston Waterfront Sustainable Transportation Plan, January 2015.
Pressure to Expand: Seaport District

<table>
<thead>
<tr>
<th>Route</th>
<th>Critical Peak Hour</th>
<th>Peak Direction</th>
<th>Existing (2013) Demand</th>
<th>Seated Capacity</th>
<th>Max. Capacity</th>
<th>2035 Growth</th>
<th>Estimated Demand</th>
<th>Demand/Max Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 4</td>
<td>AM</td>
<td>Inbound</td>
<td>126</td>
<td>195</td>
<td>275</td>
<td>114%</td>
<td>270</td>
<td>98%</td>
</tr>
<tr>
<td>Route 7</td>
<td>AM</td>
<td>Inbound</td>
<td>654</td>
<td>585</td>
<td>880</td>
<td>26%²</td>
<td>826</td>
<td>94%</td>
</tr>
<tr>
<td>Route 11</td>
<td>AM</td>
<td>Inbound</td>
<td>486</td>
<td>390</td>
<td>550</td>
<td>29%²</td>
<td>629</td>
<td>114%</td>
</tr>
<tr>
<td>Silver Line 1</td>
<td>PM</td>
<td>Inbound</td>
<td>269</td>
<td>228</td>
<td>318</td>
<td>53%</td>
<td>412</td>
<td><strong>140%</strong></td>
</tr>
<tr>
<td>(741)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver Line 2</td>
<td>AM</td>
<td>Outbound</td>
<td>971</td>
<td>564</td>
<td>792</td>
<td>73%</td>
<td>1,670</td>
<td><strong>211%</strong></td>
</tr>
<tr>
<td>(742)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver Line Way</td>
<td>AM</td>
<td>Outbound</td>
<td>837</td>
<td>564</td>
<td>792</td>
<td>73%</td>
<td>1,448</td>
<td><strong>183%</strong></td>
</tr>
<tr>
<td>(746)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Per MBTA directionality (i.e., Inbound is typically toward downtown)
2. Based on CTPS regional growth model; growth for individual routes based on daily trip ends
3. Potentially additional Silver Line trunk service capacity with introduction of Silver Line Gateway

Source: South Boston Waterfront Sustainable Transportation Plan, January 2015.
Opportunity: Consolidating and Increasing Service in the Seaport District - Background

► Purpose: Increase public access to a rapidly growing area
  ► Bus link to the Blue, Orange, and Green lines, and Commuter Rail
  ► MBTA Silver Line and bus routes #4 and 7 could approach peak-hour capacity as Seaport development continues
  ► Numerous existing privately operated shuttles also serve the district
    ► 14 routes, 43 shuttles/hour in peak, same capacity as MBTA

► Previous work proposed sets of consolidated routes with 5 - 15 minute headways (Gu, Kladeftiras, Mohammad, and Xuto, 2014)
Opportunity: Consolidating and Increasing Service in the Seaport District - Funding Route

- Proposed route cost ~ $4.2-4.6 million per year
- Estimated existing private shuttle costs are ~ $9.3 million
  - Cost difference due to ability to significantly reduce bus-hours, which would also improve congestion in the Seaport District

- Institutional interests in the Seaport include:
  - Agencies (MBTA, MassDOT, Massport)
  - Governmental entities (Comm. of Massachusetts, City of Boston)
  - District employers (some currently involved with private transit)
    - Balance level of service vs. costs
  - Existing private operators

- Funding possibility: Business Improvement District
  - Minimal contributions while ensuring future employer buy-in
  - Concept of linking contracting to additionality
Idea 2: Consider Vehicle Size Restrictions

► Private sector can operate different types of vehicles
  ► May have experience and equipment necessary to operate and maintain smaller vehicles (e.g. RTD in Denver)
  ► Example: Adding small vehicles and reallocating full-size buses

► Opportunity: Routes #4 and #7 in Seaport
  ► Route #4 infrequent and lower ridership, could be served by private sector smaller vehicles with equal or more frequent service
  ► Assigning Route #4 buses to Route #7 would improve frequency and alleviate crowding
  ► Contracting sets of routes like this might encourage operator bidding
Idea 3: Funding Private Operator Vehicle Procurement

► Public funding of privately operated vehicles
  ► Exemplified by BusPlus+ program
  ► Opportunity: Create urban transit BusPlus+ program

► Urban BusPlus Program Opportunity
  ► MassDOT subsidize capital expenses by providing buses
  ► Could competitive select operator-proposed service improvements with private operators fully paying operating costs (original BusPlus)
  ► Alternatively could specify service requirements and subsidize private operating costs with revenue sharing above costs (continued BusPlus)
  ► Benefit: either option allows for service increases with the private operator required to store and maintain vehicles
Idea 4:
Private Vehicle Supply for Public Operations

- Good if main constraint is capacity at storage and maintenance facilities
  - Could allow for continued vehicle operation by agency employees

- Example: Contract guaranteeing that $x$ vehicles would be delivered every day to the agency to operate
  - Would shift maintenance and storage risk to private sector
  - Challenge to agency maintenance workers, although these workers would continue to have at least the same amount of work as before
  - Allows for growth in number of agency vehicle operators
Recommendations

- Increase public access to existing privately operated routes to better integrate the public system with other services: EZRide, M2
- Expand or consolidate existing privately operated routes: Sullivan - Lechmere - Kendall - Kenmore, Seaport
- Provide different types of service through the private sector, such as operating smaller vehicles: Routes #4 and #7
- Focus on specific constraints limiting agency: Develop Urban BusPlus, Contract vehicle storage and maintenance with agency vehicle operations
- Continue the Discussion on the Pacheco Law