

Massachusetts Bay Transportation Authority

Impact of Operations Headcount on Service Delivery

FMCB, April 1, 2019



MBTA Service Context

- Over past year, we have increased Bus service through efforts like SL3, Late Night and Early Bird
- We have also added headcount to existing Bus service to improve reliability and our ability to meet existing schedules
- Looking forward, we are also planning on additional service with the new Orange line vehicles



Executive summary

- **Customers' experience of MBTA Service** is driven by a **number of factors**, including dropped trips and reliability (OTP)
- Due to a number of initiatives over past year, **Bus dropped trips have decreased by ~50%**, resulting in **nearly 99% of trips operated**
 - January 2019 saw lowest number of dropped trips in at least 2 years
- **Reliability (OTP)** can be affected by gap between schedules and actual run-times, which is known as **“run-time deficiency”**
 - Multiple levers exist to improve “run-time deficiency”, including on-street infrastructure and additional resources
- **Plan for FY20 to improve service:**
 - (A) **improve run-time deficiency** for Top 40 Bus Routes and Green Line
 - (B) **increase service** for Top 40 Bus Routes and Orange Line
 - (C) **invest in on-street infrastructure** like bus lanes and TSP



Key Levers to Improve Bus Service (From 2/25 Presentation)

INVESTMENT	KEY IMPACT	DEPENDENCIES
Bus Lanes TSP + Queue Jumps + Bus Bumps Bus Stop Infrastructure	Run-time consistency (reliability) & speed Comfort & Improved Accessibility	Municipal participation
People power Buses	Frequency & run-time start (reliability)	Operating budget resources Maintenance garage(s) and/or contracted buses
Scheduling & Dispatching tools Pilots & Route Changes Network Redesign	Run-time cons. (reliability) & resource utilization Additional / Improved Service (All Aspects of SDP) New/Higher Ridership & Improved Accessibility	Software upgrades and/or hardware Municipal participation MBTA & Municipal Buy-In
On Street Infrastructure	Resources	Operational Changes



Multiple levers to deliver safe & reliable service

Within MBTA's Direct Control

ROW Infra. Condition

Vehicle availability

Count + maintenance

People availability

Schedules

Routes

Dispatching

Ops. Procedures



Service Delivery

- Dropped Trips
- On Time Performance (Reliability)
- Comfort
- Frequency
- Span of Service
- Coverage

 Focus of Today

Ability to Influence / Work with Municipalities

On-Street Infrastructure Condition

Congestion

Incidents / Events

Customer Factors

(e.g. arrival rates and boarding times)



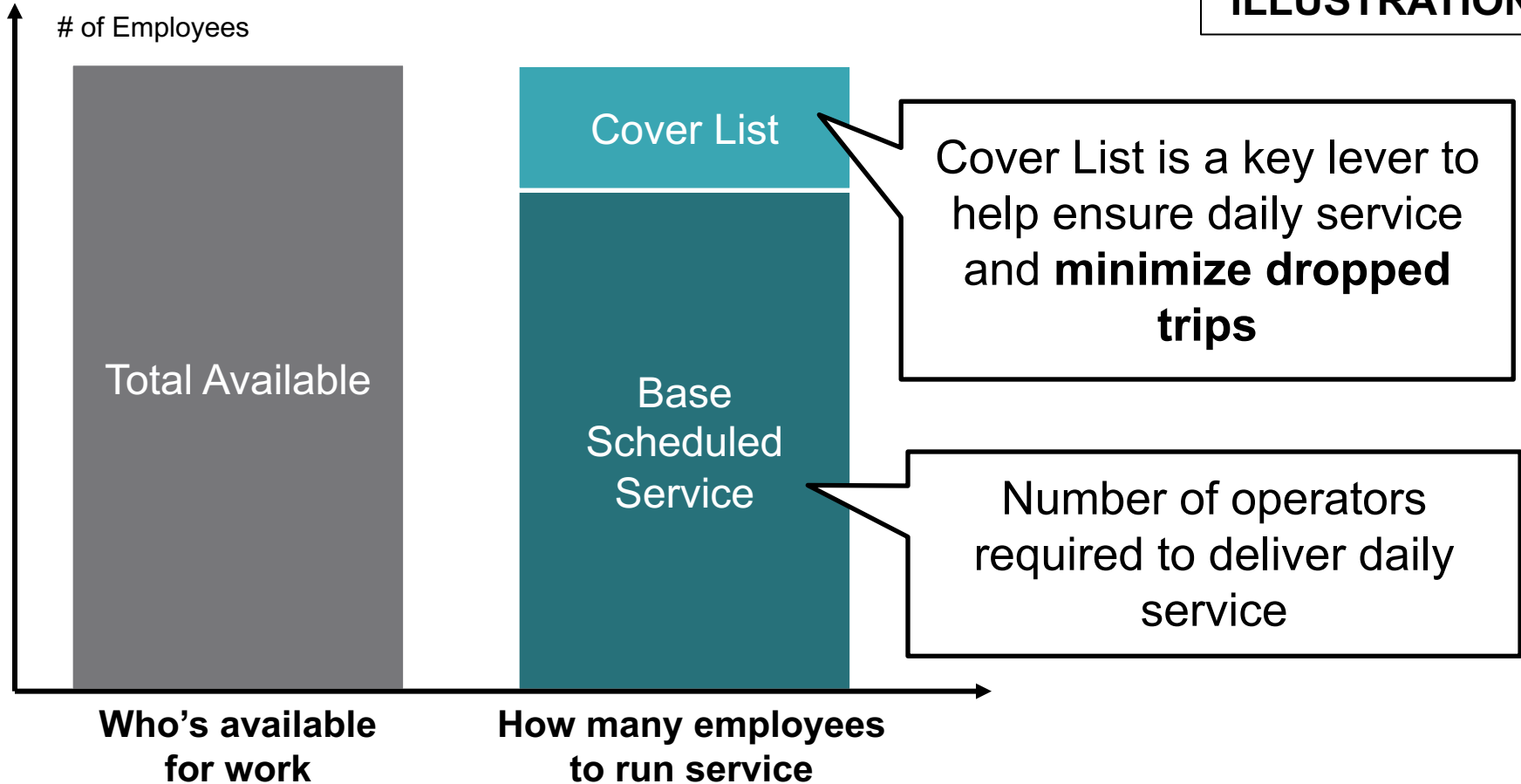
Dropped trip summary across rapid transit & bus

- A dropped trip is a **scheduled MBTA trip that is not provided** / completed
- Over the last twelve months, dropped trips have averaged 1.8% for Bus and 3.3% for Rapid Transit
 - The impact of dropped trips is **partially mitigated by trips added back** to the schedule (9% of total dropped trips)
- The **primary drivers** of dropped trips across all modes are (over LTM):
 - 70% Operator is not available to provide the trip
 - 10% Vehicle not available or disabled
 - 20% Miscellaneous (examples include traffic, police actions, passenger incidents, etc.)
- Dropped trips in **different modes are driven by different factors** – chain reactions in rail vs. single incidents in bus



How people availability impacts service delivery

ILLUSTRATION





How the Cover List is used on day-by-day basis (Bus example)

- A **set number** of Operators are planned for every day, with **majority scheduled for specific trips and the remainder on the Cover List**
 - All Operators (on specific trips and cover list) are paid at **straight time**
 - Both types of work are “picked” by Operators based on seniority
- The day prior to service, Supervisors will **assign Operators from the Cover List to scheduled work** based on both planned and some unscheduled absences
- Once the Cover List has been exhausted, **Operators are hired on Overtime** in order to cover scheduled work
- In general, **unscheduled absences are more likely to result in a dropped trip** as less ability to hire “last minute” on overtime
- Cover List size is balanced by **trade-offs** between **minimizing dropped trips, financial considerations, and good management practices**



What is the MBTA doing to reduce dropped trips?

Depts. across the T have been working to improve data analysis, operational processes, and hiring to reduce dropped trips:

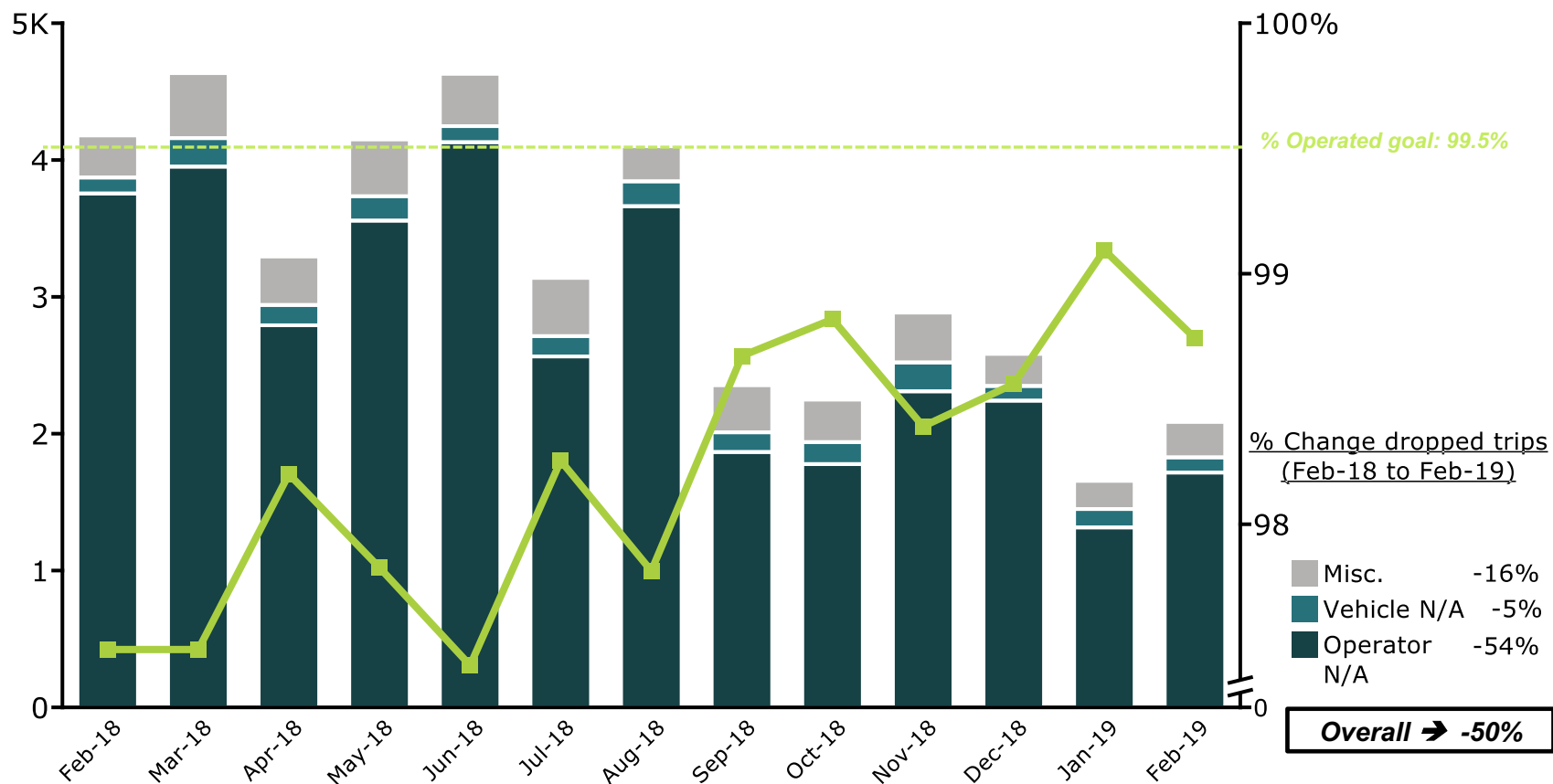
- ✓ Hired ~70 net additional Bus Operators, using 35 for run-time deficits and 35 for cover list
- ✓ Increased HR controls in administering leave under FMLA in accordance with federal and state regulations to ensure greater compliance with regulations
- ✓ Created a “Dropped Trips Task Force” including leadership from HR, Labor Relations, Legal, and Occ. Health to address issues that contribute to unscheduled absences
- ✓ Occ. Health working to implement more on-site testing to reduce the amount of time missed by Operators to attend fed. mandated random drug & alcohol tests
- ✓ Bus Ops increased best practice sharing across garages and met with garage leadership to discuss mitigation where dropped trips have been issue
- ✓ Implementing HASTUS Daily for day-to-day management



Dropped trips for Bus decreased ~50% over LTM, bringing operated (vs. scheduled) trips to nearly 99% in February 2019

Dropped trips per month (K)

% Operated

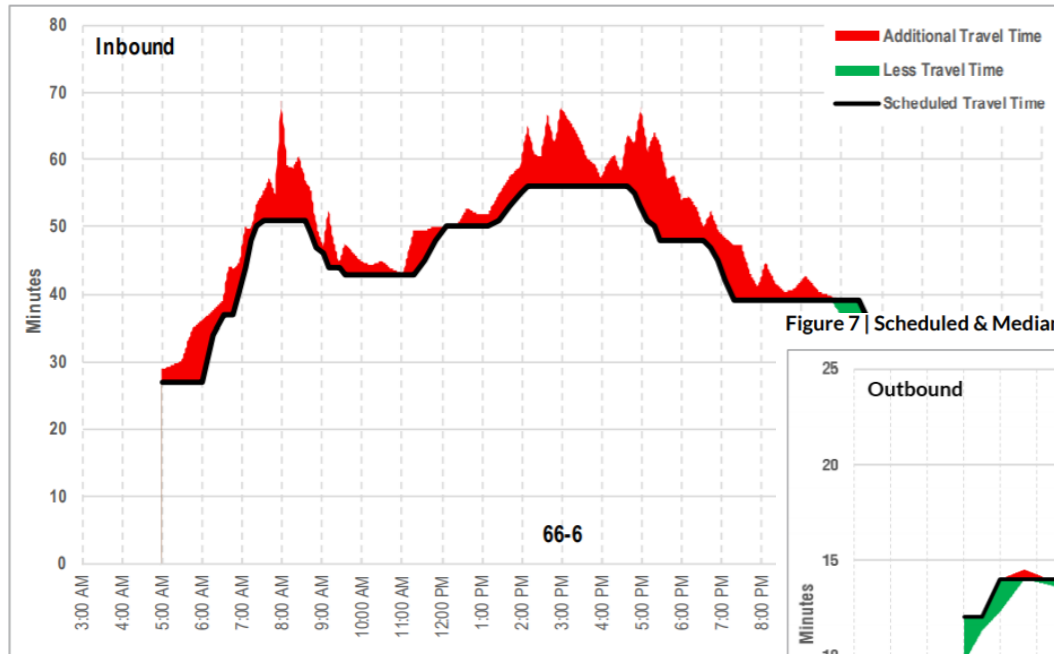


Note: Monthly MBTA Operations Report & Service Delivery Policy; % operated trips excludes any trips added, typically 0.1-0.2% of scheduled per month; Vehicle N/A includes both Vehicle not available as well as disabled vehicles



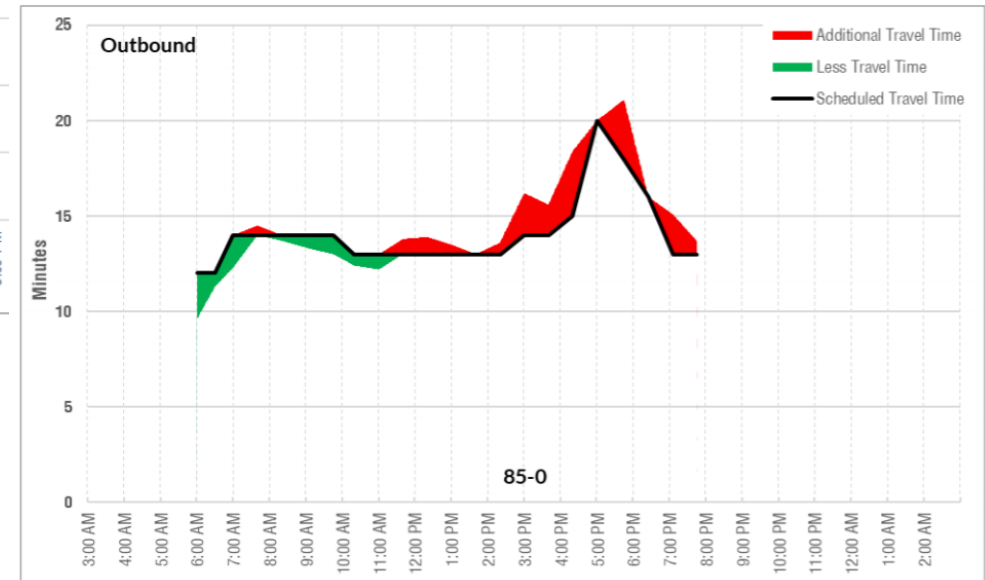
Run-Time deficits illustrate the gap between scheduled run-times and actual run-times

Figure 10 | Scheduled & Median Travel Time by Trip: Route 66 Inbound



Examples from Route profiles for all ~180 routes at <https://betterbus.mbta.com>

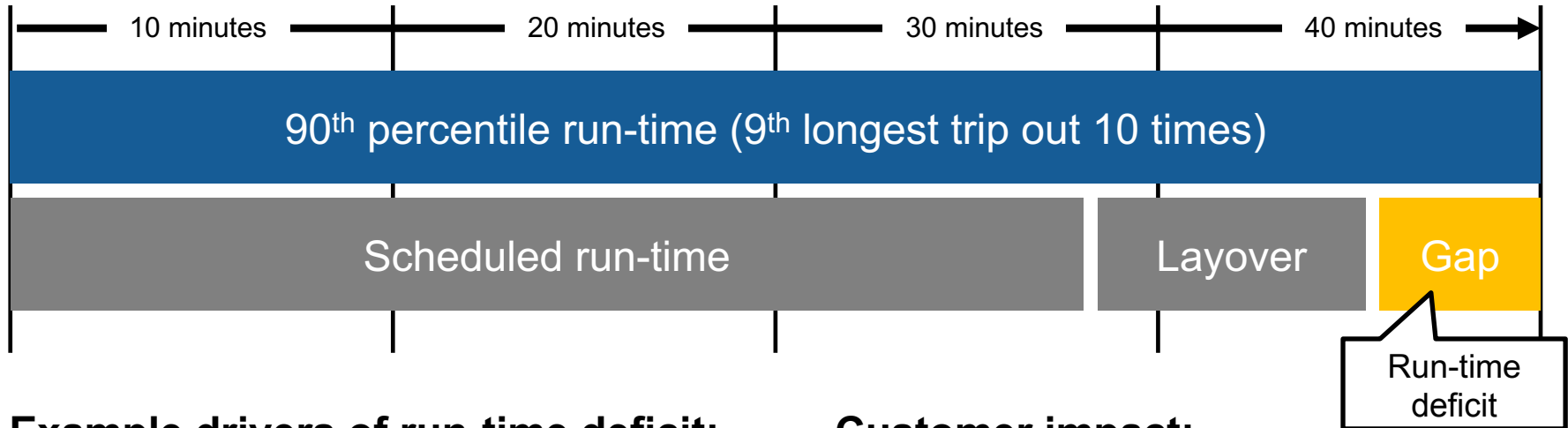
Figure 7 | Scheduled & Median Travel Time by Trip: Route 85 Outbound





When actual run-times exceed schedules & layovers, then “run-time deficits” exist

ILLUSTRATION OF ONE TRIP:



Example drivers of run-time deficit:

- **Increased congestion**
- Longer dwell times
- Increased variation (median stays constant, SD increases)
- Compounding impact from trip to trip

Customer impact:

- **Trips don't start on time reliably**
- **Dropped trips (from cascading delays)**
- Increased crowding
- Bus Bunching



Multiple Levers Exist to Address Run-Time Deficits

Lever type	Impact of Lever	How being implemented
On Street Infrastructure	<ul style="list-style-type: none"> On-street infrastructure (bus lanes, TSP, bus bump outs, queue jumps) to decrease run-time and run-time variation 	~14 miles of high priority corridors (BBP)
Resources	<ul style="list-style-type: none"> Additional people and vehicles to update scheduled run-time without decreasing frequency 	Additional off-peak operators for FY20 (BBP)
Operational changes	<ul style="list-style-type: none"> Better routing and scheduling to decrease run-time and run-time variation 	BBP near-term changes, Network Redesign, Quarterly changes
	<ul style="list-style-type: none"> Better dispatching to decrease run-time variation and decrease run-times 	Bus Dispatching pilot
	<ul style="list-style-type: none"> All door boarding to decrease dwell times 	AFC 2.0



No single lever can fully resolve run-time deficits, and without on street infrastructure in congested areas, no amount of buses and operators can guarantee that buses will run on time



Headcount Required to Address Run-Time Deficits: Bus

Bus Routes	Resolve Run-Time Deficit → Meet existing schedules		Add Service to match Service Delivery Policy (Off-Peak only)
	Peak FTEs <i>(not an option in FY20 as requires add'l buses)</i>	Off-Peak FTEs	
Top 40 Bus Routes <i>(identified in BBP multi-year investment plan)</i>	~25	~23	~22
Non-Top 40 Bus Routes	~10	~12	N/A

~45 already requested for FY20 as part of BBP

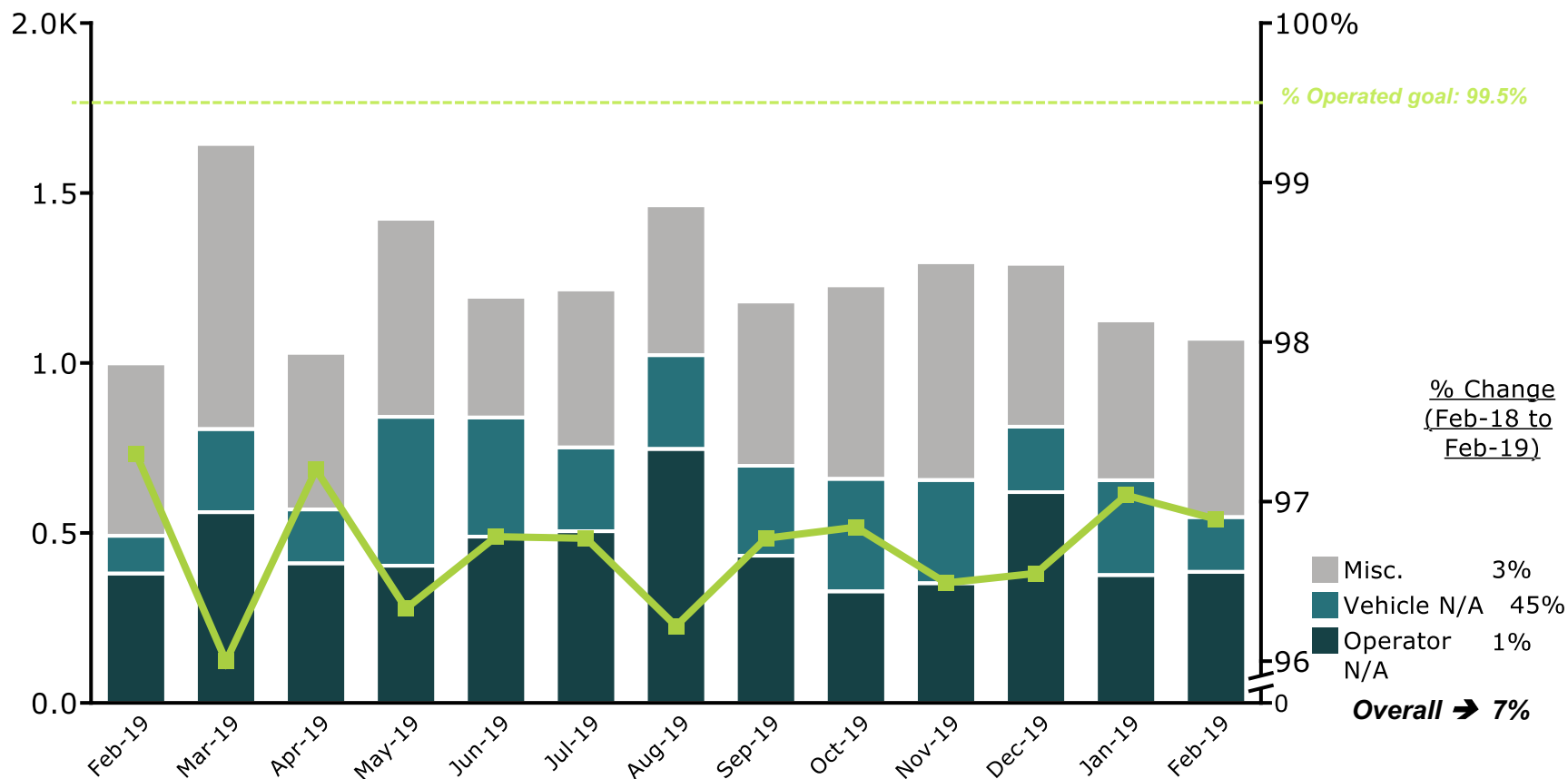
- Requested 45 FTEs for Better Bus Project to cover off-peak run-time deficit and increase service beyond existing schedules to meet aspects of SDP
- For non-top 40 Bus Routes, alternative run-time interventions (e.g. implementation of BBP near-term proposals) recommended at this time (BBP investments meant as strategic investments considering broader system context)
- Presentation planned for May to discuss potential scenarios for adding additional peak buses for FY21



Dropped trips for Rail increased ~7% over LTM, with operated (vs. scheduled) trips to close to 97%

Dropped trips per month (K)

% Operated



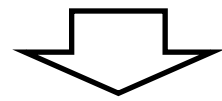
Note: Monthly MBTA Operations Report & Service Delivery Policy; % operated trips excludes any trips added, typically 0.2-0.6% of scheduled per month; Vehicle N/A includes both Vehicle not available as well as disabled vehicles



Headcount Required to Address Run-Time Deficits: Rail

Rail Modes	Resolve Run-Time Deficit → Meet existing schedules	
	Peak	Off-Peak
Green	~6	~12
Orange	0.5	0.5
Red	0.5	0.5
Blue	0	0

Additional operators already planned for FY20 for new OL & RL trains



Green Line is only rapid transit mode that has run-time deficit vs. schedules



Preliminary Plan for Green Line Run-Time Deficit

- **Current run-time deficit on Green Line** driven by combination of speed restrictions, congestion at grade crossings, traffic (for E line), and longer dwell times
- **Major limiting factor is additional vehicles and physical space:**
 - Potential opportunity to use Type 9s and Type 7s program close to completion
 - Still to be determined if Green Line Car Houses can support increased peak car count
- **Piloting higher peak car count (146 → 150) this spring** to test ability to manage higher work load, allowing to maintain higher frequencies, and returning to peak car count of pre-2010 (150)
- Requesting **6 additional Green Line Motorpersons** to partially address run-time deficit
 - Remainder of deficit to be addressed by change in resource utilization during GLT/GLX construction and managing cover list



Conclusion and next steps

- **Continue to keep focus on driving down dropped trips towards SDP goal of 0.5%:**
 - Hire to budgeted headcount and keep pace with attrition
 - Provide tools to manage Cover Lists effectively (e.g. HASTUS)
 - Monitor dropped trips and cross-functionally develop solutions
- **Address run-time deficits vs. schedules, and better meet SDP:**
 - 45 additional Bus Operators and associated support
 - 6 additional Green Line Motorpersons and associated support
- Add **additional Orange Line Operators** to add service utilizing new trains
- Continue Better Bus Project to ensure improvements across **all elements of service delivery (on-street infrastructure, operating resources, and operating changes/procedures)**



Appendix: 40 Highest Ridership Routes / Corridors

Highest Ridership Routes / Corridors Definition: >3,200 daily weekday riders						
Key Bus Routes (14)	1	28	66	111		
	15	32	71	116/117*		
	22	39	73			
	23	57/57A*	77			
Silver Line (5)	SL1	SL3	SL5			
	SL2	SL4				
Local Routes w/ highest ridership (21)	7	31	47	88	104	441/442*
	9	34/34E*	70/70A*	89	109	
	16	35/36/37*	86	93	110	
	21	44	87	101	220/221/222*	

Note: * Refers to corridor created by overlapping routes which have very high ridership when taken together; Daily weekday ridership determined via APC counts



Appendix – Service Delivery Policy standards

Service Delivery Policy

Adopted in January 2017

Comfort

Passengers should have a reasonable amount of personal space during their trips

Reliability

Passengers should be able to expect service to arrive when scheduled

Frequency

Passengers should be able to access transit within a reasonable waiting time

Span

Passengers should have confidence that service will operate during expected hours

Coverage

The geographic area where service is provided

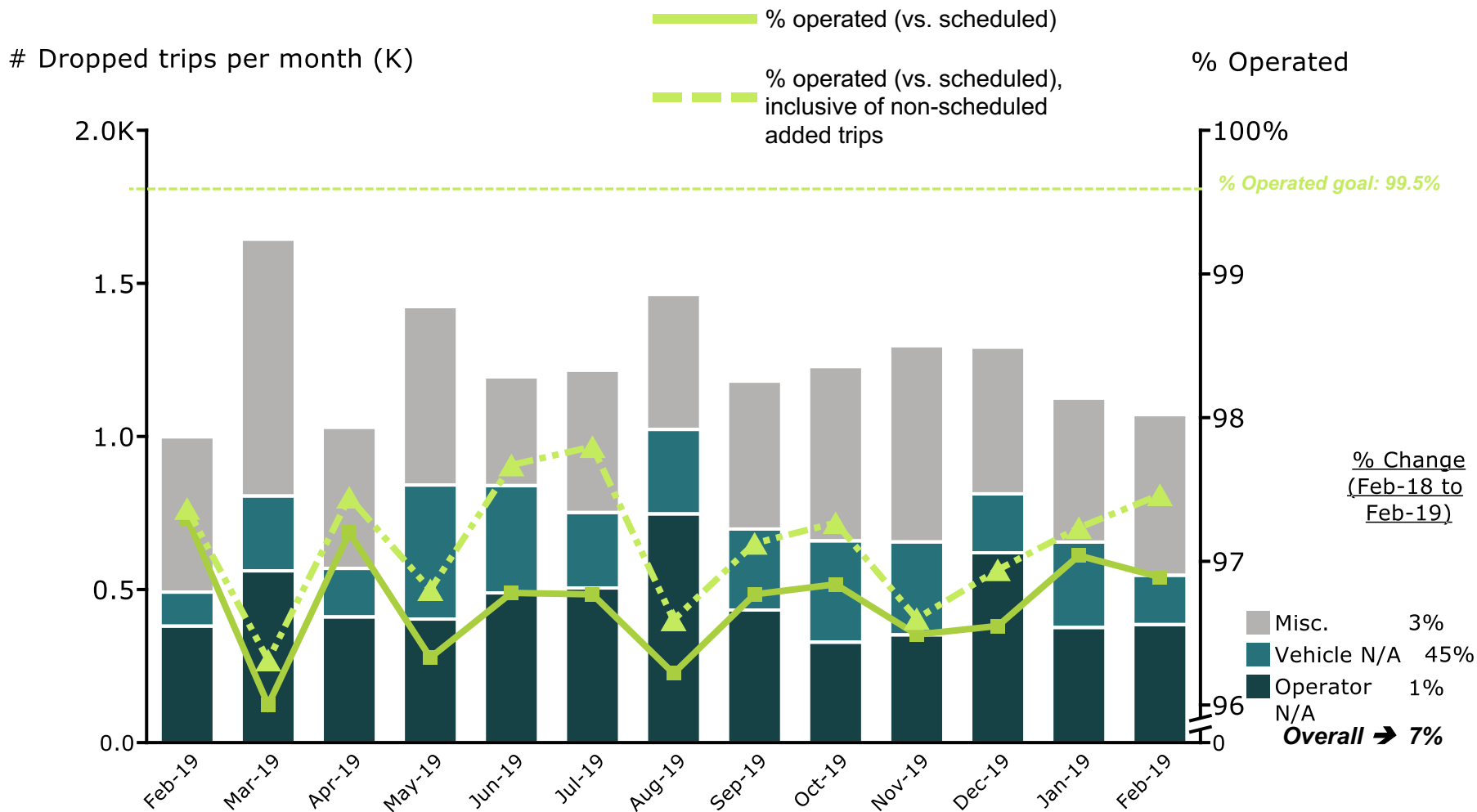


Appendix - Key elements of Service Delivery Policy

	Key Bus Route (incl. Silver Line)	Local Bus Route
# of Routes	15 (+5 SL)	117
Span (Weekday)	6am – 12am	7am – 7pm
Span (Weekend)	SAT: 6am – 12am SUN: 7am – 12am	SAT: 8am – 6:30pm SUN: 10am – 6:30pm <i>Standard only applies to high density areas</i>
Frequency	<u>AM Peak (7am – 9am):</u> Every 10 min	<u>AM Peak (7am – 9am):</u> Every 30 min
	<u>PM Peak (4pm – 6:30pm):</u> Every 10 min	<u>PM Peak (4pm – 6:30pm):</u> Every 30 min
	<u>All Other:</u> Every 15/20 min	<u>All Other:</u> Every 60 min
Reliability (On-time performance)	75% (Minimum) 80% (Target)	70% (Minimum) 75% (Target)
Comfort	Percent of passenger minutes in comfortable conditions 92% (Minimum), 96% (Target)	



% Operated is ~0.4% higher per month when also considering added trips in Rail



Note: Monthly MBTA Operations Report & Service Delivery Policy; % operated trips excludes any trips added, typically 0.2-0.6% of scheduled per month; Vehicle N/A includes both Vehicle not available as well as disabled vehicles