

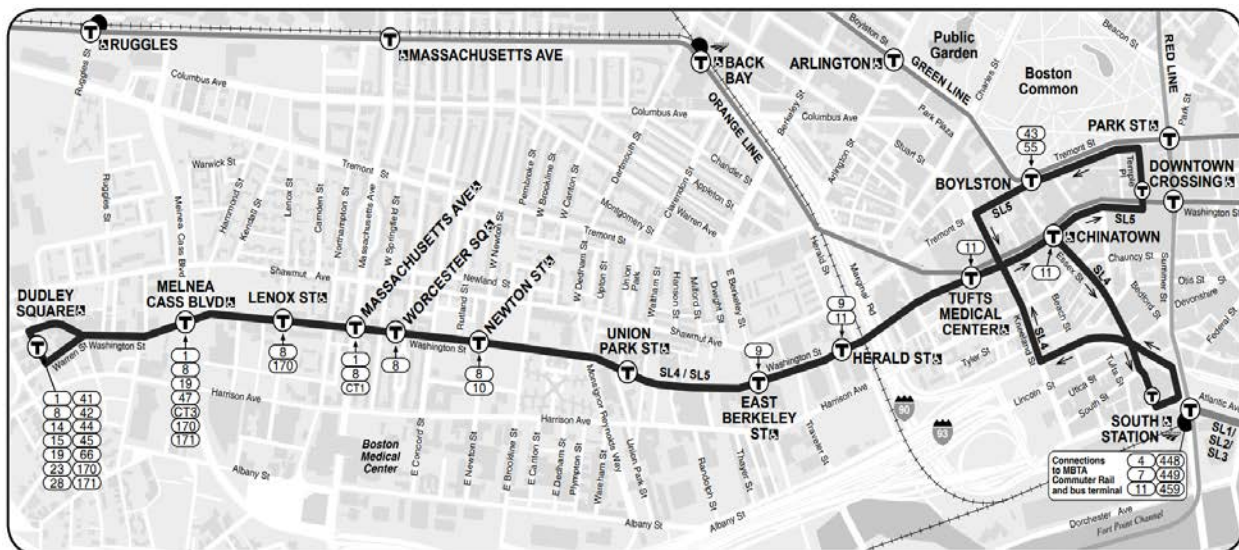
# Route SL4

## Dudley Station – South Station at Essex Street

### Route Overview

The SL4 Dudley Station – South Station at Essex Street is a Silver Line Bus Rapid Transit (BRT) route that operates between Dudley Station and South Station (see Figure 1). It is very similar to SL5 Dudley Station-Downtown Crossing, which uses the same alignment between Dudley Station and Chinatown and then operates to Temple Place in Downtown Crossing.

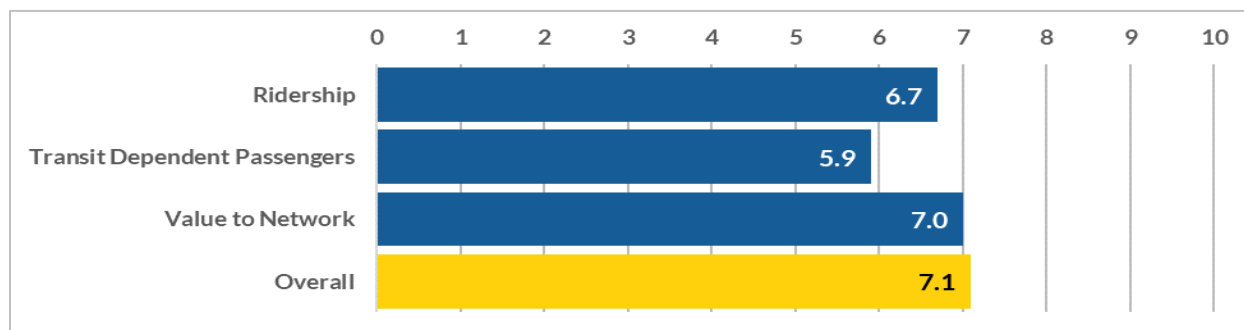
Figure 1 | Service Map



### Network Importance

Route SL4 is an important route within the MBTA bus network (see Figure 2). On a relative scale of 0 to 10, the route rates 6.7 in terms of ridership, 5.9 in terms of transit dependent ridership, and 7.0 in terms of its value to the network (which reflects the number of people who are uniquely served, the number of jobs and other important destinations, and the number of transferring passengers). Its overall score, which gives a 70% weighting to overall ridership and a 15% weight to both other measure, is 7.1.

Figure 2 | Relative Importance within MBTA Bus Network (on a scale of 0 to 10)



## Service Overview

### Schedule

Route SL4 provides frequent service from early morning until midnight on weekdays, Saturdays, and Sundays (see Table 1). On weekdays, it operates from 5:20 AM to 12:52 AM, with trips every 12 to 19 minutes all day. As described above, SL5 Dudley Station-Downtown Crossing also operates along most of the same alignment. Route SL5 operates more frequently and thus the schedules of the two routes are not coordinated.

Table 1 | Schedule Statistics

SERVICE DAY	SPAN OF SERVICE	FREQUENCY (RANGE)	FREQUENCY (AVERAGE)	DAILY TRIPS (INBOUND/OUTBOUND)
<b>Monday-Friday</b>	<b>5:20 AM to 12:52 AM</b>			<b>217/218</b>
Sunrise	5:20 AM to 5:59 AM	12 – 18	16	3/2
Early AM	6:00 AM to 6:59 AM	12 – 18	12	5/5
AM Peak	7:00 AM to 8:59 AM	12 - 14	12	10/9
Midday Base	9:00 AM to 1:29 PM	12 – 17	15	18/18
Midday School	1:30 PM to 3:59 PM	14 – 16	15	10/10
PM Peak	4:00 PM to 6:29 PM	12 – 14	13	11/12
Evening	6:30 PM to 9:59 PM	12 – 18	12	18/17
Late Evening	10:00 PM to 11:59 PM	13 – 19	19	6/6
Night	12:00 AM to 12:52 AM	19	19	2/3
<b>Saturday</b>	<b>5:23 AM to 12:55 AM</b>	<b>15 – 20</b>	<b>16</b>	<b>72/72</b>
<b>Sunday</b>	<b>6:02 AM to 12:55 AM</b>	<b>14 – 20</b>	<b>16</b>	<b>70/70</b>

Note: Span of service reflects the time the first bus begins service until the time the last bus finishes service.

On Saturdays, Route SL4 operates with a similar span of service as on weekdays, with service every 14 to 20 minutes. On Sundays, service operates from 6:02 AM to 12:40 AM, also every 14 to 20 minutes.

On weekdays during peak periods, when Route SL4 operates every 12 to 14 minutes, it does not meet the Service Delivery Policy (SDP) standards for Silver Line services that

specify that service should operate every 10 minutes. It does meet the minimum service frequency standards during other times on weekdays, and on weekends. It meets the service span standards on all days.

### Service Patterns

Route SL4 operates with a single inbound and outbound service pattern, with all service operating as indicated in Figure 1. Note that service operates very circuitously between Washington Street and South Station, primarily due to one-way street restrictions between Chinatown and South Station.

Table 2 | Service Patterns

PATTERN	ORIGIN	DESTINATION	UNIQUE FEATURE	TRIPS PER WKD	TRIPS PER SAT	TRIPS PER SUN
<b>INBOUND</b>				<b>217</b>	<b>72</b>	<b>70</b>
SL4.0	Dudley Station	South Station	Via Washington Street	217	72	70
<b>OUTBOUND</b>				<b>218</b>	<b>72</b>	<b>70</b>
SL4.0	South Station	Dudley Station	Via Washington Street	218	72	70

### Ridership

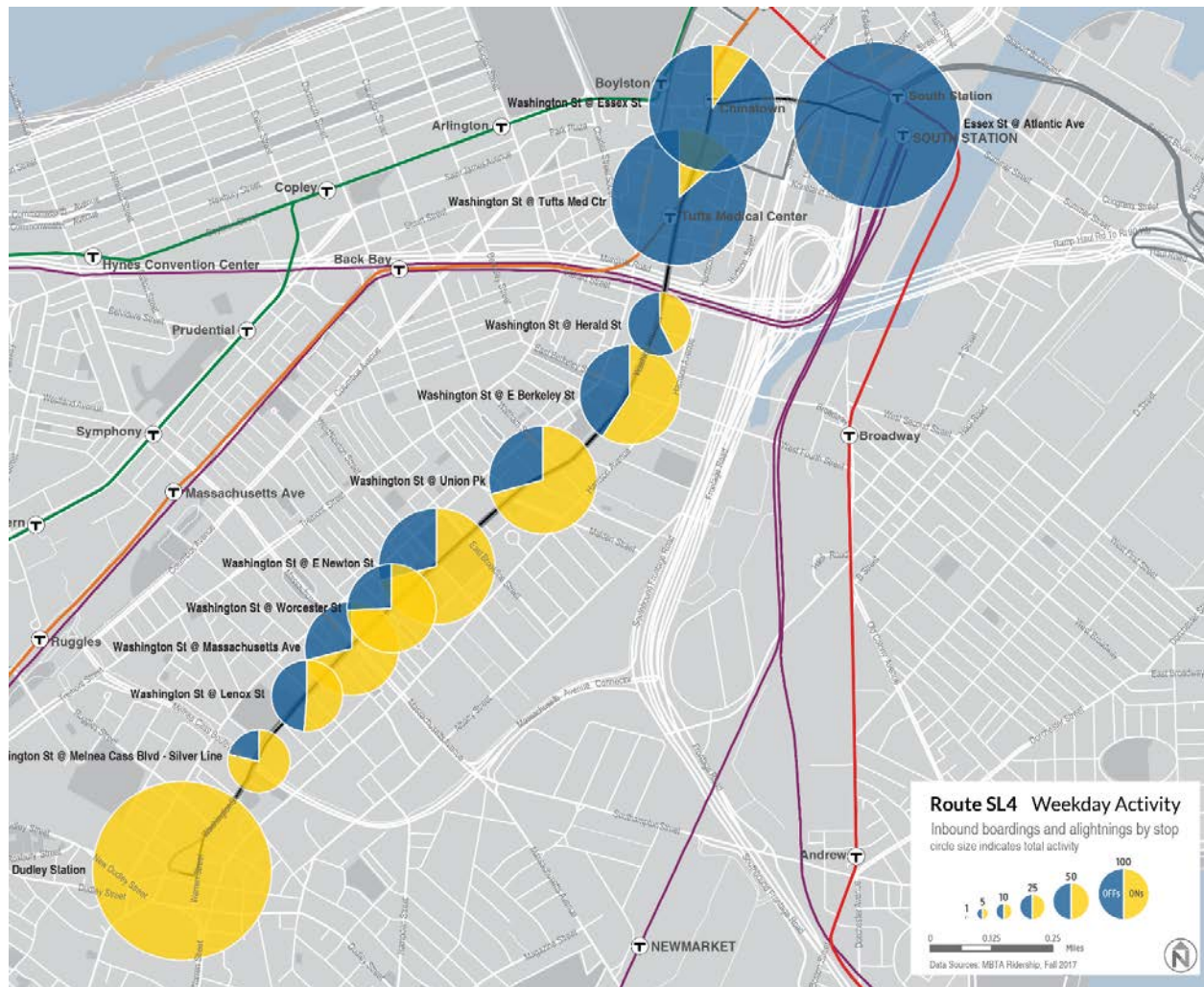
Route SL4 carries 5,800 riders per weekday, 3,100 riders per Saturday, and 2,500 riders per Sunday. While Route SL4 ranks among the top twenty highest ridership routes on weekends, it carries only about 55% of Route SL5’s weekday ridership. Because most riders can use Route SL4 and Route SL5 interchangeably, this ridership is directly proportional to the differences in service levels (Route SL4 provides 56% as much service as Route SL5).

### Ridership by Stop

Route SL4 has strong ridership at most stops. On inbound trips (see Figure 3):

- Close to 40% (1,220 passengers) of all daily boardings occur at Dudley Station, which serves Dudley Square and is a major transit hub.
- Most stops south of the Mass Pike serve more boardings than alightings. However, alightings are also high, indicating that there are large volumes of travel within the

Figure 3 | Weekday Inbound Ridership by Stop Map



corridor and not just to downtown Boston. After Dudley Station, the bus stops with highest boardings are:

- Mass Ave, with 240 boardings and 100 alightings
- Worcester Street, with 220 boardings and 80 alightings
- East Newton Street, with 370 boardings and 150 alightings
- East Berkeley Street, with 230 boardings and 160 alightings.
- Approximately 20% of all riders, or 610, alight at Tufts Medical Center, which is the first opportunity to transfer to the Orange Line.
- Approximately 18% of all riders, or 550, alight at Essex, which is the stop closest to Downtown Crossing and the last stop shared with Route SL5.

- Nearly 35% of all riders, or 1,050 alight at South Station. This compares to 1,710 who alight at Temple Place on Route SL5.

Outbound ridership is close to the reverse of inbound ridership on weekdays, with fewer boardings in the Leather District and more boardings along E. Berkeley Street. Weekend ridership patterns are also similar.

### **Ridership by Trip**

Route SL4's weekday ridership is strong throughout the day. It also exhibits typical commuting patterns, with higher ridership inbound during the AM peak and outbound during the PM peak (see Figure 4 and Figure 5).

Many AM peak inbound trips carry over 80 passengers, and many PM peak outbound trips carry over 60 passengers. However, due to the use of 60' articulated coaches and significant levels of ridership turnover along the route, on average, all trips operate within maximum crowding levels. Midday ridership is strong inbound, with trips serving more than 50 passengers. Outbound ridership is lower, generally at 30 to 40 passengers per trip. After 5:30 PM inbound and 6:00 PM outbound, ridership per trip falls to 20 passengers or less. Late night trips serve few riders.

On Saturdays, ridership fluctuates between 20 passengers to up to 40 per trip in both directions between approximately 6:00 AM and 6:00 PM, and with fewer than 15 passengers on trips after 7:00 PM inbound (see Figure 6 and Figure 7).



Figure 4 | Weekday Ridership by Trip: Inbound

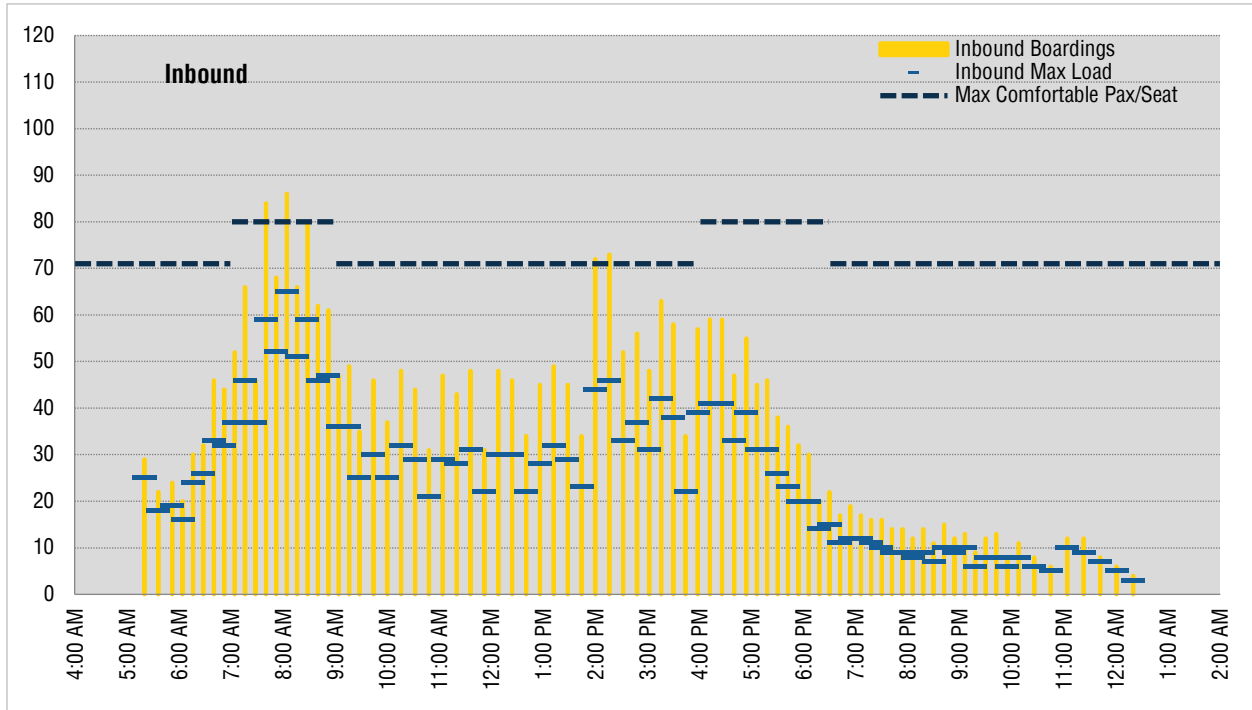


Figure 5 | Weekday Ridership by Trip: Outbound

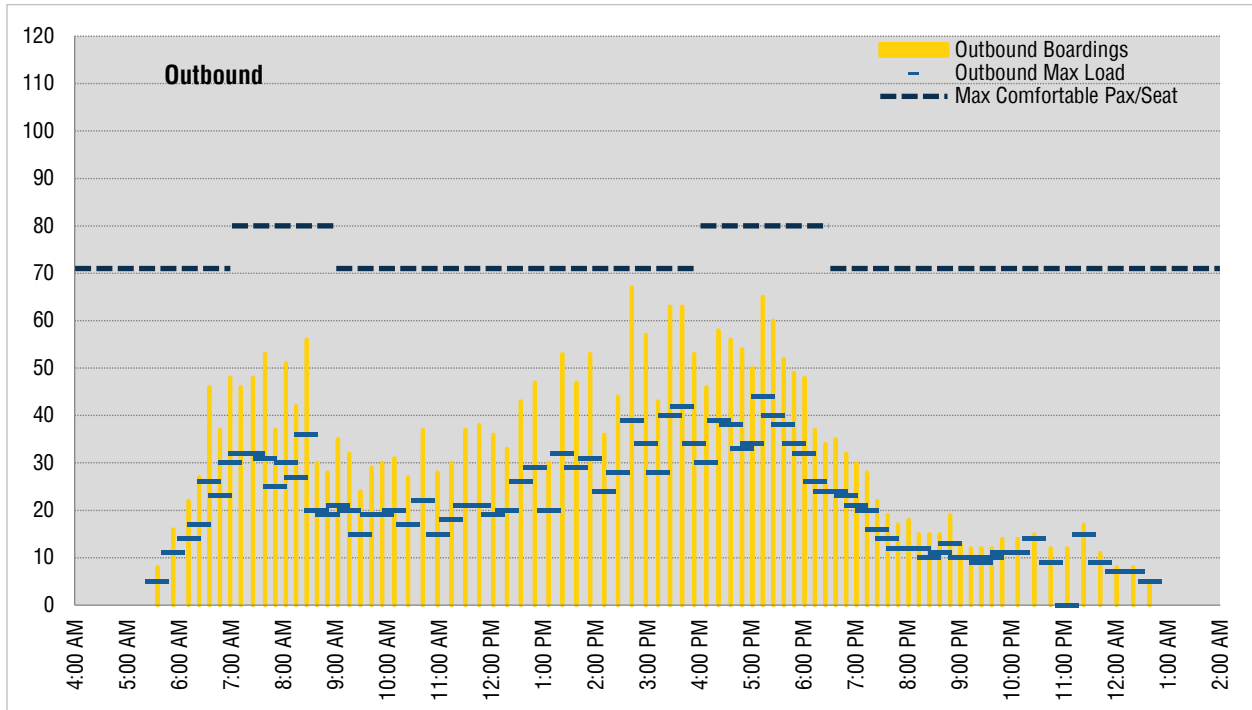


Figure 6 | Saturday Ridership by Trip: Inbound

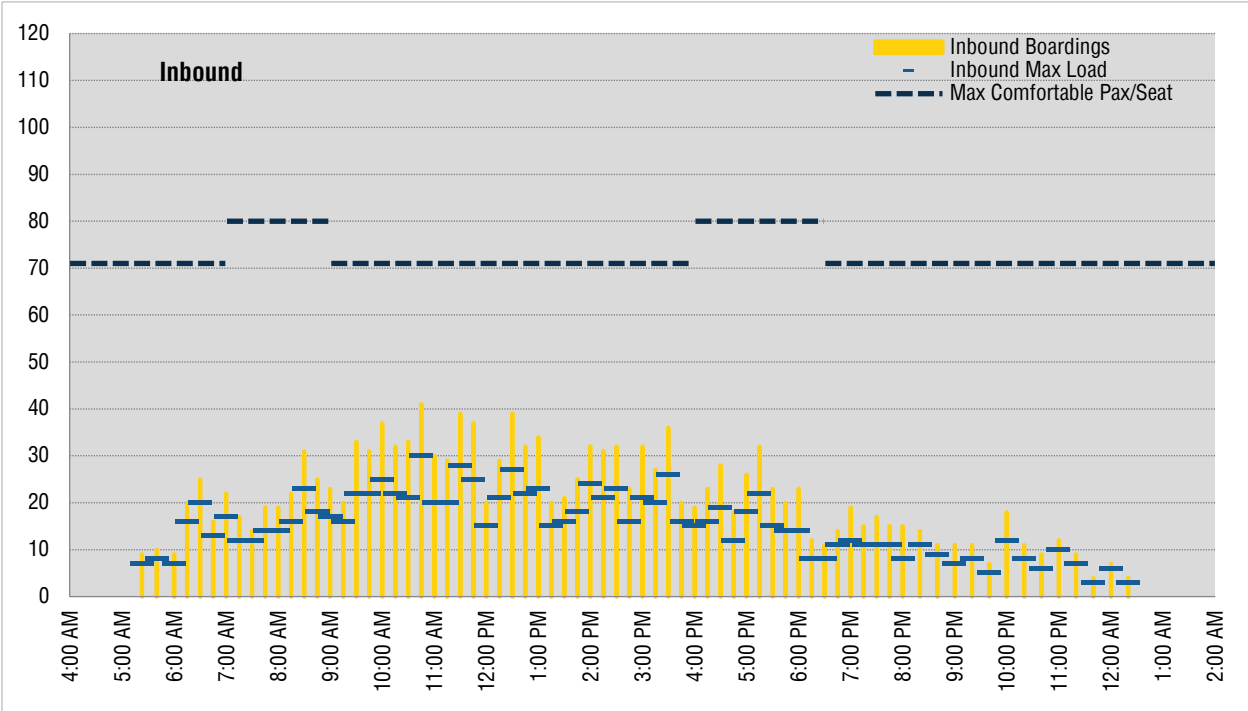
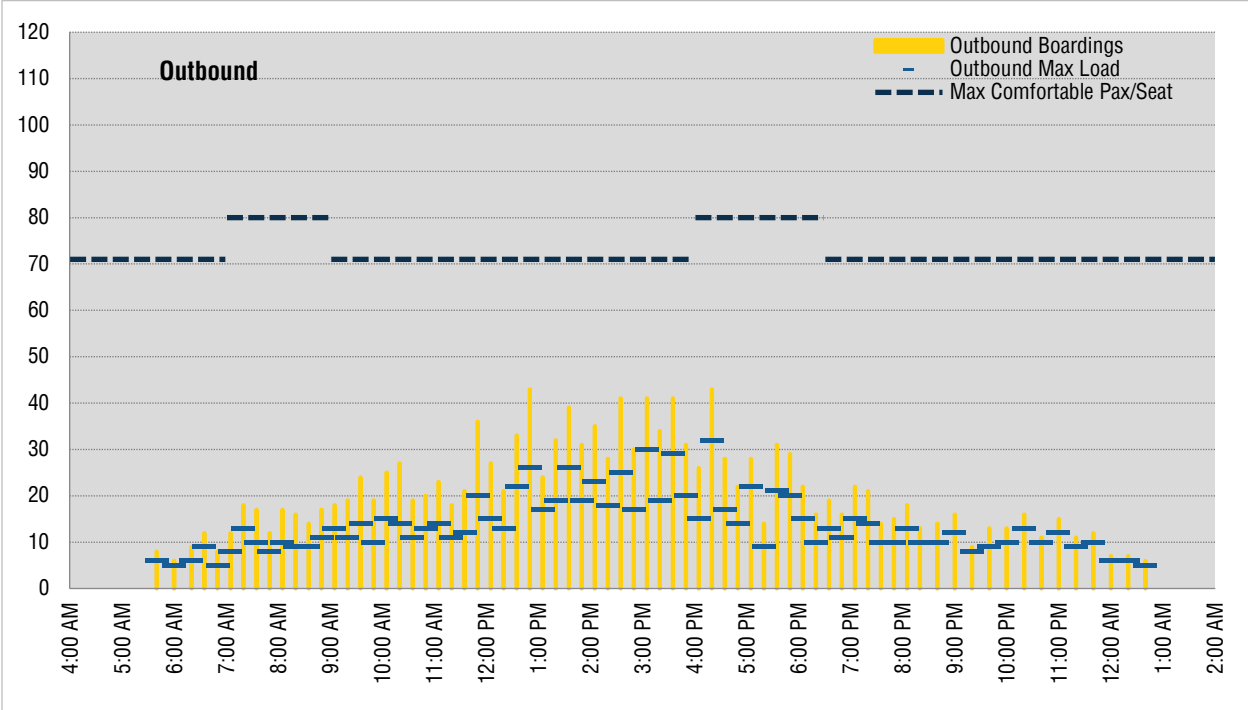


Figure 7 | Saturday Ridership by Trip: Outbound



Sunday patterns are similar but with ridership per trip that is approximately 20% lower (see Figure 8 and Figure 9).

Figure 8 | Sunday Ridership by Trip: Inbound

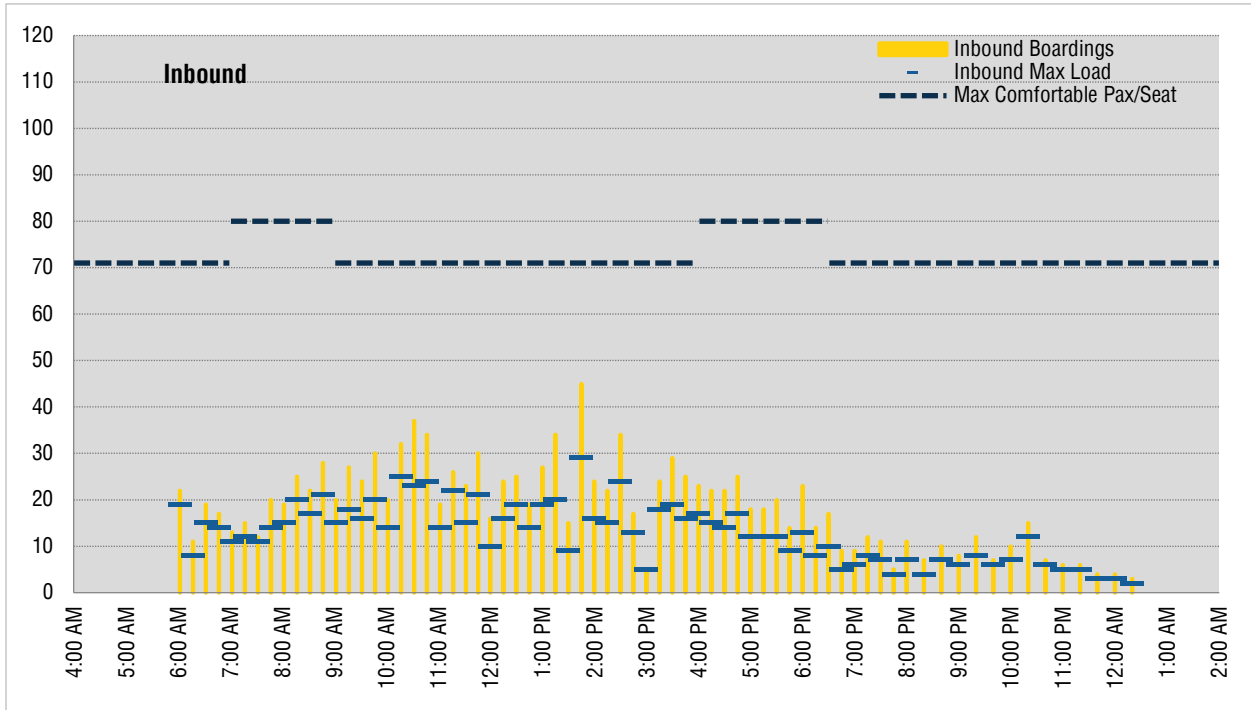
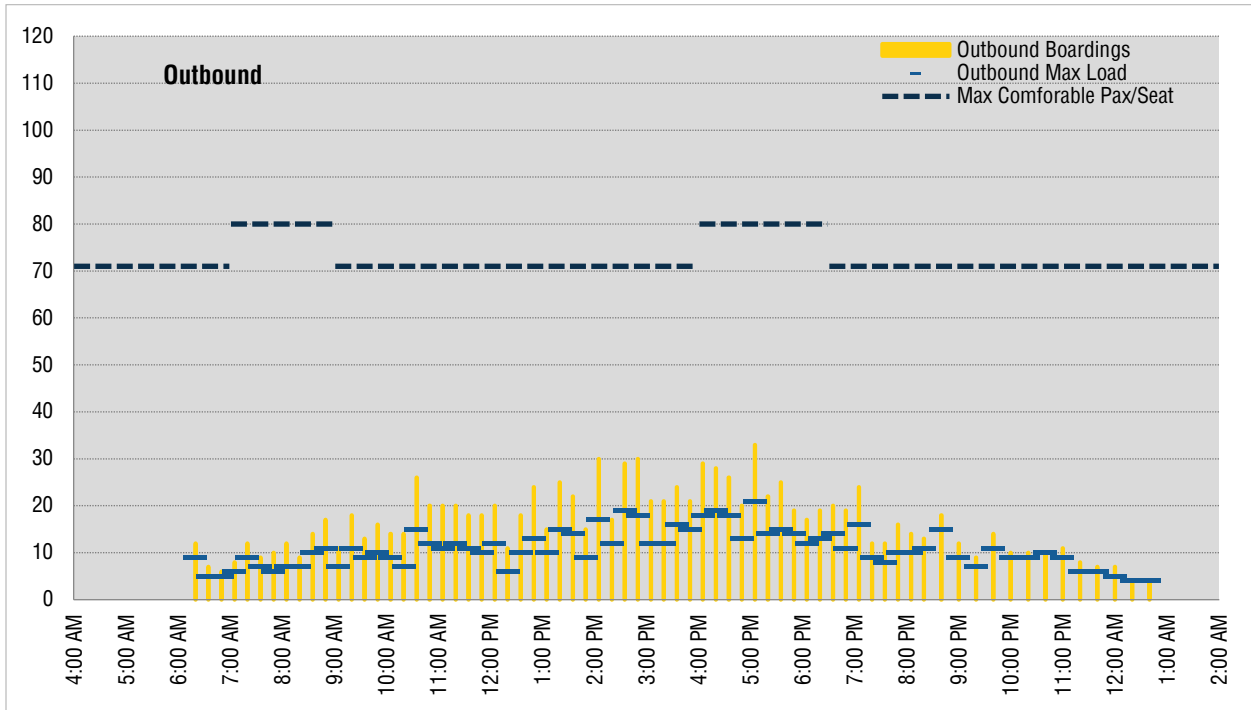


Figure 9 | Sunday Ridership by Trip: Outbound





## Passenger Comfort

The MBTA desires that passengers travel in relatively comfortable conditions. At the same time, the MBTA's definition of comfort reflects the very high volume environment in which the MBTA operates, and that some passengers may have to stand for a portion of their trip. More specifically, at least 92% of passengers' travel times should be in comfortable conditions, and ideally, at least 96% of travel times should be in comfortable conditions. Comfortable conditions are considered to be 140% or less of seated capacity during high volume periods and 125% or less during other periods. On Route SL4, 97% of passenger minutes are in comfortable conditions, which is above the target of 96% (see Table 3).

Table 3 | Passenger Time Spent Traveling in Comfortable Conditions

	WEEKDAYS	SATURDAYS	SUNDAYS
<b>Minimum Standard</b>	92%	92%	92%
<b>Target</b>	96%	96%	96%
<b>Actual</b>	97.4%	100%	100%

## Reliability and Speed

### Reliability

Passengers using higher frequency services like Route SL4 expect buses to arrive on a regular basis, and typically do not rely on published schedules. Route SL4's weekday reliability of 78% is above the MBTA's minimum standard of 70% despite a relatively high percentage of dropped trips (2.2%). However, given that Route SL4 operates in dedicated bus lanes for most of its length, this on-time performance is lower than would be expected. Saturday and Sunday reliability, at 74% and 81%, exceed and meet the target of 75% reliability on the weekends, but are not a marked improvement over weekday on-time performance.

Table 4 | Reliability

SERVICE DAY	ORIGIN/MID-ROUTE ON-TIME PERFORMANCE	DESTINATION ON-TIME PERFORMANCE	OVERALL RELIABILITY	DROPPED TRIPS
<b>Monday-Friday</b>	78%	83%	78%	2.2%
<b>Saturday</b>	74%	77%	74%	-
<b>Sunday</b>	81%	78%	81%	-

### Running Times

Off-schedule performance is caused in large part by actual running times that differ from scheduled running times. During the morning peak period, midday, and evening, trips

routinely run five minutes late (see Figure 10). Conversely, most outbound service after 10:00 AM runs up to eight minutes early (see Figure 11).

Figure 10 | Scheduled & Median Travel Time by Trip: SL4 Inbound

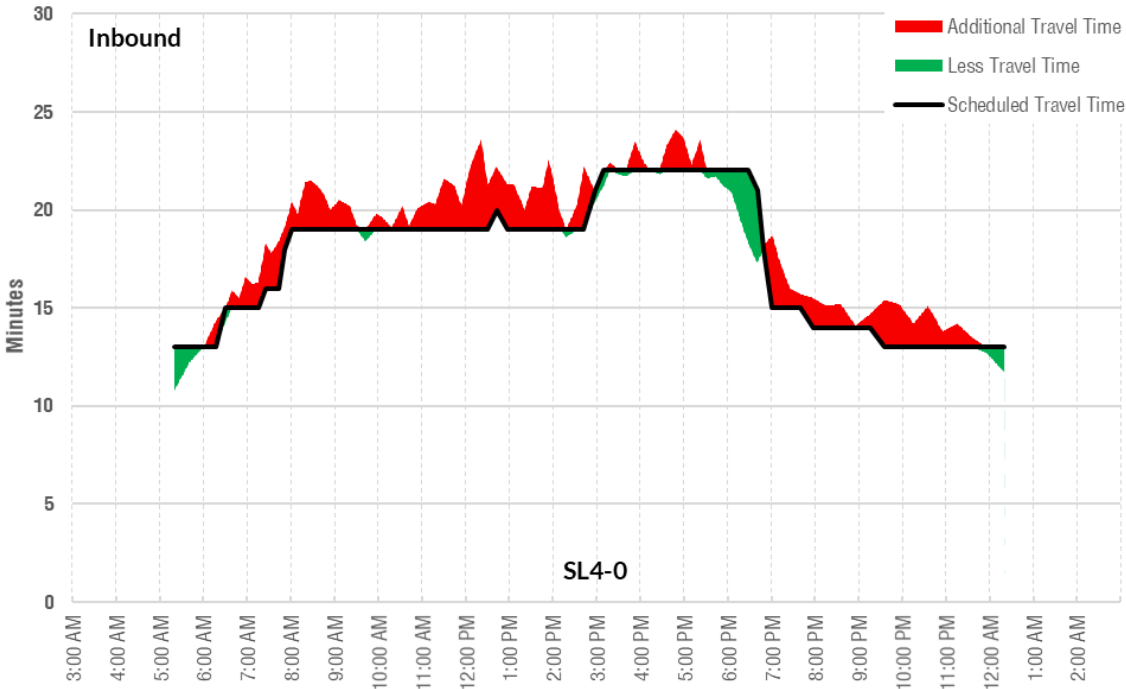
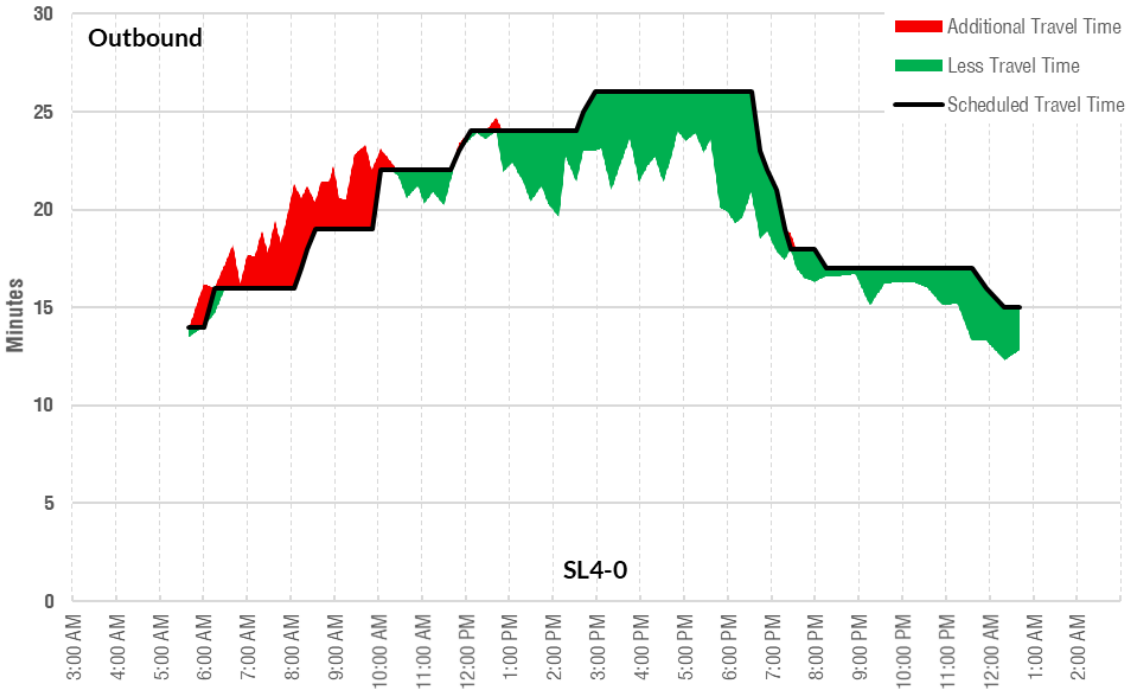


Figure 11 | Scheduled & Median Travel Time by Trip: SL4 Outbound



## Stop Spacing

Route SL4 has 12 stops over its 2.4 mile length or an average of five per mile. This overall spacing exceeds the MBTA's guidelines of two to four stops per mile for BRT routes, and some stops, particularly between Newton Street and Melnea Cass Boulevard are much closer (see Figure 1). In particular, the Worcester Square and Lenox Street stops are not transfer points with other routes and are very close to other stops.

## Summary

Route SL4 is essentially a supplement to Route SL5 Dudley Station-Downtown Crossing that provides direct service to and from South Station. Most of its riders use it interchangeably with Route SL5, but a large number – over 2,000 total passengers per weekday – use the service to South Station. There are two major issues with the route:

1. Its lack of coordination with Route SL5, which produces very irregular schedules along Washington Street between Dudley Square and Chinatown.
2. It's very slow and circuitous alignment between Chinatown and South Station.

In addition, some stations are spaced very close together for an arterial BRT route, which contributes to the route's slow speed.