

Modernizing the Haverhill Line

Rapid, Reliable Transit for Haverhill and the Merrimack Valley

Introduction

The 33-mile long Haverhill Line serves the Gateway Cities of Haverhill and Lawrence, the growing residential and commercial district of Malden, and various suburbs in between. Despite the high potential population of riders at the outer end, ridership is low, and only grew by about 1.7 percent in the 2010's.

The infrastructure on the line and the diesel trains that run on all commuter rail lines limit the line's frequency and usefulness. Regional Rail improvements will eliminate the barriers to higher frequency and make this line a more valuable asset for the communities it serves. With our proposed improvements, the trip time from Haverhill to Boston could be cut down from 1:10 to 40 minutes and from Reading to Boston to 20 minutes.

We wish to acknowledge the following TransitMatters members who contributed to this report:

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TransitMatters is a 501(c)(3) nonprofit dedicated to improving transit in and around Boston by offering new perspectives, uniting transit advocates, and informing the public. We utilize a high level of critical analysis to advocate for plans and policies that promote convenient, effective, and equitable transportation for everyone.

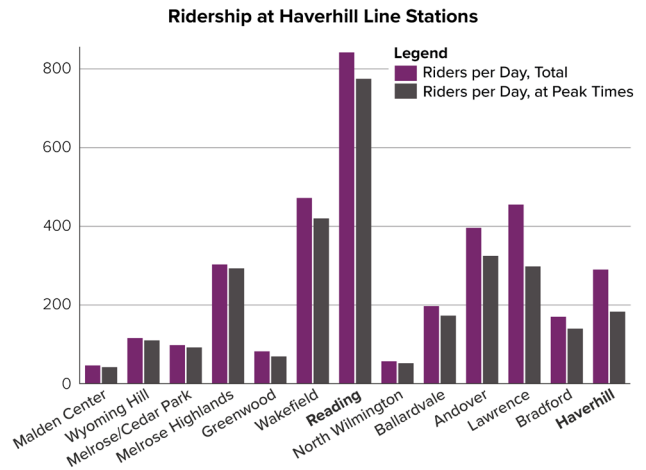
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Current Situation

The Haverhill Line averaged approximately 7,112 boardings every weekday in 2018, the lowest number out of the North Side lines. Moreover, ridership only grew by 1.7 percent between 2012 and 2018, the lowest growth of all North Side lines. The majority of these commuters come from the inner part of the line. Haverhill Line ridership from Malden Center station is very low, at only 46 inbound boardings, as the Orange Line provides cheaper and more frequent service.

Most ridership, 84 percent of total ridership, occurs at peak commute times, but all-day demand from Haverhill and Lawrence is somewhat stronger. Rush-hour riders accounted for 63 and 65 percent of ridership, respectively, while 92 percent of boardings at Reading, the busiest station overall, were at rush hour. Running half-hourly service all day in both directions will make the line more useful for such intercity trips; at present, Haverhill has a train roughly every 90 minutes to two hours. Riders from Reading heading south will also benefit from more frequent service (in this case, every 15 minutes) because of the proximity to Boston and to suburban destinations like Malden.

About 4,000 people live within a half-mile of a station and work near North Station (or near stations on either of North Station’s two subway connections—the Orange Line and the Green Line).

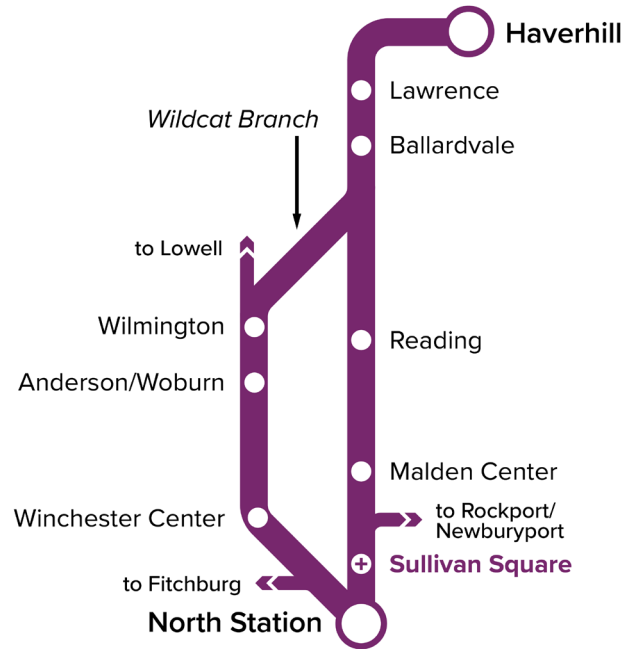


At stations along the Haverhill line, a very high percentage of weekday ridership occurs at peak times (6:30 - 9:30 AM, 4:30 - 7:30 PM), partially due to the low frequency of service outside of these times.

The Haverhill Line runs relatively infrequently due to capacity and service quality problems. These include long stretches of single track, signal system and interlocking limitations, substandard stations, low track speeds, and schedule conflicts with freight trains. Regional Rail resolves these issues in a coordinated fashion by planning the schedule (half-hourly all-day frequency, possibly every 15 minutes), rolling stock (electric multiple units, or EMUs), and infrastructure (high platforms, key double-tracking) together.

The Haverhill Line shares tracks with a few daily freight trains, as well as with Amtrak’s Downeaster service to Maine and New Hampshire, which operates six daily roundtrips. In neither case does the current service present significant challenges to operating Regional Rail, even if there is significant future expansion.

There are two routes from Haverhill to North Station. The routing used by nearly all MBTA commuter trains comes via Reading. The Wildcat Branch, used by a handful of Haverhill Line trains and by Amtrak, bypasses Reading and uses the lower Lowell Line to reach Boston. The Regional Rail concept requires the MBTA to either run all Haverhill trains via Reading or run them all via the Lowell Line. Today’s divided routing does not work for a frequent, tightly integrated timetable¹. Since the Lowell Line routing skips the inner portion of the Haverhill Line, that option would require additional trains on the old routing up to Reading. There are pros and cons to each option, but we recommend the Lowell Line option, for the reasons explained in this document.

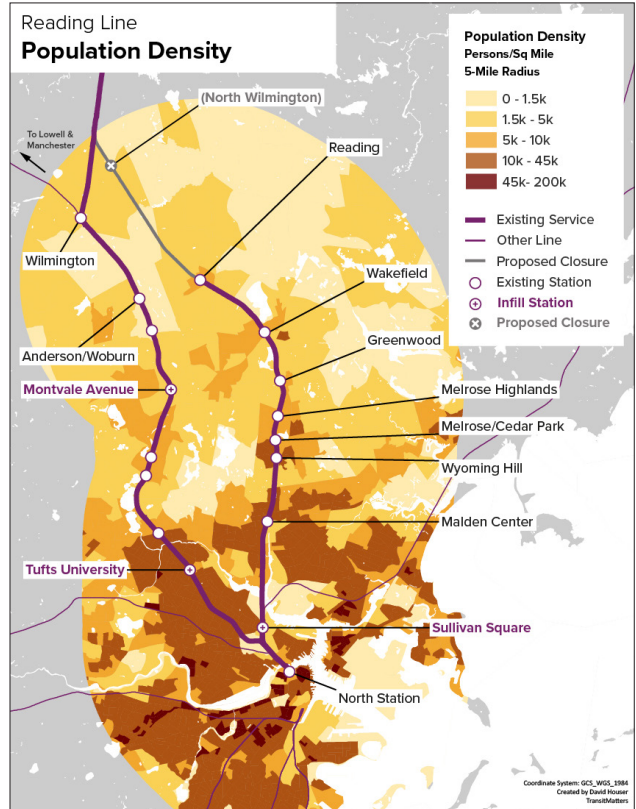
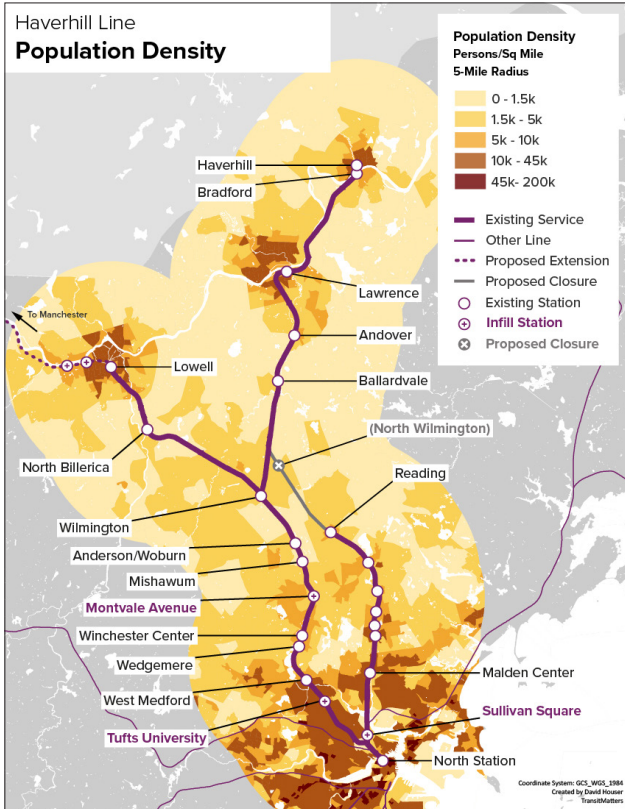
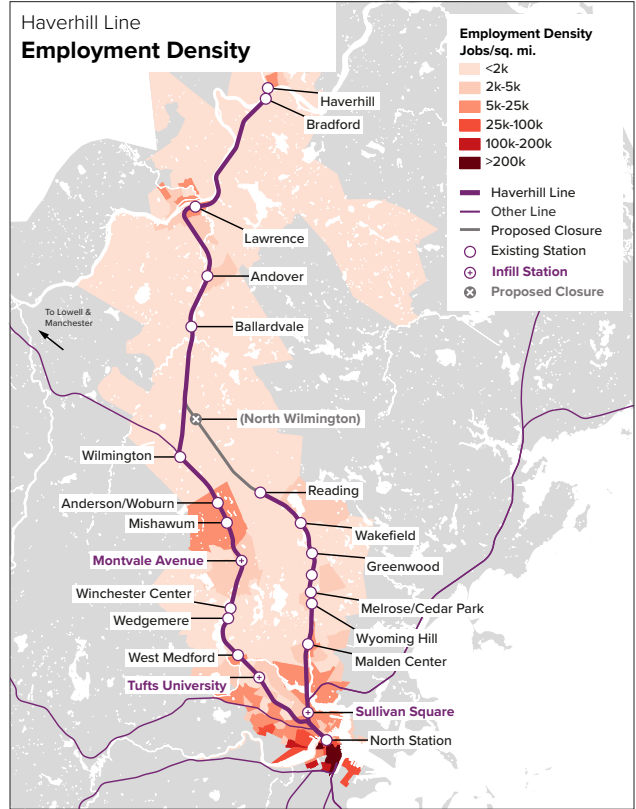
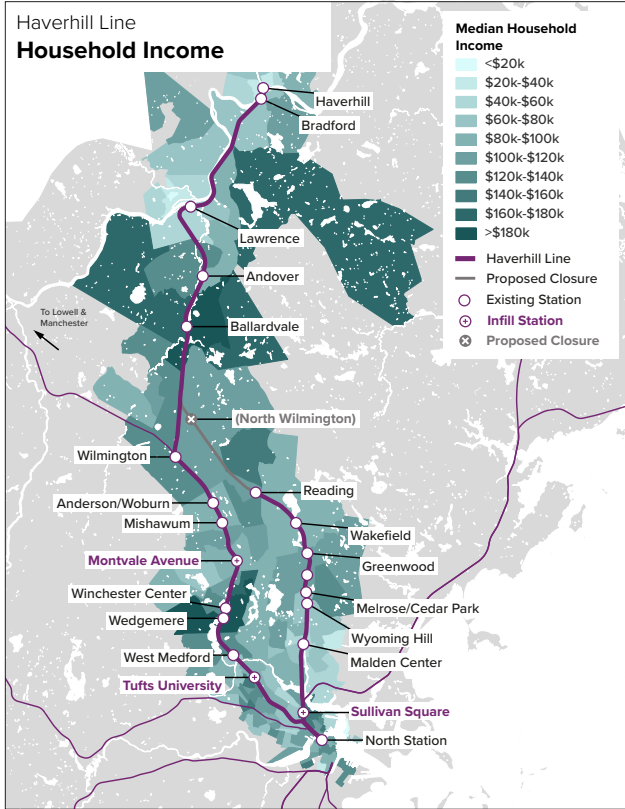


Haverhill’s rail station is located near the downtown of the gateway city, and a 5-minute walk from a bus transportation center served by several regional routes.

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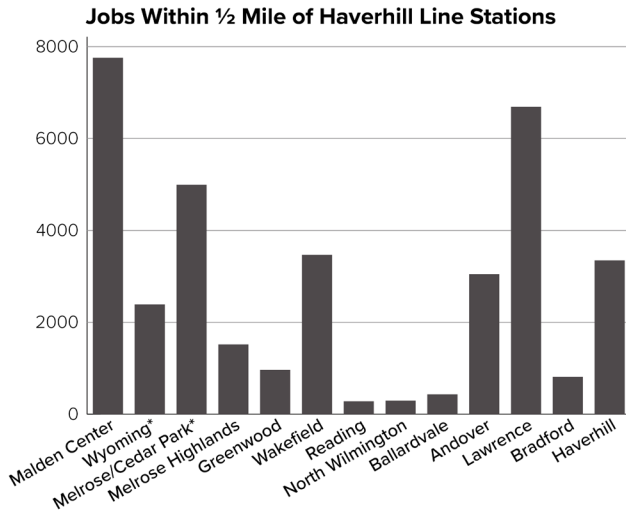
¹ See analysis for why running to the same destination via multiple routes is not optimal: Levy, Alon, “The Wrong Kind of Branching”, *Pedestrian Observations*, 2015. <https://pedestrianobservations.com/2015/02/04/the-wrong-kind-of-branching/>

Demographics



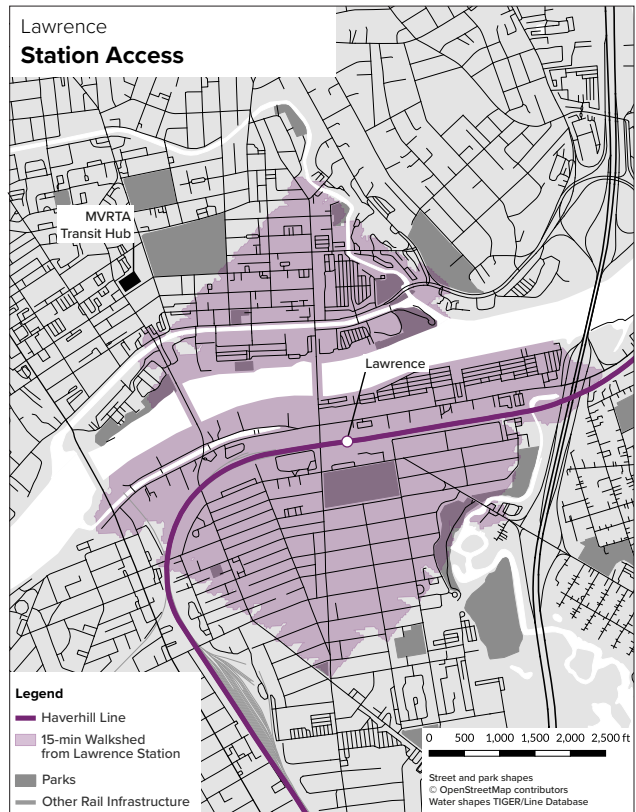
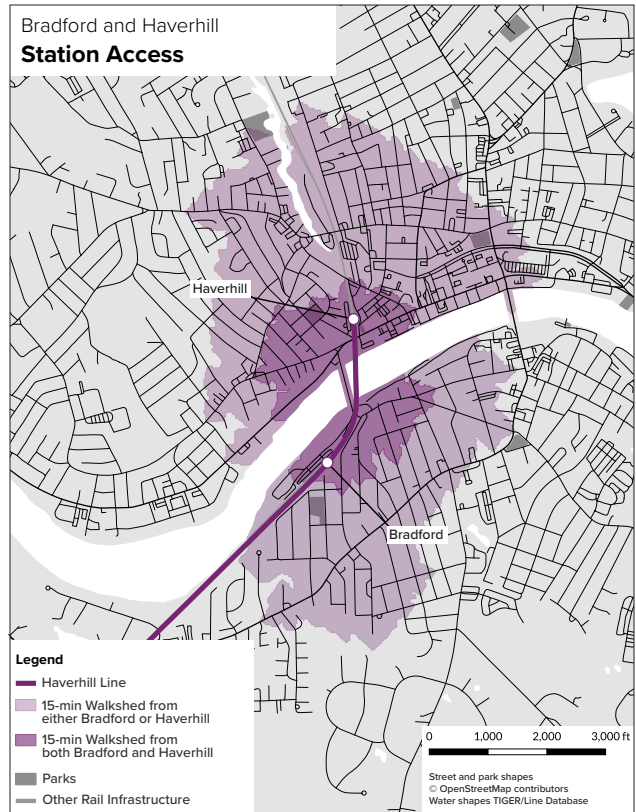
Jobs

There were 36,000 jobs within half a mile of Haverhill Line stations not including North Station, in 2017, broken down as follows:



* 2,266 of these jobs are in the overlapping area between Wyoming and Melrose/Cedar Park.

Lawrence and Haverhill’s stations are both set away from their downtown areas; within half a mile of Downtown Lawrence there are 7,756 jobs, and within half a mile of Downtown Haverhill there are 4,589. With better service, these two stations could be attractive to people commuting into Lawrence and Haverhill, if not to companies trying to attract reverse commuters as employees.



Interim Higher-Frequency Diesel Service

Increasing frequency, particularly during peak hours, is difficult on any line because locomotives and coaches are already devoted to existing service. However, additional off-peak service may be plausible in the short term. Once the Providence/Stoughton, Fairmount, and Newburyport/Rockport lines are electrified, there should be sufficient rolling stock and track capacity to operate service every 30 minutes in each direction between Haverhill and North Station. The capacity constraints on the line as discussed below impose some challenges on slow-accelerating diesels that EMUs can more easily get around.

With full-build Regional Rail, service must be clockface—that is, arriving at consistent times every hour. Meaning, if a train in one direction arrives in Andover at :10 past the hour, the next train in the same direction arrives at :40, and then the schedule repeats. Immediately, Haverhill Line trains should use consistent, dedicated platforms at North Station, a practice which continues with full Regional Rail implementation. This should be applied to all lines, ensuring reliability, improving dispatching, and providing a better rider experience².



While not a good solution in the long term, the existing diesel fleet used for service today can be moved from other lines (once upgraded) to provide better service to Haverhill before being fully decommissioned.

Credit: Byron A. Nash, [CC BY 2.0](https://creativecommons.org/licenses/by/2.0/), via Wikimedia Commons

² See [TransitMatters, Regional Rail Proof of Concept: How Modern Operating Practice Adds Capacity to the Commuter Rail Network, 2019](#) for further discussion of the importance of dedicated platforms and clockface scheduling.

Required Infrastructure Investment

Electrification

Based on comparable projects in peer countries, the cost of wiring the 33-mile Haverhill Line is \$80-150 million. Wiring the Wildcat Branch would add \$5-10 million.

This cost does not include bridge work. Electrification sometimes requires an increase in vertical clearance under bridges, especially high-voltage electrification. German railroad law requires 27 cm (just under 11 inches) of static clearance from 25 kV catenary to fixed structures such as bridges as well as to the roof of a train. As it is, the Haverhill Line passes under some bridges that are barely high enough to clear high-voltage wires.

The absolute minimum bridge height³ that will clear 25 kV catenary is 16'4". The lowest bridges over the Haverhill Line have exactly 16'4" clearance.



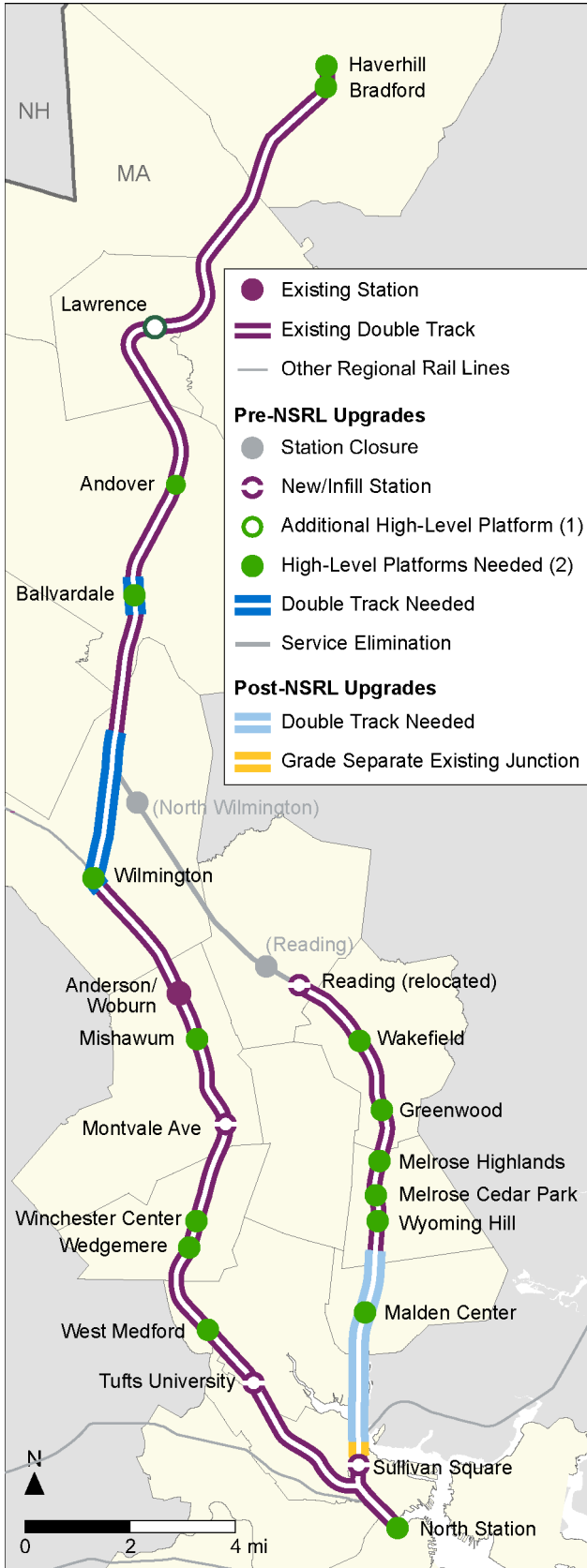
Electrification enables the use of modern trains, like those used on London's Elizabeth Line (shown above), for faster and more reliable service.

Credit: Sunil060902, [CC BY-SA 4.0](https://commons.wikimedia.org/wiki/File:Sunil060902), via Wikimedia Commons

Project Type	North Station—Lowell	Wilmington—Haverhill	North Station—Reading	Total
Electrification	\$90M	\$40M	\$50M	\$180M
Double Track	—	\$50M	\$10M	\$60M
Platforms and Stations	\$250M	\$100M	\$200M	\$550M
Total	\$340M	\$190M	\$260M	\$790M

³ There exists 15'5" catenary height on Japanese high speed lines, and moreover, the same 11" clearance to the train roof produces 14'6" train height, which is normal on the Northeast Corridor (where the minimum 25 kV catenary height is 15'6", not 15'5", but the extra inch is not necessary), see Next Generation Corridor Equipment Pool Committee, "Standardized Technical Specification: PRIIA 305 Next-Generation Rail Committee Single-Level Passenger Rail Cars", National Institute of Standards and Technology, 2011, p. 13, pp 1.4.3-4 https://www.nist.gov/system/files/documents/mepspecs_single_level_passenger_rail_car.pdf

INFRASTRUCTURE REQUIREMENTS IN-DEPTH



The McGovern Transportation Center, Lawrence's rail station, has a single high-level platform. While this is more than most stations along the line, adding a second high-level platform (with safe pedestrian access) is important for allowing higher frequency service on the line.

Credit: Pi.1415926535, [CC BY-SA 3.0](https://commons.wikimedia.org/wiki/File:McGovern_Transportation_Center.jpg), via Wikimedia Commons



Despite having two platforms, the current Reading station only has a single track. Moving the station slightly south removes the need to build a second track, and helps avoid several nearby grade crossings.

Credit: Pi.1415926535, [CC BY-SA 3.0](https://commons.wikimedia.org/wiki/File:Reading_station.jpg), via Wikimedia Commons

Capacity Constraints

There are 12 miles of single track on the 33-mile Haverhill Line. This includes much of the urban segment between Sullivan Square and Oak Grove, where the line shares a right-of-way with the Orange Line, a 6-mile stretch from Reading to Andover, and then 2 more miles through the Ballardvale section of Andover, including the Ballardvale station.

The presence of the Orange Line on the route's densest segment means that 15-minute headways are probably sufficient for the short term. This level of service can be achieved with electrification and existing infrastructure, but more frequent service will require more investment.

Scheduling Around Single-Track Bottlenecks

Our guiding principles are:

- » **Organization before electronics before concrete:** it is cheaper to design schedules around current infrastructure than to build tunnels and viaducts and widen the right-of-way; electrification and signaling are intermediate in cost between organization and concrete.
- » **Coordinated planning of timetable, rolling stock, and infrastructure:** since infrastructure can be expensive, it should be added only where necessary based on a planned service schedule, relative to the rolling stock to be used (that is, EMUs).

With electrification and minimal track or station work, trains can run between North Station and Reading every 15 minutes

Double Track: North Station—Reading

Achieving 15-minute frequency on single-tracked sections requires careful scheduling: inbound and outbound trains can't cross except at dedicated double-track locations, or meets. Meets have to be placed at intervals equal to half the headway: with half-hourly frequency, meets occur every 15 minutes. With EMU speed and reliability, meets can be timed on a 15 minute timetable on the Reading-North Station segment at already doubled sites.

The ideal location for a meet is a station. The reason is that the timetables are, in practice, accurate only to within about a minute. If a slight delay happens and the meet is between stations, trains have to sit still. If it happens and the meet is at a station, passengers have more time to get on or off.

One possible issue is Reading station. It is single-track and can plausibly remain so, but double-tracking it may improve reliability, at the cost of having to build two high platforms instead of one, or moving the station itself to the double track segment immediately east of Route 28 and Ash Street. If all service to Haverhill runs via the Wildcat Branch, the schedule stabilization is less of an issue. The cost of double tracking Reading station would be approximately \$7-10 million, and building a new station near Ash Street would cost \$20 million.

Double Track: Reading—Haverhill

If Haverhill trains continue running on the present-day route, it will be necessary to construct short double-track segments at North Wilmington for half-hourly headways. If all Haverhill service uses the Wildcat Branch, then it is necessary to double-track the single-track Wildcat Branch for half-hourly headways, and make sure Andover is designed as a double-track station, whereas today only one track has a platform.

High-Level Platforms

The other key investment to enable Regional Rail standards of service, in addition to electrification and strategic double track, is high platforms at every station. Level boarding reduces dwell time, improves accessibility, and provides a better passenger experience, all through eliminating the need to climb stairs when boarding. It is essential for the transition to Regional Rail to provide wheelchair accessibility, improve reliability, and speed up service.

The Haverhill Line has the peculiar distinction of having none of its stations meet this standard for accessibility and throughput, except North Station. Lawrence has a high platform but only on one track, and Malden Center has a high platform only 400 feet long, half the MBTA's standard. Seven more stations have mini-high platforms; the remaining five are entirely low-platform.

With gap fillers mounted on the trains, as used throughout Switzerland and on the Brightline service in Florida, even curved platforms could have gap-free boarding.

MBTA standards call for 800' platforms, long enough for 9- and almost 10-car trains. At one location, Wakefield, this is not possible, as the station is between two grade crossings with just 450' between them. To resolve this while respecting the 800' standard, the MBTA should move the station slightly to the south, between Albion Street and just south of Armory Street.



A mini-high platform, seen here at Reading, provides an easier boarding experience than a low-level platform on its own, but still reduces the rate at which people can board.

Credit: Pi.1415926535, [CC BY-SA 3.0](https://commons.wikimedia.org/wiki/File:Pi.1415926535), via Wikimedia Commons

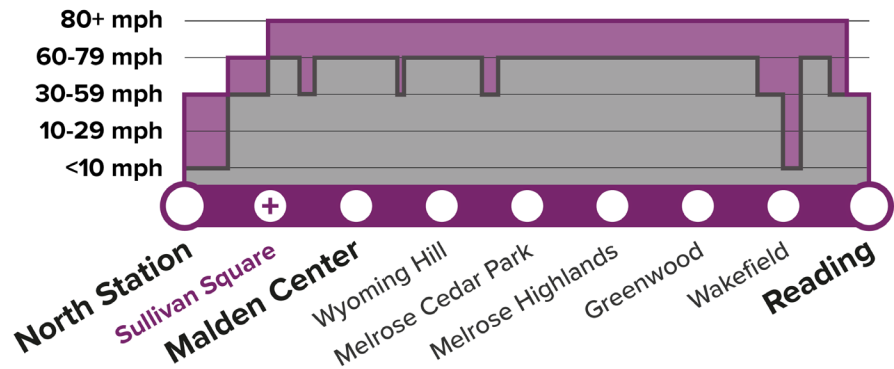
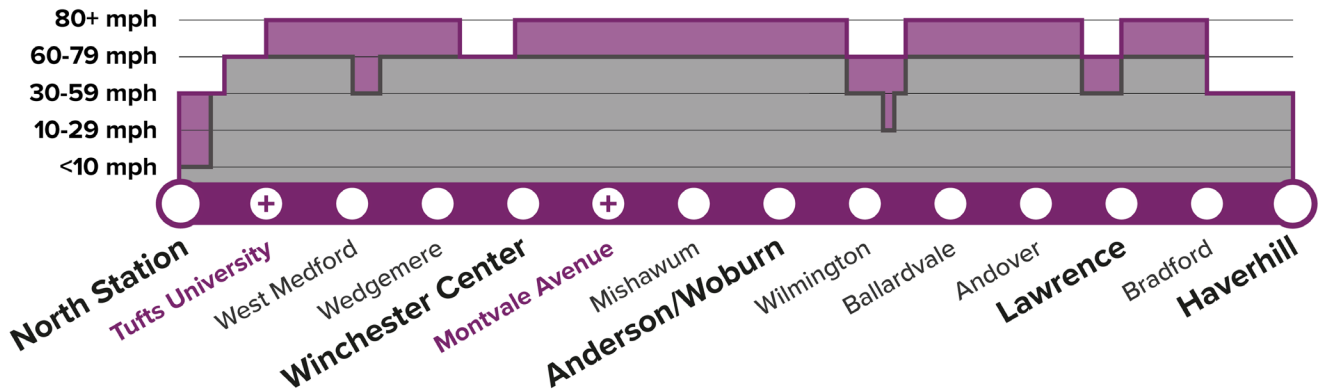
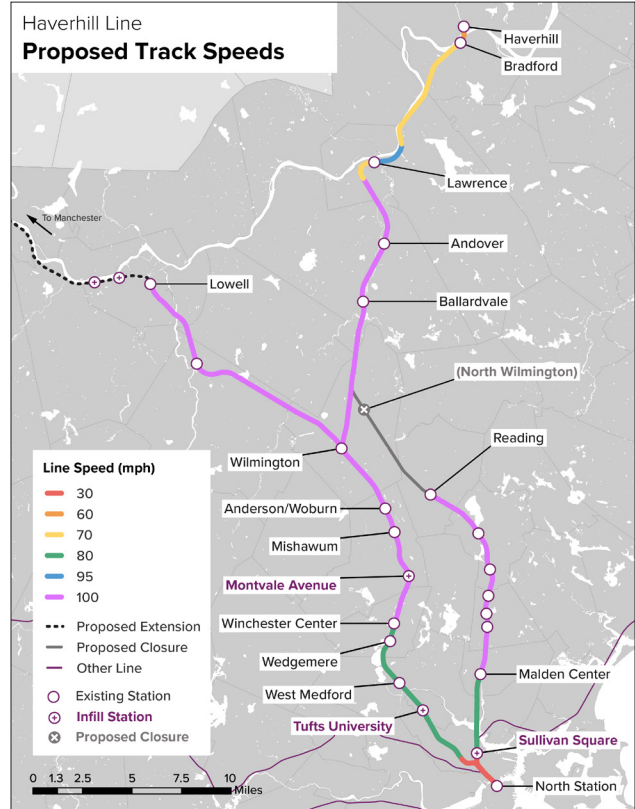
That said, because ridership on the Haverhill Line is fairly light today even at rush hour, full length high platforms may not be necessary. If peak trains come every 15 minutes, especially if there is a train on the Wildcat Branch every 15 minutes and a separate Reading train every 15 minutes, then 4- or 5-car trains may be sufficient, shortening platforms to 350'-450'. Shorter platforms are cheaper to construct, and in the case of Wakefield, allow the trains to stop at a more central location without a grade separation.

Speed

The maximum speed today is 60 mph, but the line is straight enough for 80 mph on the inner segment and 100 on some outer segments. The current speed limit stands for two reasons: the signaling system is antiquated and the combination of slow-accelerating diesel locomotives and close stop spacing makes for low top speed. Both of these problems are inexpensive to fix.

Thankfully, the signaling system is being upgraded. As part of the national mandate for positive train control (PTC), the MBTA is installing the Advanced Civil Speed Enforcement System. This PTC system is also used on the Northeast Corridor and is scheduled to be operational in the near future.

The close stop spacing means the line would benefit from electric multiple units (EMUs) with their fast acceleration and deceleration rates. With electrification and routine track repairs, trains could actually reach 80 mph between stations on parts of the inner line, and achieve 100 mph between stations past Reading.



Exact speeds may be lower due to a number of factors, such as stopping at stations, temporary maintenance zones, or small details in the track geometry.

Further Investments

North-South Rail Link

While a significant capital project, the North-South Rail Link (NSRL) will enhance the utility of Regional Rail, particularly for lines north of Boston, because riders will gain a one-seat ride to downtown and to areas south and west of Boston. NSRL requires additional double tracking, most extensively on the Reading Line, for two reasons.

First, NSRL introduces the dependency between Reading Line schedules and the schedules of the lines that would share a tunnel, likely the Newburyport/Rockport Line, and the paired South Side lines. This means that building the timetables around single-track bottlenecks on both sides will not always be possible.

Second, NSRL provides a one-seat ride downtown from the North Side. This improves connectivity to the point that it would be reasonable to increase peak frequency: a train every 5-7.5 minutes to Reading instead of every 15, and a train every 15 minutes to Haverhill instead of every 30.

As a result, NSRL service requires full double-tracking to Reading. Malden Center in particular would require extensive work, as it is on a viaduct, and the junction at Sullivan Square would also need to be grade separated at great expense. An alternative is to replace the Regional Rail service to Reading with an extension of the Orange Line, as planned in the middle of the 20th century. Because both projects involve significant expense and entail major tradeoffs, we do not endorse one option or the other.

Farther north, it becomes necessary to double track Ballardvale station; however, this has already been proposed in the near term. Once this is complete, the entire Haverhill Line will be double-tracked.

Freight Conflicts

The Haverhill Line has a small amount of freight service, provided by the Class II railroad Pan Am Railways, which is currently up for sale and will likely be bought by one of the larger Class I railroads soon.

The stretch of the line from Lowell Junction to Haverhill comprises part of Pan Am and Norfolk Southern's Patriot Corridor, the primary freight route from New York to Maine. Traffic averages six trains per day in each direction, light enough to fit between half-hourly off-peak trains on the outer parts of the line.

South of Lowell Junction, traffic is limited to two daily roundtrips as well as a few weekly runs and short-distance trains. It is not difficult to slot this number of roundtrips between passenger trains in substitute slots just before the start of rush hour service or late in the evening when frequency decreases; it can go to Boston via either the Lowell Line or the present-day Haverhill Line route.

If freight can move to the Lowell Line, then it can use this route early in the morning and around 10 or 11 at night as frequency is lower than the usual but service still runs. Today freight trains run at night, whereas we propose to leave the line unused at night so that maintenance workers can do repairs.

Currently, a major complicating issue is dispatching, but this can be changed. While the MBTA owns and maintains the entire line, train dispatching is handled by Pan Am north of Lowell Junction. But the MBTA has the legal right to rescind Pan Am's dispatching rights in order to improve the line's reliability and allow for frequent passenger service.

Lowell Line Interlining

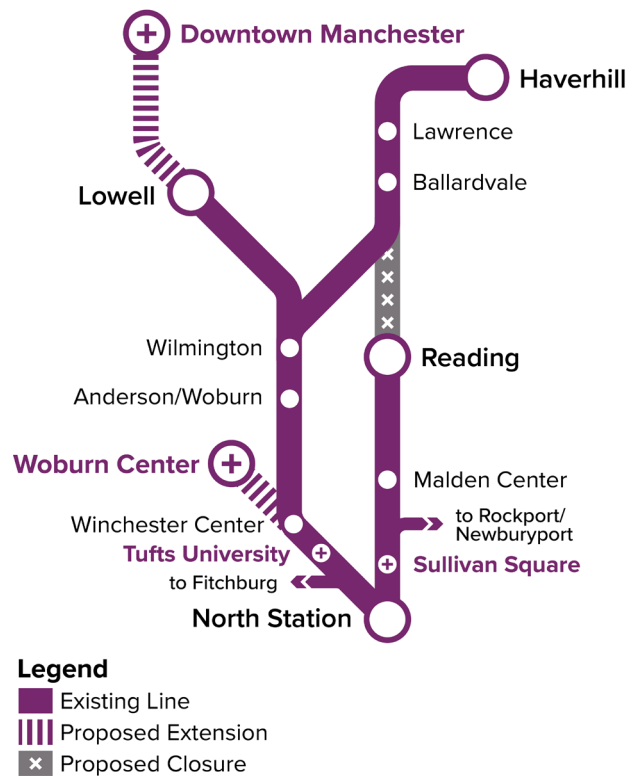
There are two routes between North Station and Haverhill: the current route via Malden and Reading, and the Lowell Line and its Wildcat Branch via Winchester and Wilmington. Nearly all Haverhill Line trains use the Reading route, but a handful use the Wildcat Branch, especially reverse-peak. Amtrak’s Downeaster service to Portland runs over the Wildcat Branch as well. Under a Regional Rail operating model, the MBTA must choose either of the routes and run all trains on it. Alternating between trunk lines creates scheduling complications and cuts frequency to intermediate points in half.

One option is more or less the status quo: all Haverhill trains would go to Boston down the present-day route via Reading. The North Side MBTA lines would then operate as four fully independent trunks - Fitchburg, Lowell, Haverhill, Newburyport/Rockport. North-South Rail Link service would treat the North Side as a system with four relatively equal lines.

The other option is to send all trains to Lawrence and Haverhill via the Wildcat Branch. The outer Haverhill Line would become a branch of the Lowell Line, just as the Newburyport and Rockport Lines are branches of the same system. North Wilmington station would be closed, while the Reading to North Station segment would operate as its own separate, shorter line, which could be a standalone line like the Fairmount Line or an extension of the Orange Line.

The existing North Wilmington station is cut off if Haverhill trains run via the Wildcat Branch. However, it only served 58 daily riders as of 2018. Fortunately, merging Lowell and Haverhill trains onto the Lowell Line and Wildcat Branch still gives the town of Wilmington 15-minute headways all day at Wilmington station, in both directions.

We recommend the Wildcat Branch option, for three reasons:



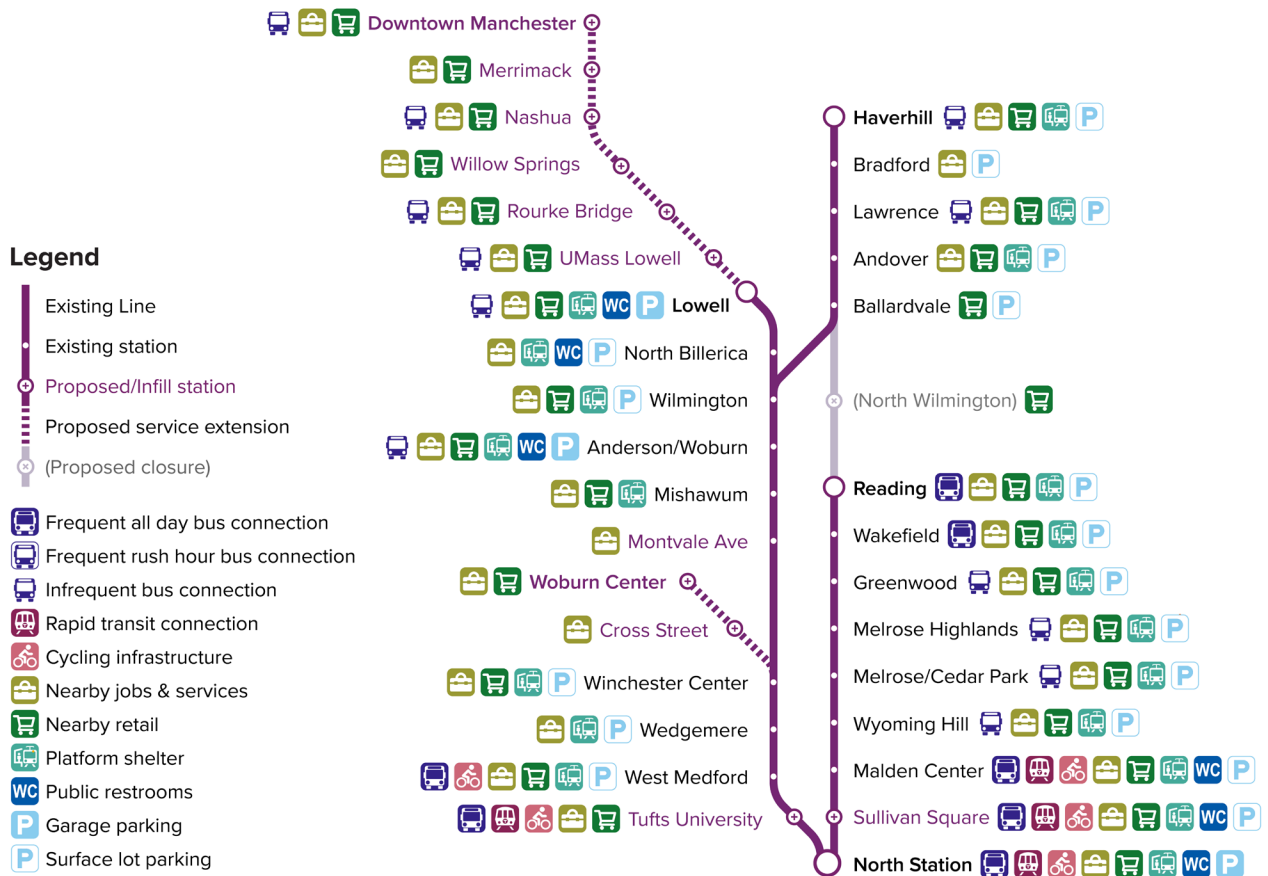
- Budget uncertainty.** If money is limited then the system still works and there is the future option of an Orange Line extension. In contrast, upgrading the entire Haverhill Line right now locks the MBTA to operating the Haverhill Line via the Reading route forever, regardless of future changes.
- Speed.** The Wildcat routing provides a faster trip to and from Boston from the outer Haverhill Line, optimizing the schedule for fast service to the population centers of Haverhill and Lawrence.
- Costs.** The status quo option requires more double tracking through North Wilmington. With NSRL, demand for higher frequencies may increase given the one-seat ride to downtown Boston, requiring upgrades through the built-up area between Malden and Boston. It may be more cost-effective to provide capacity via an Orange Line extension.

Issue	Haverhill via Reading	Haverhill via Wildcat
Travel speed	Slightly slower route: Haverhill to North Station in 42 minutes.	Slightly faster route: Haverhill to North Station in 40 minutes, including infill.
Destinations near business districts	Sullivan Square is developing as a commercial transit-oriented development (TOD) site.	Tufts is a potential infill stop on the Lowell Line, serving a major university and providing transfers to the Green Line and buses.
Infrastructure needs: double track	Doubling is needed north of Reading to run 15-minute frequency to Haverhill	Some doubling is needed at Andover or on the Wildcat Branch to provide 15-minute service to Haverhill.
Infrastructure needs: platforms	All platforms need to be raised, Wakefield needs to be moved or grade-separated, and Reading station must either be double-tracked or moved south.	All platforms need to be raised (except North Wilmington, which would be closed, and Malden), but Malden may need to be expanded. Reading can stay single-tracked.
Freight conflicts	More at present, though they can be scheduled around.	Fewer under current assumptions, though it may be prudent to move freight to the Lowell Line.
Phasing	The entire line has to be modernized at once.	The line naturally divides into two, and it's possible to phase either half first in early action.
Urban frequency	The urban portions of both the Lowell and Haverhill Lines get service every 15 minutes.	Trains to Reading come every 15 minutes, trains to Winchester come every 15 minutes, potentially 7.5 with future service increases post-NSRL.
North-South Rail Link service	Four relatively evenly-matched lines feeding in from the north (Newburyport/Rockport, Lowell, Haverhill, Fitchburg). Significant double tracking required for reliability and demand reasons.	Lines remain evenly-matched in the base case. If the Orange Line subsumes the Reading Line, there would vbe an imbalance between North and South Side lines.

Station Access

It is fortunate that most of the Haverhill Line's stations are located in walkable urban and village centers. North Wilmington station is the sparsest, though even here there is some light retail; due to its low ridership and location on the line between the disconnected sections, we propose closing it in any event. Adding level boarding improves accessibility, and in some cases road improvements may be necessary to improve walkability.

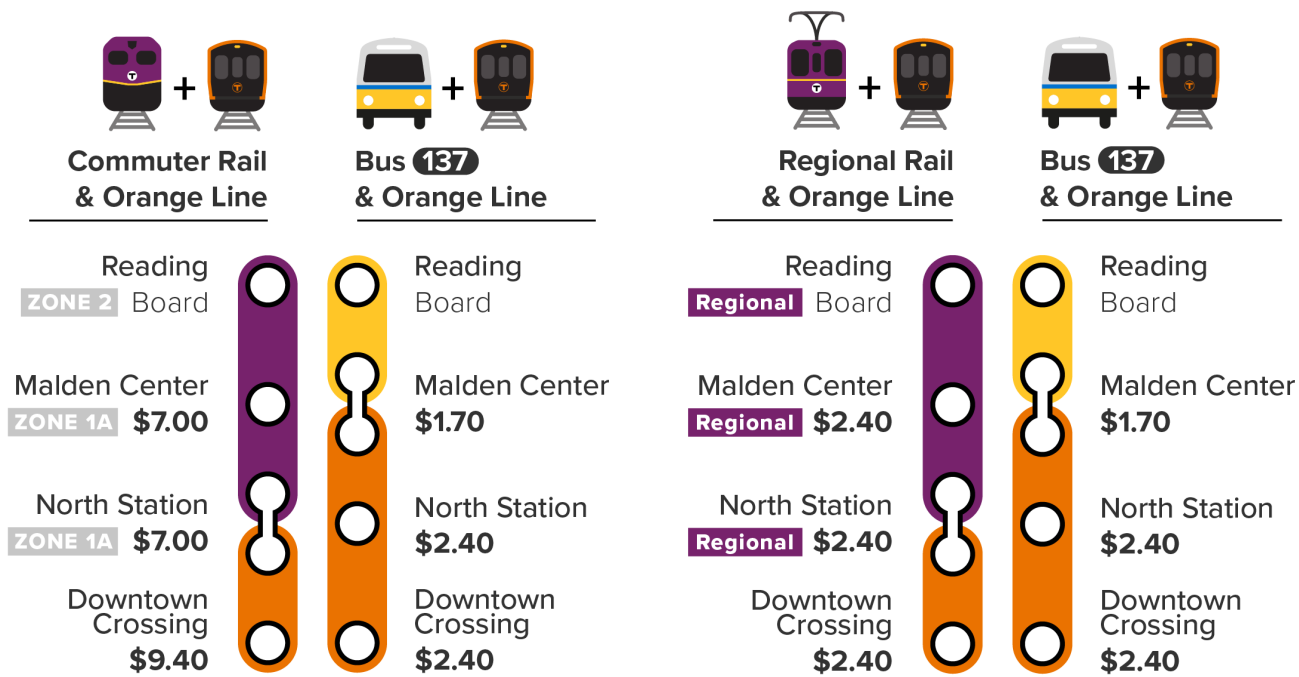
The trunk line shared between the Lowell and Haverhill lines passes job centers near Route 128, but they are in heavily auto-oriented areas. Improvements to walkability as well as shuttle and local bus connections can improve the rail system's utility for getting to these jobs. For more details, see the Lowell Line appendix.



Fares

It is necessary to integrate the fares on the Haverhill Line with those of the rapid transit system and other Regional Rail trains, as we propose on all lines. This means that fares within a fixed zone, such as within the Route 128 ring, should be the same by all modes of public transportation, with free transfers. Today, commuter rail charges premium fares, which deters ridership from Malden to North Station; our proposal fixes this by lowering Regional Rail fares to the same level as the subway where both systems run.

Since we propose moving outer Haverhill Line trains to the Wildcat Branch and the Lowell Line, this is relevant on the Lowell Line as well. It is necessary to charge the same fare at West Medford on Regional Rail as on a bus+Green Line transfer trip, to allow riders to take faster trips affordably.



The current fare system charges considerably more to take a trip by rail versus a slower bus and subway transfer.

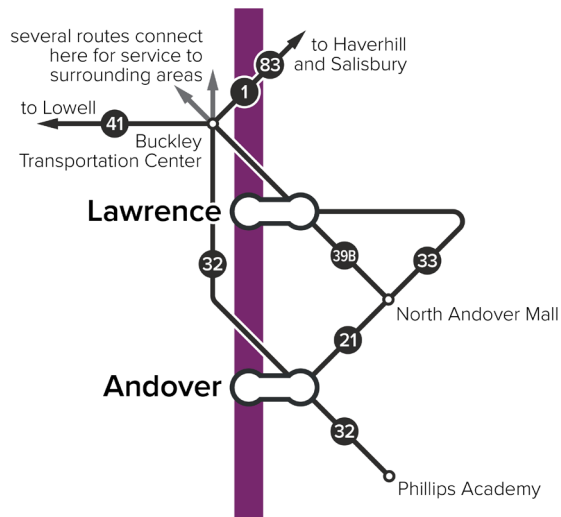
Under the proposed fare system, traveling the same distance costs the same reasonable price, regardless of mode used.

Bus Connections

Trains must work together with buses, rather than running as two separate systems. This requires the following reforms:

- » Mode-neutral fare integration: buses, subways, and trains should charge the same fare within a specified zone, with free transfers.
- » Orienting bus routes and schedules to feed Regional Rail, made easier by clockface scheduling and the reliability improvements from electrification.
- » Signage, shelter, and other information, potentially via announcements onboard trains, indicating which bus connections are available.

The Haverhill Line connects with bus routes operated by the Merrimack Valley Regional Transportation Authority (MVRTA) on the outer line. Unfortunately, the quality of bus connections at Lawrence and Haverhill is limited: both stations are somewhat away from the centers of these cities, where the bus hubs are. In Lawrence, while the train station is a long walk from the downtown bus hub, there is an opportunity to route more buses to the train station, particularly if frequency increases.

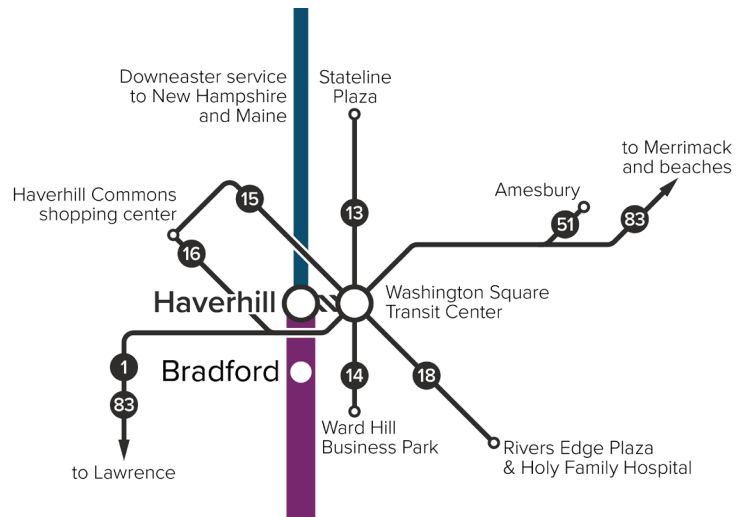


Currently, only two bus routes stop at Lawrence station (McGovern Transportation Center), with most routes instead centered around the downtown bus station (Buckley Transportation Center) nearly a mile away.



Several MVRTA buses connect at Haverhill's Washington Square Transit Center, located about a 5-minute walk from the train station. While transfers are possible with this distance, schedules and fares aren't presently integrated.

Credit: Byron A. Nash, [CC BY 2.0](https://commons.wikimedia.org/wiki/File:Byron_A._Nash_-_MVRTA_Bus.jpg), via Wikimedia Commons



Haverhill also has routes centered around a bus station rather than its rail station, but this station is only a five-minute walk away, making connections more manageable. Currently, no routes serve nearby Bradford station.

Scheduling and Stations

The Haverhill Line has dense stop spacing relative to the rest of the commuter rail network. With EMU acceleration, it is possible to add additional stations, but there are not many viable possibilities. The only strong candidate on the line to Reading is Sullivan Square, which is also on the Newburyport/Rockport Line. On the shared trunk with the Lowell Line, there is infill opportunity at three locations: Tufts University, with a connection to the Green Line, and Montvale Avenue and Mishawum in Woburn, which are located closer to employment centers.

HAVERHILL		
Station	Proposed	Current
NORTH STATION	0:00	0:00
<i>Tufts University</i>	0:05	—
WEST MEDFORD	0:08	0:13
WEDGEMERE	0:10	0:16
WINCHESTER CENTER	0:12	0:18
<i>Montvale Avenue</i>	0:15	—
MISHAWUM	0:17	0:23
ANDERSON/WOBURN	0:19	0:25
WILMINGTON	0:22	0:30
BALLARDVALE	0:27	0:47
ANDOVER	0:30	0:53
LAWRENCE	0:34	1:00
BRADFORD	0:39	1:09
HAVERHILL	0:40	1:11

The tradeoff of this timetable is that if the trip time on the Haverhill Line gets longer by more than about 1 minute, then operating costs rise significantly, as an additional trainset is required. This makes it unlikely that infill on the Haverhill Line itself can be justified. Likewise, extending revenue service beyond downtown Haverhill has poor return on investment—a costly extra trainset would be required, while potential demand is very low.

The proposed timetable assumes a full rollout of Regional Rail: electrification, increased track speeds, additions of double track where needed, and full high-level platforms at all stations.

READING		
Station	Proposed	Current
NORTH STATION	0:00	0:00
<i>Sullivan Square</i>	0:04	—
MALDEN CENTER	0:07	0:13
WYOMING HILL	0:10	0:18
MELROSE CEDAR PARK	0:12	0:20
MELROSE HIGHLANDS	0:13	0:22
GREENWOOD	0:15	0:24
WAKEFIELD	0:17	0:27
READING	0:20	0:33

Travel Times

Assuming level boarding, electrification, and EMU deployment, the fast schedule below is feasible. Trains would run at least 30 mph upon entering the North Station terminal area. On the present-day route, trains would run 60-80 mph from Sullivan Square up to Reading, and then 80-100 mph to the north. If service runs on the Wildcat Branch, then service should be 80 mph from the throat to Winchester, and then 100 mph north. NSRL would allow for time savings of one minute from this schedule, because the elimination of the stub end terminal would let trains run at 60 mph into North Station.

The trip times via the Wildcat route include substantial infill, as outlined in our forthcoming Lowell Line appendix: the Tufts and Montvale Avenue stations do not currently exist, Mishawum is barely served, and Wilmington is not presently served by any Wildcat Branch train.

Frequency

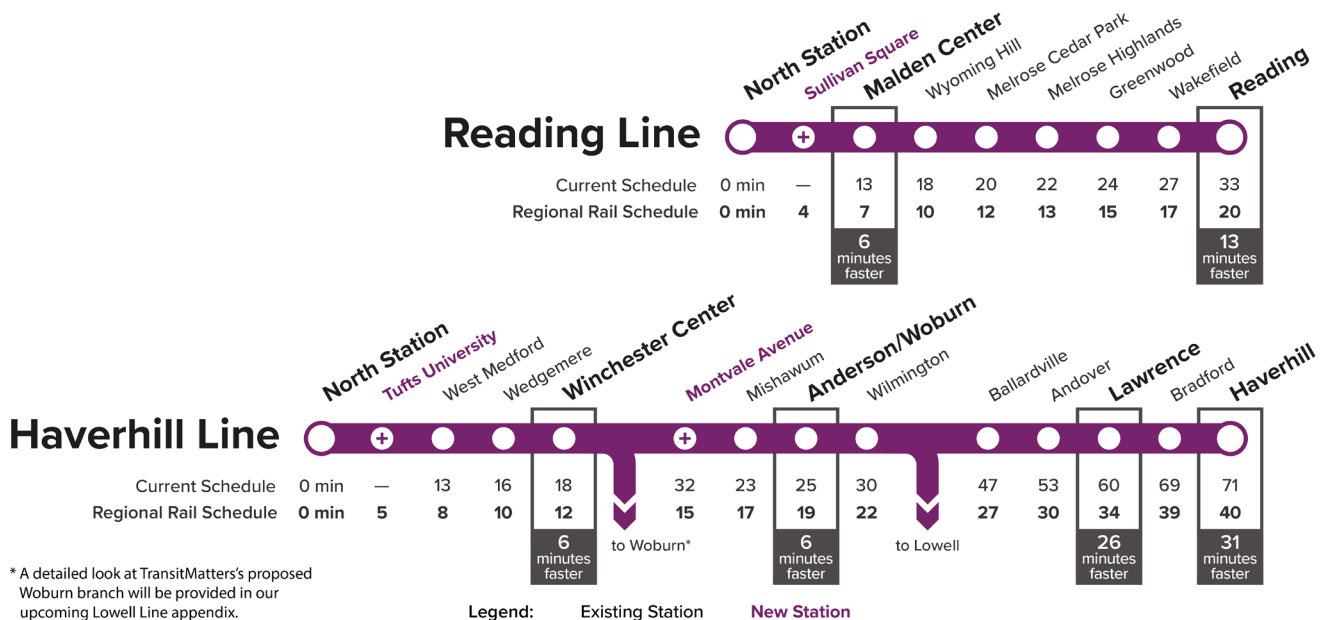
With electrification, moving Haverhill service to the Lowell Line and Wildcat Branch, and double tracking or moving Reading station, the following schedule is possible:

Stations	Regional Rail	Current (peak)	Current (off-peak)
North Station—Reading	15 min	30 min	2 hours
North Station—Wilmington	10 min	20 min	1 hour
Wilmington—Haverhill	30 min	30 min	1.5 hours

Fleet Requirement

If the Haverhill Line runs via Reading, then 15-minute frequency all the way to Haverhill at the peak requires seven trainsets, and 15-minute frequency to Reading with 30-minute frequency to Haverhill off-peak requires six.

If Haverhill and Reading trains run separately as we recommend, then 15-minute frequency to Reading requires four trainsets. With careful interlining, 30-minute frequency to each of Lowell and Haverhill can be achieved with four trainsets to Haverhill, and three to five on the Lowell Line, depending on whether the line remains as it is or extends to Manchester. 15-minute service to each requires seven sets on the Haverhill Line and six to ten on the Lowell Line.



What is Regional Rail?

MBTA Commuter Rail operates as a mid-20th century service with a mid-20th century business model. It reflects out of date biases about where people and jobs are located, and about how people desire to get from one place to another. Many people no longer work on a strictly 9 am to 5 pm weekday schedule, and many more want convenient and frequent train schedules that respond to the needs of their daily lives.

“The current Commuter Rail paradigm costs way too much money for way too little ridership.”

— MBTA FMCB Chairman Joe Aiello, 11/20/17

Our current approach to Commuter Rail, as a business model, fails to offer its rider/customers the service they want and need. As a result it contributes to the region’s worsening traffic congestion, keeps Gateway Cities isolated during most of the day, and exacerbates income inequality since the inadequate service compels many to drive – for lower income people, the high cost of owning, maintaining and driving an automobile can have a crippling effect on their ability to make ends meet.

Public transit must be frequent all day, not just at rush hour. A Regional Rail system would have trains running at least every half hour all day in the suburbs and at least every fifteen minutes in Boston and other Inner Core communities.

Regional Rail requires both frequent all day service, accessible platforms and smarter equipment to provide the service. That means high-level platforms at stations to simplify and speed up boarding and alighting. It also means electrification of the system, enabling use of Electric Multiple Units to replace the current push/pull diesel fleet. EMUs will be more reliable and less expensive to maintain, will provide riders with speedier trips, and will provide better service without polluting the air around them.

A highly functioning Regional Rail system includes five critical components:

- » **Systemwide electrification** and the purchase of high-performance electric trains.
- » **High platforms**, providing universal access and speeding up boarding for everyone.
- » **Strategic infrastructure investments** to relieve bottlenecks.
- » **Frequent service all day**: every 30 minutes in the suburbs and every 15 minutes in denser neighborhoods.
- » **Free transfers** between regional trains, subways, and buses, and fare equalization with the subway in the subway’s service area.

And one useful component that will complete cross-region mobility:

- » With a modern electric Regional Rail system in place, the **North-South Rail Link** (NSRL) is the next step to drastically enhance regional mobility. NSRL allows trips between any two stations through a one-seat ride or single, seamless transfer, providing the flexibility and connectivity to which many riders and potential riders would be drawn.

MORE INFORMATION AND REPORTS AVAILABLE AT:

[HTTP://REGIONALRAIL.NET](http://REGIONALRAIL.NET)

<i>REGIONAL RAIL FOR METROPOLITAN BOSTON</i>	WINTER ‘18
<i>REGIONAL RAIL PROOF OF CONCEPT</i>	FALL ‘19
<i>REGIONAL RAIL PHASE 1</i>	SUMMER ‘20
<i>PROVIDENCE/STOUGHTON LINE</i>	SPRING ‘20
<i>FAIRMOUNT LINE</i>	FALL ‘20
<i>NEWBURYPORT/ROCKPORT LINE</i>	WINTER ‘21
<i>OLD COLONY LINES</i>	SPRING ‘21
<i>REGIONAL RAIL ELECTRIFICATION</i>	FALL ‘21
<i>HAVERHILL LINE</i>	FALL ‘21

Regional Rail has 5 transformative benefits:



Almost all commuter rail stops have poor accessibility. 32 are entirely inaccessible. High-level platforms provide step free access to all riders, including those with mobility constraints, parents with strollers, and riders with heavy equipment or suitcases.



Regional Rail improvements facilitate economic growth and provide a wider customer base for local businesses. Frequent, reliable rail can increase development near stations. Regional Rail provides a green, economical way to access our rich cultural resources and recreational amenities.



Modern electric trains create zero local emissions, reduce noise pollution, and increase reliability, making rail more attractive relative to car trips. Electrification can thus help reduce respiratory ailments in environmental justice communities, and is critical for meeting the Commonwealth's 2050 zero net emissions goals.



Regional Rail opens up new housing markets, and makes transit-oriented development more attractive. Workers who commute some or all days of the week can use the train for other longer trips, and walk or bike to local destinations. Frequent, reliable, and affordable rail service opens up new employment opportunities, particularly in Gateway Cities, which are well positioned to become employment centers in their own right.



Frequent, reliable, and affordable rail service opens up new employment opportunities. Regional Rail both reduces the “spatial-skills mismatch” that holds back employment, and provides access to vocational opportunities to boost workers’ skills. Regional Rail itself will provide up to 250,000 direct and indirect jobs during construction.



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