

# A Better Bus Map: How Good Transit Map Design Can Strengthen the MBTA's Bus System

by Alexander Boccon-Gibod

Submitted to the Department of Urban Studies and Planning and to the Department of Architecture in Partial Fulfillment of the Requirements for the Degrees of

Bachelor of Science in Planning and  
Bachelor of Science in Art and Design at the

Massachusetts Institute of Technology

May 2022

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## Abstract

Greater Boston is poised to radically reimagine its bus system in the coming years. With an ongoing network redesign by the Massachusetts Bay Transportation Authority (MBTA) seeking to create a dense network of high frequency bus lines as well as growing political momentum for fare-free transit spearheaded by Mayor of Boston Michelle Wu, the current moment is an exciting one for the future of sustainable, equitable mobility. Improvements to the bus system have the potential to attract more riders, decrease transportation-related carbon emissions, and increase equitable access to opportunities for marginalized communities.

Despite ongoing service improvements, there has been little discussion of visual improvements to the bus system. How will riders perceive and discover a redesigned network? How can historic improvements in bus service be bolstered by systemwide visual cues? A key gap in the MBTA's otherwise strong brand identity represented by color-named transit lines lies in its printed bus system maps available at bus shelters and online. Visually unifying the transit system is a crucial part of maximizing the benefits of these changes in service.

This thesis explores bus map redesign precedents, historical MBTA maps, and transit mapping techniques to reconsider what the MBTA bus system map could be. Guided by two main principles of consistency with the MBTA's brand and highlighting service frequency, this thesis iterates through different options to arrive at a draft proposal of a new bus map that reframes how the transit system—and broader region—can be depicted and perceived.

### Thesis Supervisor

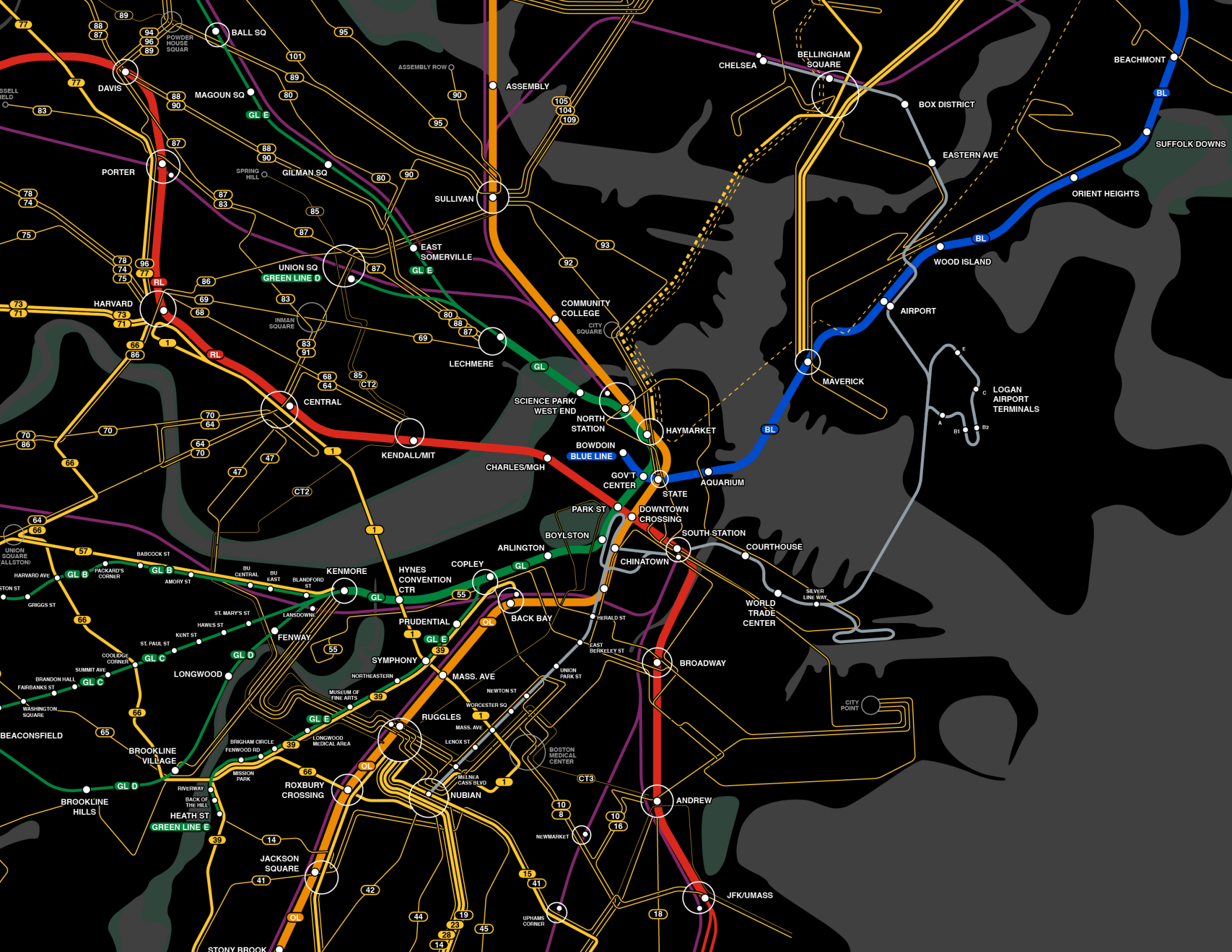
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# **Introduction**

## **Background**

**Buses in Greater Boston: An Essential Service**

**A History of Neglect of Buses**

**A Progressive Moment for Buses**

**The Opportunity for a Better System Map**

# Background

This thesis rests on the assumption that in order to have sustainable, just, and vibrant cities—especially in the United States—the experience of riding transit must be efficient, intuitive, and dignified. I would argue that this is not remotely the case for most American transit systems, especially bus systems, which are known for complicated, infrequent, and unreliable service as well as sub-par facilities. Improving the transit riding experience is crucial, not only for treating current riders with the respect they deserve, but also for encouraging new transit ridership.

I'm particularly interested in the legibility, or lack thereof, of transit and bus systems. In 2020-2021, I worked in transit mapping at inat mapping and wayfinding ([www.inat.fr](http://www.inat.fr)) focusing mostly on designing schematic bus/tram maps for a few cities in Switzerland. I was exposed to a variety of transit mapping techniques and gained experience designing beautiful, functional products. I also learned about the specific complexities of comprehensive transit maps as opposed to those only focusing on rail systems.

I continue to ask myself how this kind of transit map design could be applied to the U.S. While Switzerland already has a legacy of high-quality transit and a cultural value for graphic design, American transit systems could uniquely benefit from stronger visual identities. Greater Boston, a region I have lived in for almost 5 years, stands out as an obvious opportunity. The MBTA—the local transit agency—has a strong historic brand and mapping system which de-emphasizes buses, but is actively looking to reimagine the bus network. Moreover, there is significant political momentum for these transit improvements. While bus service improvements have been often discussed, there has been little to no mention of this gap in the brand. My investigation focuses precisely on reimagining the MBTA bus brand as it is manifested in the agency's system map.



Figure 1: Transit map of Lausanne, Switzerland I worked on



Figure 3: MBTA logo on a sign post indicating a subway entrance

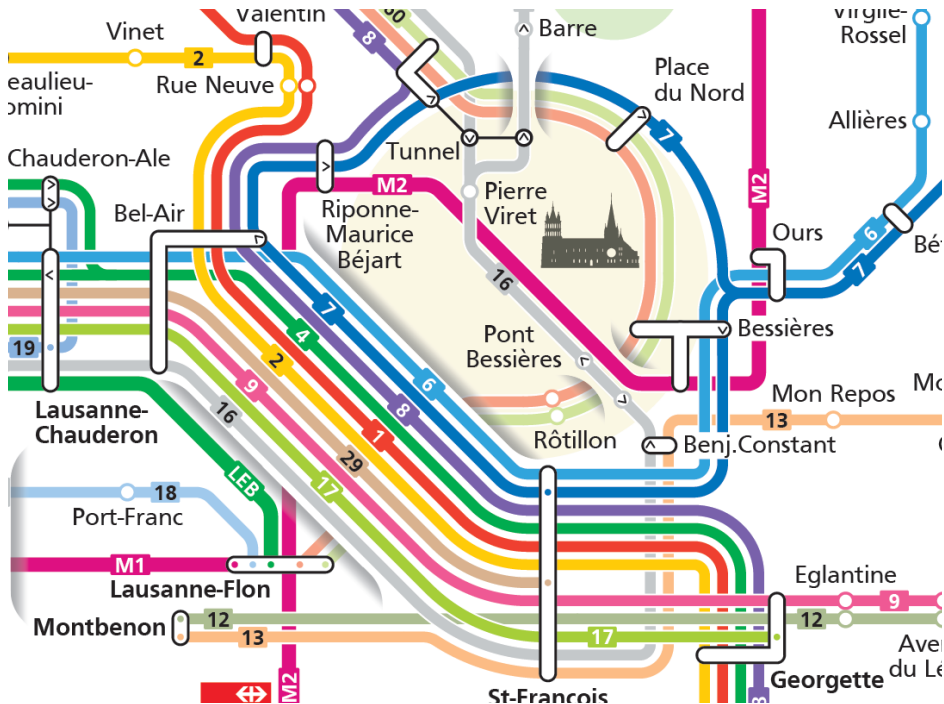


Figure 2: Transit map of Lausanne, zoomed in on city center

Figure 4: Current MBTA system map, zoomed in on Boston/Cambridge

# Buses in Greater Boston: An Essential Service

Greater Boston's public transit system performs an essential regional function. It serves as a backbone of affordable, sustainable mobility in a broader transportation system dominated by cars. In 2019, the Massachusetts Bay Transportation Authority (MBTA)—the transit agency serving a total of 65 municipalities in Eastern Massachusetts—saw 1.2 million trips per weekday in 2019 (“MBTA Performance Dashboard” 2019), 32% of which occurred on buses. In 2018, 32% of commuters in the City of Boston took transit to work (MilNeil 2019).

Transit is a key connector to economic opportunities. When the MBTA lost close to 75% of its ridership during the COVID-19 pandemic, the lines that retained the most ridership tended to be bus lines serving “essential workers” (Calef 2020), thus highlighting the critical societal need that the MBTA, and particularly its bus system, fulfill.

Buses are also a key factor in providing equitable access to opportunities and amenities. With 42% of MBTA bus riders being low-income—compared to 26% for the subway and 7% for the commuter rail—better bus service would spur equitable economic development (Barker 2019).

Finally, buses are a key part of broader adaptation to climate change. As the transportation sector represents the highest proportion of greenhouse gas emissions in Massachusetts, it is safe to say improving public transit service to increase ridership is an essential piece of the decarbonization puzzle. While most MBTA buses operate using diesel—notwithstanding the agency's ongoing conversion to electric buses—their emissions per rider are far below the same for cars. Moreover, as climate change-induced sea level rise represents an “existential threat” to the MBTA's subway service (The Editorial Board 2021), the bus system emerges as a more flexible, adaptable alternative.



Figure 5: Riders boarding an MBTA bus at Sullivan Square station



Figure 6: The MBTA's rapid transit map

# A History of Neglect of Buses

Many of the racial inequities present across Greater Boston are also embedded in the MBTA's bus system. Regional studies have found that Black bus riders spend 64 more hours per year on buses than White riders ("64 Hours: Closing the Bus Equity Gap" 2019). For Latinx riders, that same figure is 10 hours.

Crucially, the bus system continues to broadly under-serve the region. Buses have the poorest service reliability among MBTA modes (72% in April-May 2022 compared to 89% for subway and 95% for commuter rail) ("MBTA Performance Dashboard" 2022). In 2018, 63% of residents and over 50% of jobs in the MBTA service area were not served by a bus route with all-day frequent service ("State of the Bus System 2018" 2018).

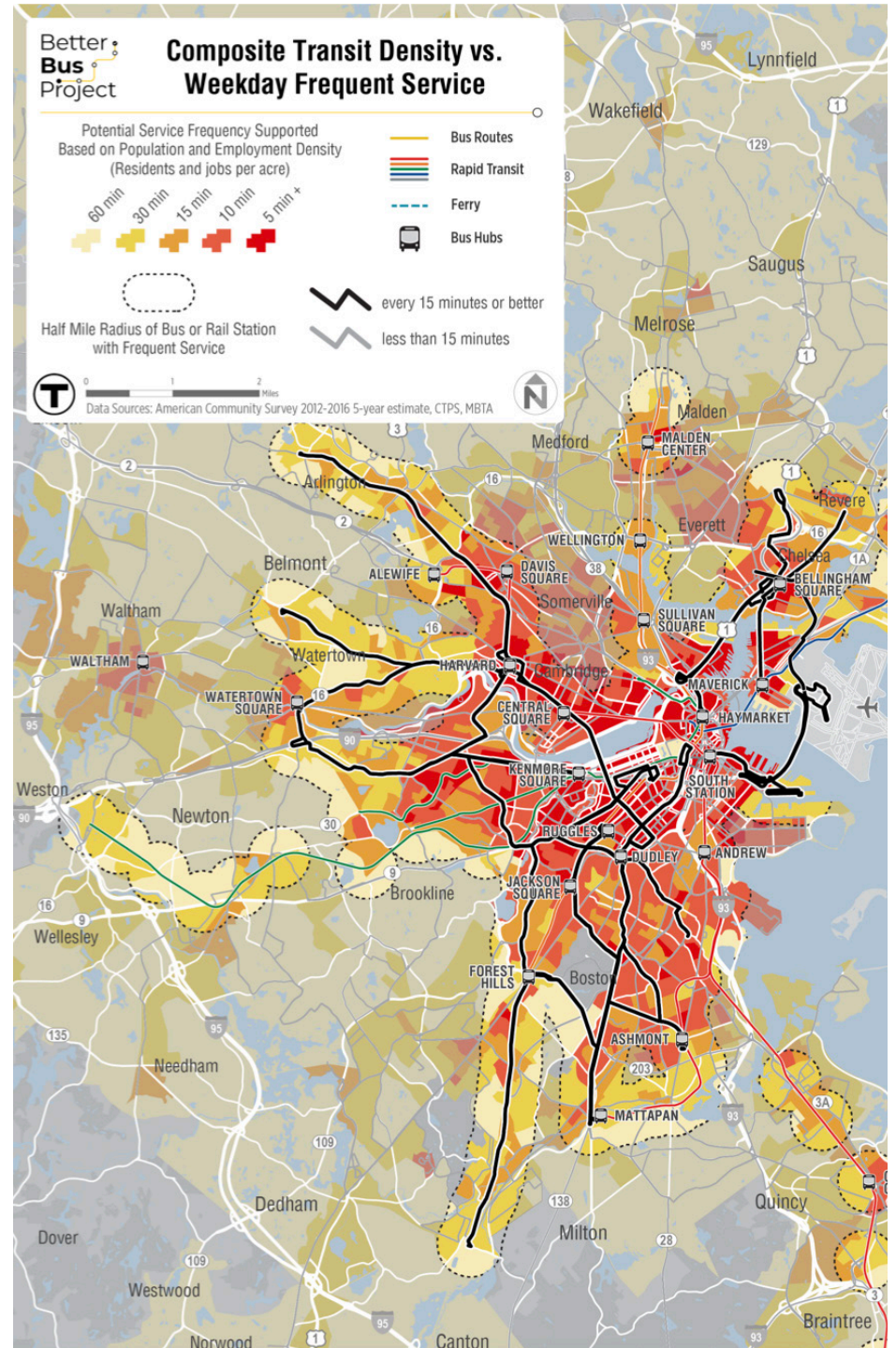
The MBTA seems to have suffered from ascribing to a theory of "captive" or "dependent" bus ridership which suggests that low-income, minority riders who don't own cars will ride buses no matter how bad the service (Spieler 2020). This theory closely follows a national trend of associating buses with poverty and thus failing to improve bus service under the assumption that ridership levels are fixed by socioeconomic factors rather than service levels themselves (Higashide 2019). Greater Boston, among other urban areas, now has the opportunity to reduce inequality and intentionally improve transit service for all.



Figure 7: Riders boarding an MBTA bus at Nubian Square station



Figure 8: Map showing gaps in frequent transit service in Greater Boston



# A Progressive Moment for Buses

Despite a legacy of disadvantage and disinvestment, there is now significant momentum for radical improvements to the MBTA's bus system.

The agency itself has highlighted the bus system as a priority area for improvement and is actively investing in and planning for long-needed changes. Key among those is the bus network redesign which seeks to restructure the bus network in response to regional demographic and employment shifts. The network redesign relies on creating a backbone of high frequency bus lines. Bus service is expected to increase by 25% on weekdays and 70% on weekends (Seay 2022). The ongoing network redesign will comprehensively restructure the network to make it more legible, better serve transit demand, improve equity, and increase transit's competitiveness compared to driving. Planning for the new network started in 2021 while implementation is expected to take place gradually from 2023 to 2028 ("Bus Network Redesign | Projects | MBTA" 2021). A proposed map is currently being released with a final plan to come after significant community engagement.

In addition to changes in service planning, the MBTA is partnering with municipalities to allocate more of the region's street space to bus travel. In 2021, center-running bus lanes opened along Columbus Ave in Roxbury, Boston. These lanes greatly improved bus service reliability along the corridor and are an example of a broader agency priority to expand bus transit priority projects across the region (MilNeil 2021).

Beyond agency initiatives, there has been significant advocacy for improvements to the bus system and encouraging transit ridership, most notably by current Mayor of Boston, Michelle Wu (Dolven 2021). Wu led advocacy efforts and secured funding to first make three bus routes free, all of which primarily serve low-income riders of color along Blue Hill Ave (Dolven 2022).

The political will for reimagining the MBTA's bus system is strong. A rare policy window for transformative investments has now opened up.



Figure 9: The Better Bus Project logo



Figure 11: Michelle Wu



Figure 10: Bus lanes and bus stop on Columbus Ave

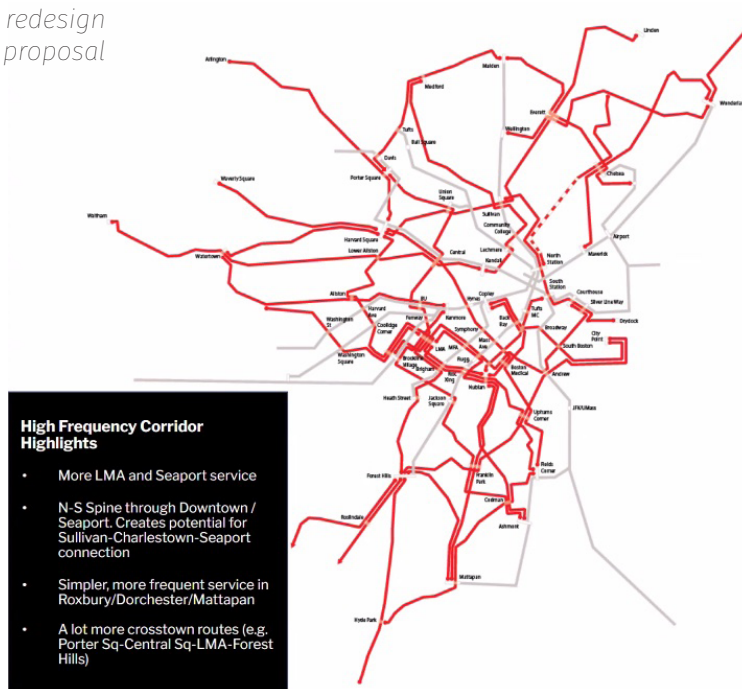
Figure 12: A fare-free 28 bus

Figure 13: Current frequent bus lines



## High Frequency Routes Today

Figure 14: A rough network redesign proposal



## Working Draft High Frequency Routes

**We have a “long list” of corridors that were identified -- not all places will have high frequency service necessarily as we are still refining. This map will change and also does not show lower frequency service.**

**If we keep resources for frequent service roughly the same:**

We will have fewer high frequency routes.

We will maintain overall network coverage with hourly and half hourly service.

**If we reallocate additional resources to high frequency service:**

We will have more high frequency routes.

We will maintain overall network coverage, but service outside of high frequency corridors will be largely hourly.



# The Opportunity for a Better System Map

Despite many ongoing improvements to bus service, there has been little discussion about any visual improvements to the bus system. How will riders understand a redesigned network? How can the bus system be made more legible and intuitive? How can we provide a more dignified, seamless experience for Greater Boston's bus riders?

The MBTA has a distinctive visual identity thanks to a rebranding effort in the 1960s by CambridgeSeven Associates, as manifested by its famous logo and color-based line naming system (Byrnes 2018). However, the subway—represented by four colors, large stations, real-time arrival signs, a robust wayfinding system, and a distinctive schematic map—has a much stronger identity compared to the bus—only represented by the color yellow, small stop signage affixed to poles doubling as parking signs, the occasional shelter, and a complex system map.

The way the current system map depicts buses represents a gap in the MBTA's visual identity. The map gives no indication of different line frequencies, and is never used in its entirety at bus stops—only sections, such as the North Side, are ever used at one time. Thus, the map succeeds at showing where bus service exists, but not much more. It prevents riders from being able to form an overall sense of the bus network's structure, as well as from discerning how useful different lines are based on frequency, thus impacting the decision of whether to consult a schedule.

I'd like to consider a map which shows the entire network, distinguishes high-frequency "key bus routes" from low-frequency routes, and fits into the rest of the agency's brand identity. By offering a comprehensive view of the transit system's usefulness (Walker 2020), it would allow both existing and future riders to feel more confident riding the bus as well as discover new bus-accessible areas and hopefully encourage ridership.

Beyond furthering goals such as increasing ridership, improving equity, and enhancing sustainable mobility, a new bus map could encourage civic pride in the bus system. If distributed effectively, it would be an easy, relatively inexpensive, but highly impactful improvement for the system. Coupled with the ongoing service improvements, such a map would bolster public trust in the MBTA to provide useful, reliable bus service.





Figure 17: A Red Line subway train at a station platform



Figure 18: A subway station entrance



Figure 19: Signage on a Green Line light rail platform



Figure 20: Real-time arrival information at a Blue Line subway platform



Figure 21: An MBTA bus



Figure 23: A bus stop sign



Figure 22: Bus lanes and bus stop on Columbus Ave



Figure 24: Real-time information on an E-ink screen at a bus stop

# Research

**What is the Purpose of Transit Maps?**

**The Challenge of Bus Maps**

**Bus Map Redesign Precedents**

**The Evolution of the MBTA's System Map**



# What is the Purpose of Transit Maps?

Fundamentally, transit system maps are a single, but essential component of a transit agency's rider information system. The best ones provide a clear overview of a complex network and enable riders to understand a multitude of services at a glance. In other words, they make a transit system legible to a general audience. Whereas other rider information tools, such as journey planning apps, schedules, real-time arrivals, and line maps, provide riders with relevant information given an origin, destination, and time, system maps are unique in that they show riders the possible range of origins and destinations. They empower riders to discover and master the system on their own in a way that journey planning apps never can. While tourists and newcomers often have the greatest gap in understanding of a transit network, even a regular rider may discover a new transit-accessible destination by looking at a system map. Many transit agencies nowadays rely more on digital transit information in the form of mobile trip planners and websites, but these tools cannot replace the essential function that system maps serve: showing access to opportunity ("Transit System Maps Still Matter" 2021).

System maps also serve a political purpose as proof of transit service. They provide evidence that a government effectively used tax revenue to provide a broadly useful public service to a region. Most riders will never ride every line in a system, but they trust the system map enough to believe that all lines and stations exist. System maps are thus a powerful shaper of what riders perceive a transit system—and broader region—to be. To remove a bus line from a map is to remove it from existence for all but regular riders of that line. How a transit map is designed has broad implications for how much trust and satisfaction riders have in a transit system.

Ideally, transit maps are designed to reflect the character and specificity of a place. The best ones respond to the actual experience of riding the given transit system. This specificity can be reflected in everything from color palettes, typography, and depictions of local landmarks that ground an abstract depiction in real life. Often printed and shown identically across a network, system maps can serve as an icon representing the city. Riders and residents all see the same view, leading to a shared navigation experience and sense of place. At their best, transit system maps bolster civic pride.

Figure 25: Real-time information on an E-ink screen at a bus stop



Figure 27: The bus schedule page on the MBTA's website

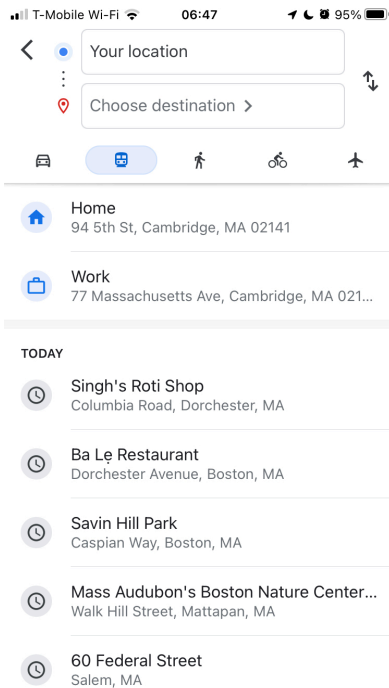
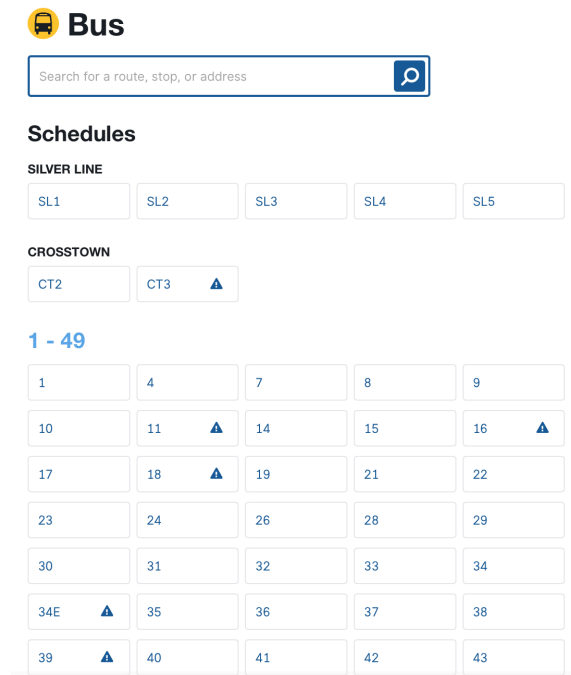


Figure 26: A screenshot of looking up transit directions in Google Maps

## Trip Planner

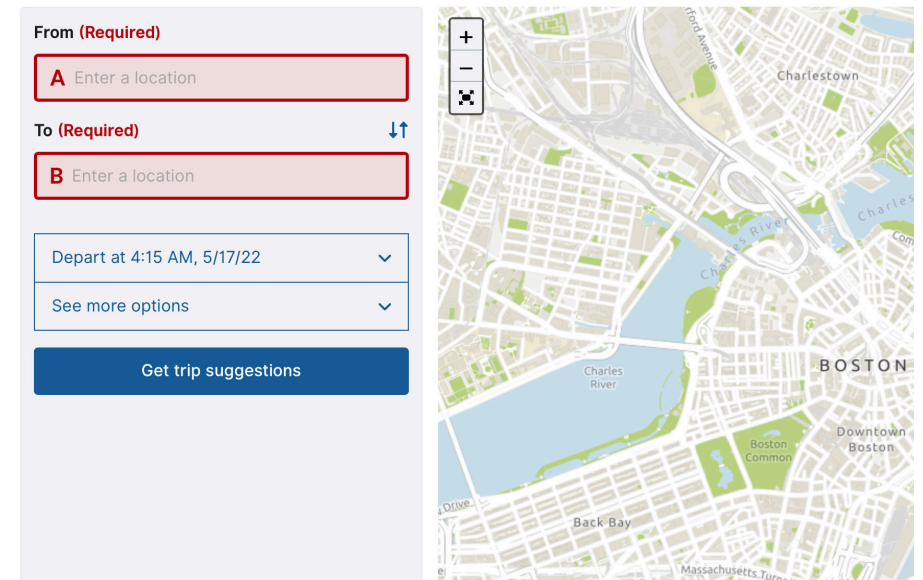


Figure 28: MBTA Trip Planner

# The Challenge of Bus Maps

Comprehensive bus system maps pose a particular challenge for legible mapping, especially compared to subway and rail maps. They are often characterized by dense, overlapping, circuitous lines. Bus service more likely includes one-way segments, route variations, and non-stop express service which all contribute to visual clutter if not adequately simplified.

Geographic accuracy is more important to preserve for bus system maps than for subway maps because buses run directly on streets and riders perceive distance more accurately from a bus than, say, in a subway tunnel. Moreover, streets and landmarks are more noticeable, and the stop spacing is much smaller.

Bus system maps may use a variety of strategies to mitigate this complexity and ensure system legibility by creating an information hierarchy. Generally, bus maps differ by how they depict and prioritize bus lines (Cerović 2016). Colors are often used simply to differentiate individual bus lines. Alternatively, colors may be used to differentiate buses from other modes such as subways, trams, and regional rail. Perhaps the most powerful line depiction strategy is to use colors and thicknesses to show frequency. Frequency mapping allows system maps to show not only where buses run, but when they run (Walker 2020). The temporal dimension in addition to the spatial dimension is crucial to understanding how useful different bus lines are. The experience of riding a bus that, say, runs every hour is diametrically opposed to that of a bus that runs every 10 minutes.





# Bus Map Redesign Precedents

Many cities and transit agencies have redesigned their bus maps in recent years to great success. Examining how they address bus mapping challenges shows the range of design techniques available for rethinking how bus systems are perceived.

## **San Francisco, CA**

In 2014, the San Francisco Municipal Transportation Agency released a new system map for Muni, the city's transit system. This new map represented a major shift in the agency's transit mapping strategy. The previous map had a weak visual hierarchy, but did attempt to show the bus system's structure by distinguishing routes that serve downtown, crosstown routes, and infrequent "community" routes. The new map highlights service frequency as the main organizing principle (Bialick 2014). Thick red lines are used for frequent, limited stop service, while blue lines in decreasing thickness and increasing lightness are used to show three tiers of frequency for local service.

## **Luxembourg City**

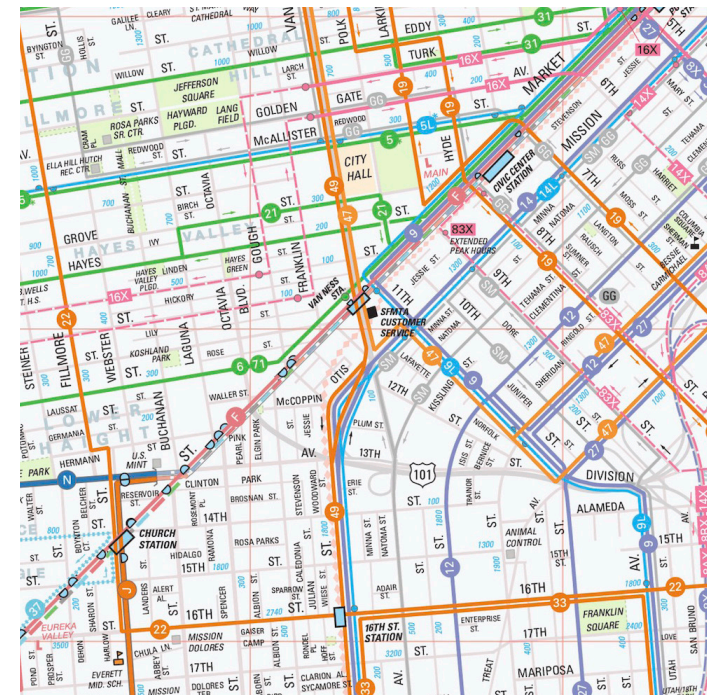
In 2016, Luxembourg City adopted a new bus map designed by Jug Cerović of inat mapping and wayfinding to replace what had been called a "spaghetti monster" of a bus map ("A Graphic Designer Just Got His Unauthorised Redesign Adopted as the Official Luxembourg Bus Map" 2016). The new map groups lines by corridor and aligns to angles complementary to the historic center's pentagonal shape. The central area of the map maintains geographic accuracy and shows cityscape elements such as streets and parks while the outer area is schematized such that the entire map is legible at a smaller size.
































# San Francisco Pre-2014



Figure 31: San Francisco Muni's system map before 2014



## SAN FRANCISCO MUNICIPAL RAILWAY

- |  |  |  |
|--|--|--|
|  To and From Downtown                 |  Muni Metro (surface)         |  Other Transit Systems  |
|  Crosstown Service                    |  Muni Metro (subway)          |  AC Transit   |
|  Community Service                    |  Accessible Wayside Platforms |  SamTrans   |
|  Limited-Stop Service                 |  Station                      |  GG Transit   |
|  Cable Car                            |  BART/Caltrain                |  Ferry Service  |
|  Historic Streetcar                   |  Line Number                  |  PresidiGo Shuttle (with stop)                                |
|  Express Service To and From Downtown |  Peak Hours Only              |  Pedestrian Overcrossing                                      |
|  Express Area (and stop)              |  Line Terminal                |  Stairway or path   |
|  |  |  Library  |
|  |  |  School   |
|  |  |  School with supplemental service (refer to chart on reverse) |
|  |  |  Hospital   |
|  |  |  Buildings and Landmarks                                      |

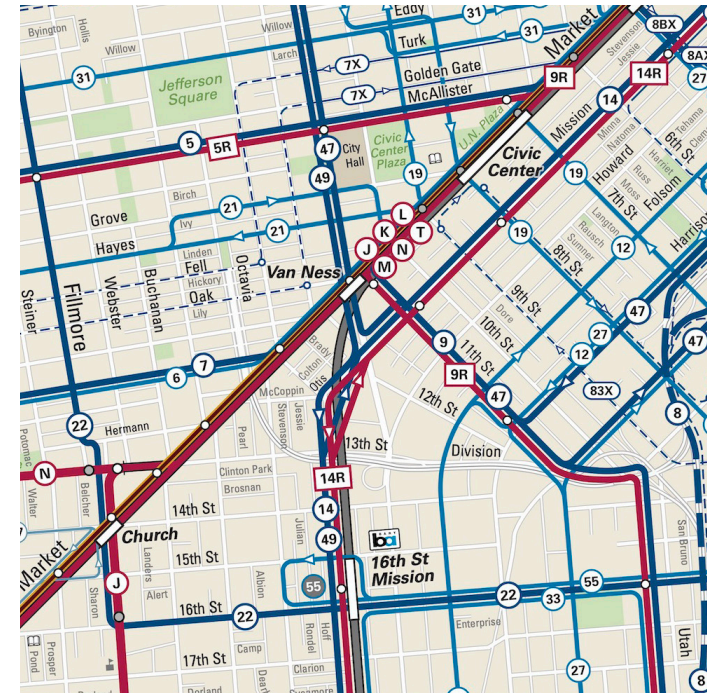
\* Service may vary with time of day or day of week. Refer to Route Descriptions, Frequency Guide on reverse for important details of service, visit [www.sfmta.com](http://www.sfmta.com), or call 311.



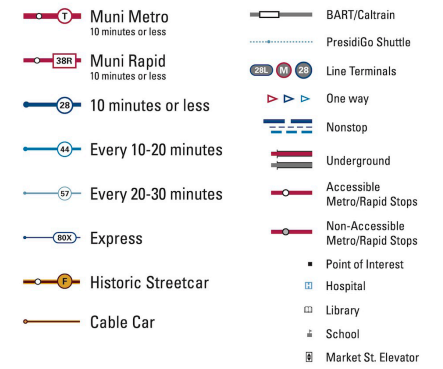
# San Francisco 2014-present



Figure 32: San Francisco Muni's redesigned system map



## San Francisco Transit Map



# Luxembourg City Pre-2016

## Réseau des Autobus Municipaux



- 1 P.R. BOULLON / KIRCHBERGLUXEPO
- 2 ROY KUNEN - KOLL ENBERG - GASPÉRICH / IMPFERTSBERG / L. MOÛLE LUCHE
- 3 HOWALD - WASSERTEURM - BONNEVOIE / IMPFERTSBERG / L. MOÛLE LUCHE
- 4 ROY KUNEN - CESSANGE / IMPFERTSBERG / L. MOÛLE LUCHE
- 5 BONNEVOIE / DEMY SCHLECHTER / SOMMELANGE / PARC DE L'ÉTOILE
- 6 BONNEVOIE / DEMY SCHLECHTER / BERTRANGE / BARTRENG GEMENG
- 7 BONNEVOIE / DEMY SCHLECHTER / BERTRANGE / BARTRENG GEMENG
- 8 GARE - CENTRE / VAL STE OVALE - STRASSEN / BARTRENG - EC. EUROPÉENNE R
- 9 GARE - CENTRE / BEGGEN - SENNINGERBERG / CHATELY STATION
- 10 GARE - CENTRE / BEGGEN - STEINHEIL IN BODANGE PLAZ
- 11 GARE - CENTRE / BEGGEN - WÄLFERDANGE / WÄLFER GARE
- 12 LUXEPO - P.R. BOULLON / BELAIR / P.R. BOULLON
- 13 LUXEPO - P.R. BOULLON / KIRCHBERG - VEIERSKIRCH - EICH - CENTRE CULTUREL
- 14 P.A.C. GASPÉRICH / R. HOZEMBERG / EICHENBERG - CENTRE / WASSERTEURM
- 15 MERL / CÉLES - HOLLERICH / MARI FINE DE BERTRANGE
- 16 P.A.C. HOWALD / HESPER / CITÉ UM SCHLASS / BONNEVOIE - AÉROPORT
- 17 P.R. BOULLON / CENTRE
- 18 P.R. KOCKELSCHUER / PATROIRE / KIRCHBERG / J.F. KENNEDY
- 19 MATHS ST LAMBERT / WEIERSHOF / PFAFFENTHAL - BEGGEN / R. DONAT
- 20 GARE - VIELLE VILLE / PLATEAU BOUSSIER
- 21 CLOCHE D'OR / GABRIELLE KROLL / KOLLINGERBERG / EICH - CENTRE CULTUREL
- 22 P.R. LUXEMBOURG / OUD / CITÉ HOSPITALIER - STRASSEN / PRIMÉRIES
- 23 GARE CENTRALE / STADTGRUND / GROUN GRECK
- 24 P.R. BOULLON / CLOCHE D'OR / GABRIELLE KROLL
- 25 SOMMELANGE - GARE / CENTS / WASSERTEURM
- 26 GARE - LEUDELANGE / BERTRANGE / BELLE ÉTOILE
- 27 GARE / BERTRANGE / BELLE ÉTOILE

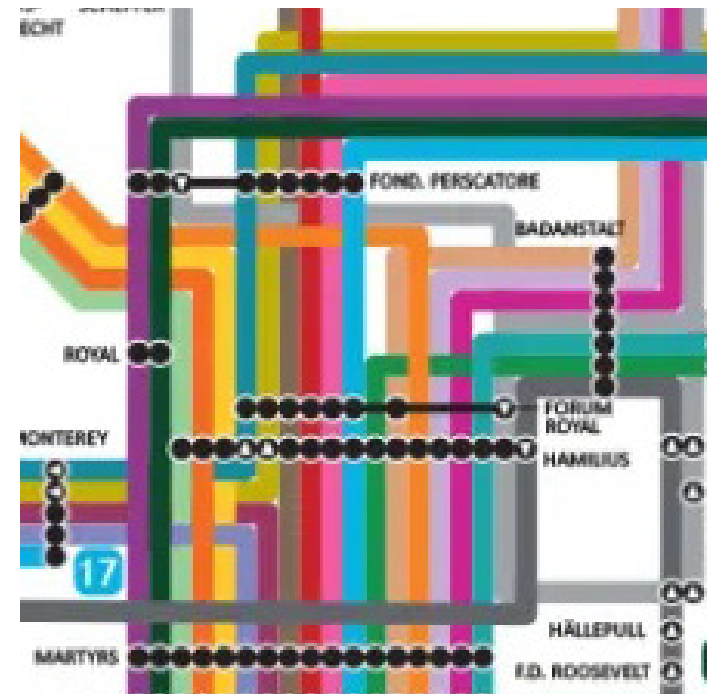
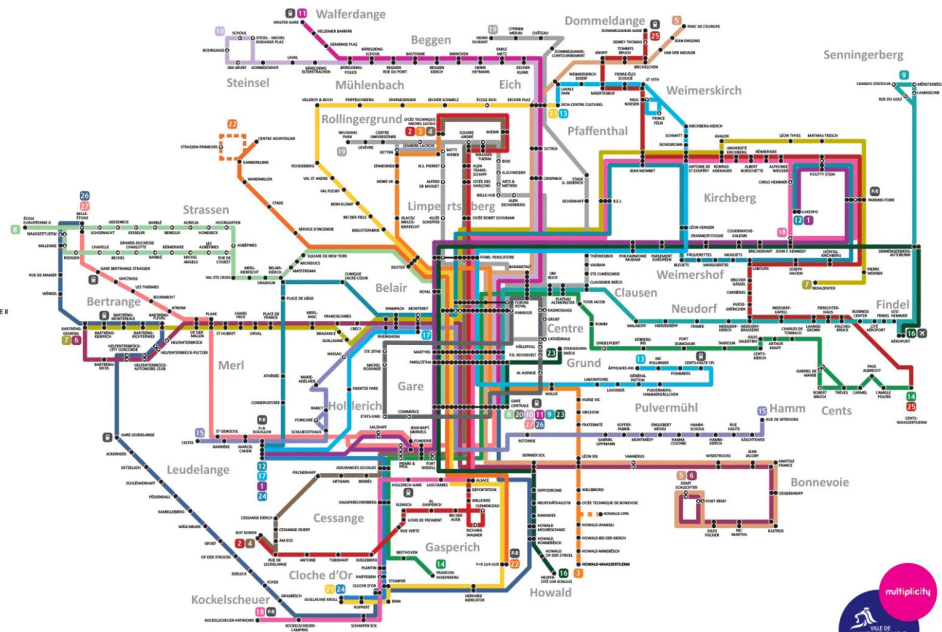


Figure 33: Luxembourg City's "spaghetti monster" transit system map (before 2016)





# Luxembourg City 2016-present

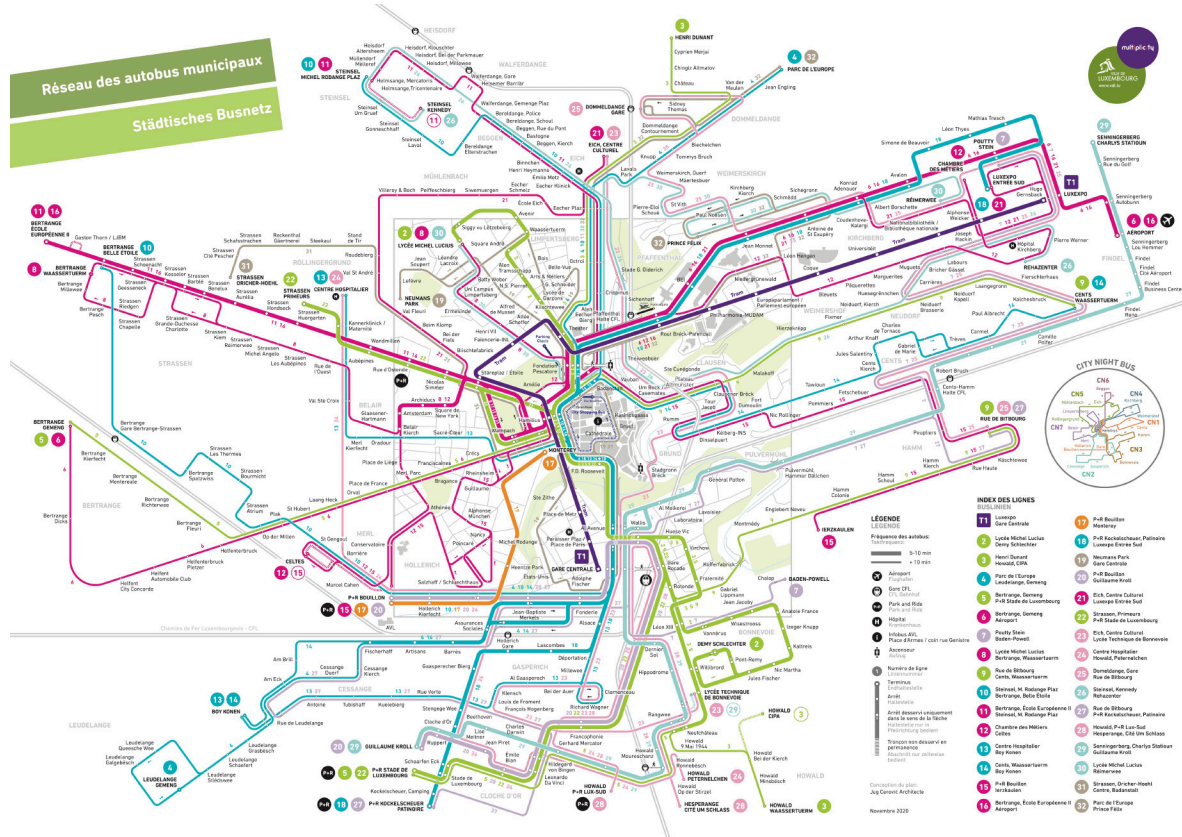
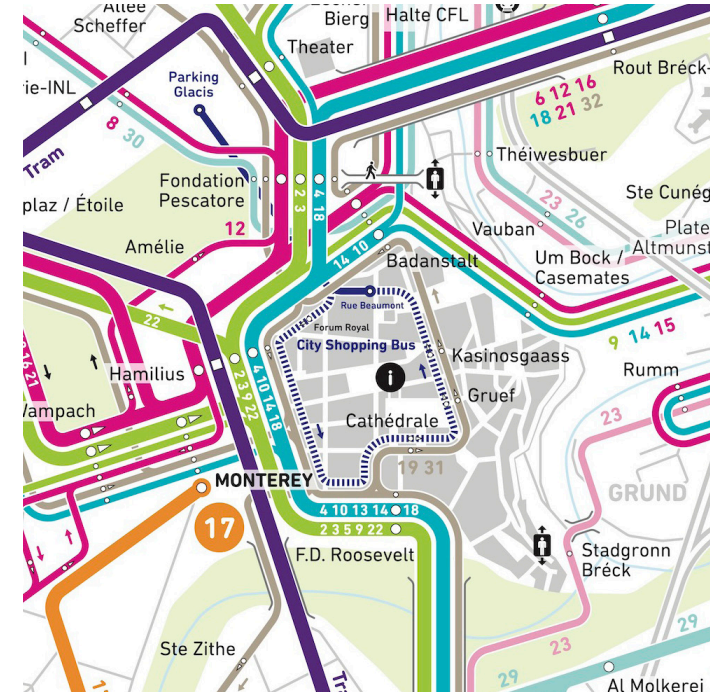


Figure 34: Luxembourg City's redesigned transit system map



- LEGÈNDE**
- Fréquence des autobus:**  
Taktfrequenz:  
5-10 min  
+ 10 min
- Aéroport Flughafen
  - Gare CFL, CFL Bahnhof
  - Park and Ride Park and Ride
  - Hôpital Krankenhaus
  - Infobus AVL Place d'Armes / coin rue Genestre
  - Ascenseur Aufzug
  - Numéro de ligne Liniennummer
  - Terminus Endhaltestelle
  - Arrêt Haltestelle
  - Arrêt desservi uniquement dans le sens de la flèche Haltestelle nur in Pfeilrichtung bedient
  - Tronçon non desservi en permanence Abschnitt nur zeitweise bedient
- T1** Luxexpo Gare Centrale
  - 2** Lycée Michel Lucius Demy Schlechter
  - 3** Henri Dunant Howald, CIPA
  - 4** Parc de l'Europe Leudelange, Gemeng
  - 5** Bertrange, Gemeng P+R Stade de Luxembourg
  - 6** Bertrange, Gemeng Aéroport
  - 7** Putty Stein Baden-Powell
  - 8** Lycée Michel Lucius Bertrange, Waassertuerm
  - 9** Rue de Bitbourg Cents, Waassertuerm
  - 10** Steinsel, M. Rodange Plaz Bertrange, Belle Étoile
  - 11** Bertrange, École Européenn Steinsel, M. Rodange Plaz
  - 12** Chambre des Métiers Celles
  - 13** Centre Hospitalier Boy Konen
  - 14** Cents, Waassertuerm

# The Evolution of the MBTA's System Map

A look back at previous MBTA system maps reveals a great variety of graphic strategies and adherence to the MBTA's brand identity which inform a future bus visual identity.

The 1967 system map (Boston Redevelopment Authority and Massachusetts Bay Transportation Authority 1967) relies on thick colored lines for subways, thin black lines for all MBTA buses, and thin black dashed lines for private suburban buses, all on a white background.

The 1977-1978 system map (General Drafting Company and Massachusetts Bay Transportation Authority 1977) also uses thick color lines for subways, but uses both thick and thin black lines for buses. This hierarchy seems to be based on frequency, but it's difficult to confirm without historical schedules.

The 1996 system map (Dumas and Guerra 1996) continues the subway/bus hierarchy, but introduces thick brown lines for frequent bus routes, thin brown lines for less frequent bus routes, and thin blue lines for crosstown bus routes.

The current map, debuted around 2008, reuses some visual language from the 1996 map, but entirely scraps the frequency hierarchy. Buses are "randomly assigned" colors to be differentiated. More importantly, these colors are not used in digital rider information tools—which all stick to the same shade of yellow. This map only shows where buses go, but not when. The current map is also never used in its entirety in print, likely as a result of competing size requirements of geographic extent, minimum legible text size, and frame size at bus shelters.

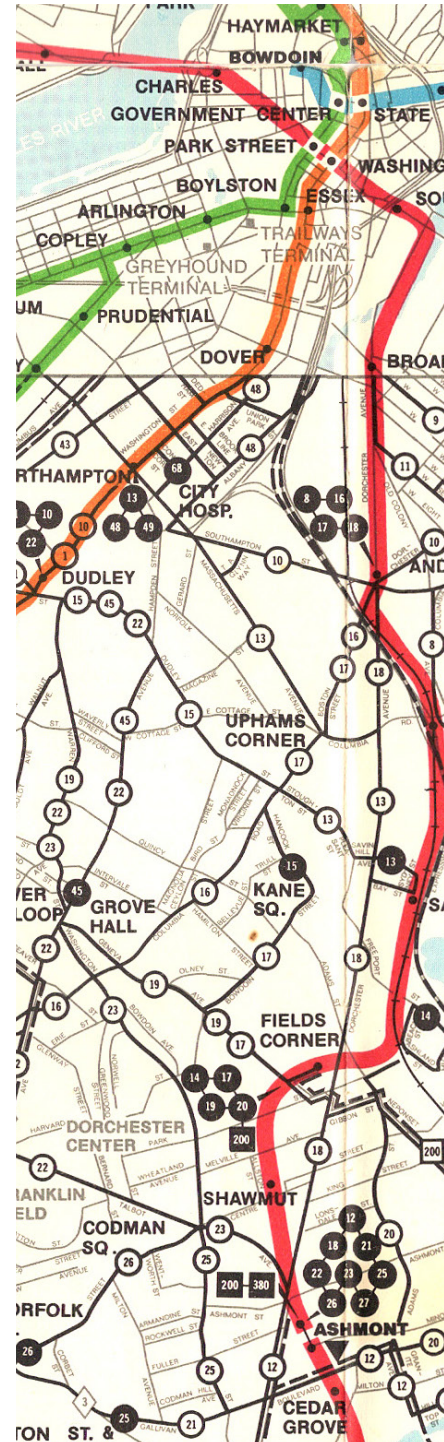
The 10-20 year change cycle for the MBTA's system maps' graphic styles is an inherent precedent for a contemporary change. Moreover, the current map is a historical anomaly in that it does not differentiate line frequency. Despite yellow enduring as the corresponding color for buses since the 1960s, no maps depict yellow bus lines.



# 1967



Figure 35: MBTA System Map 1967





# 1977-1978

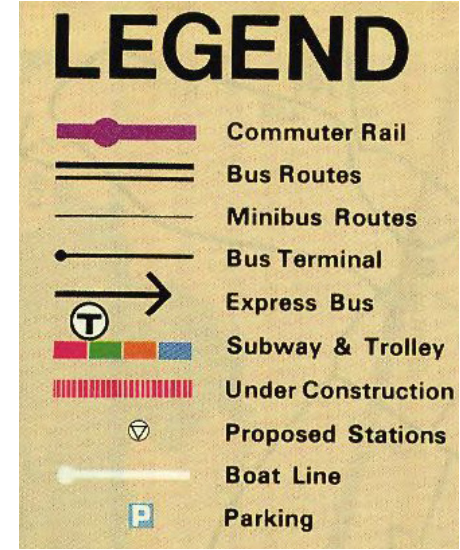
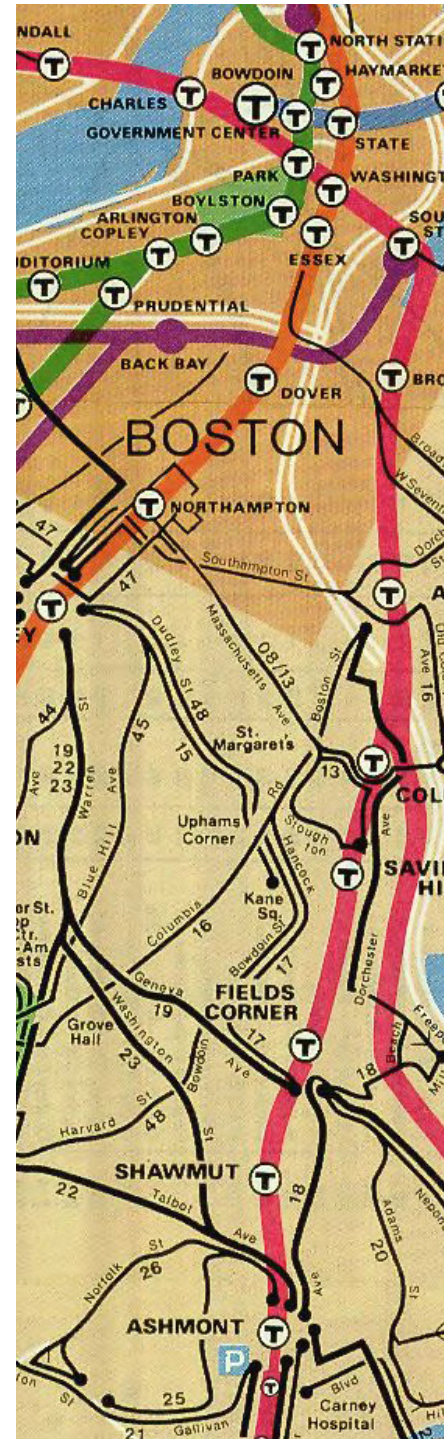
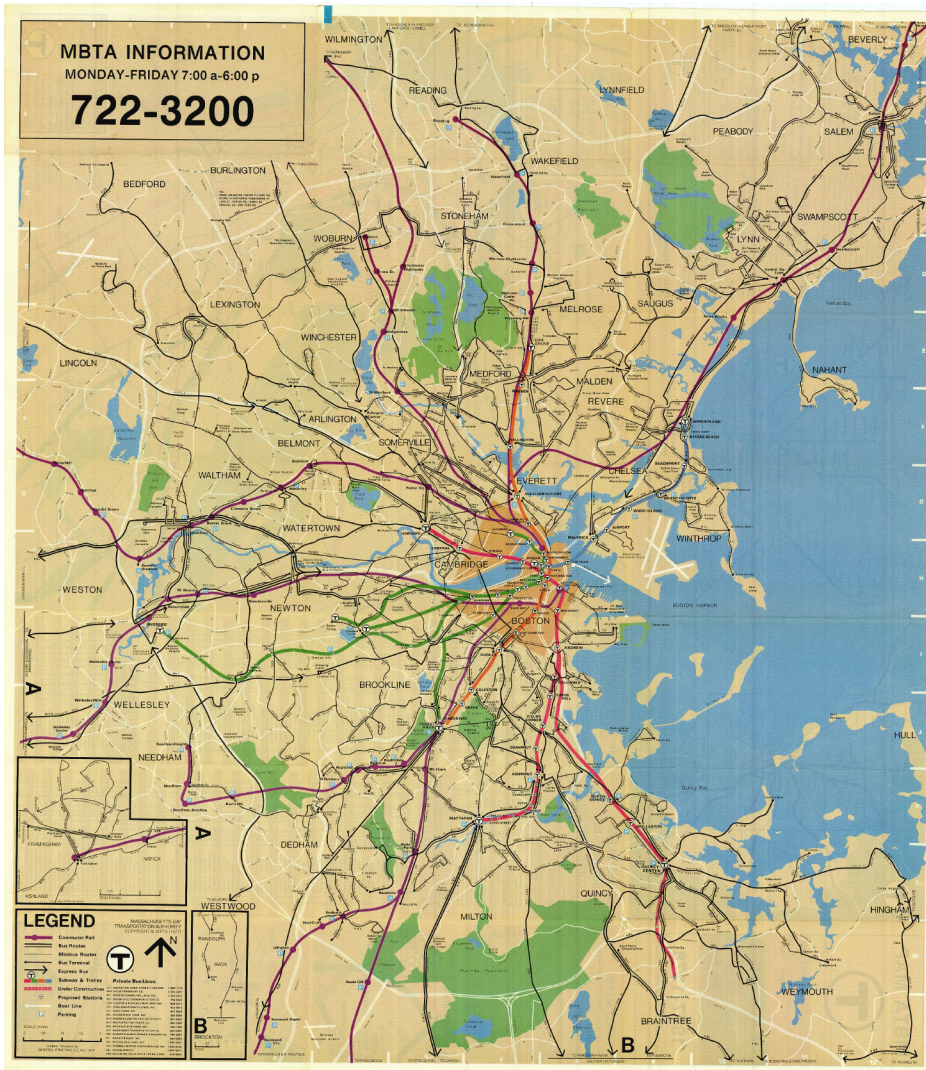
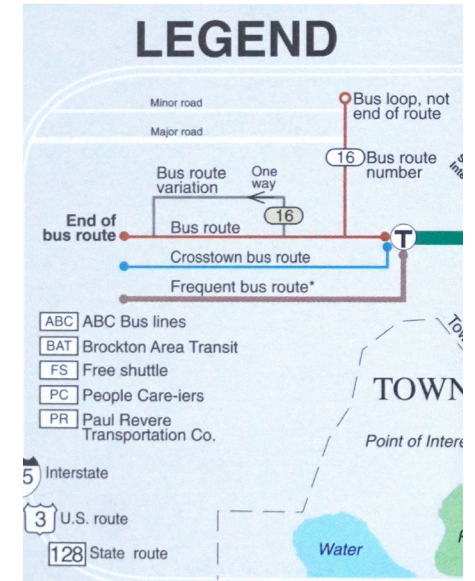
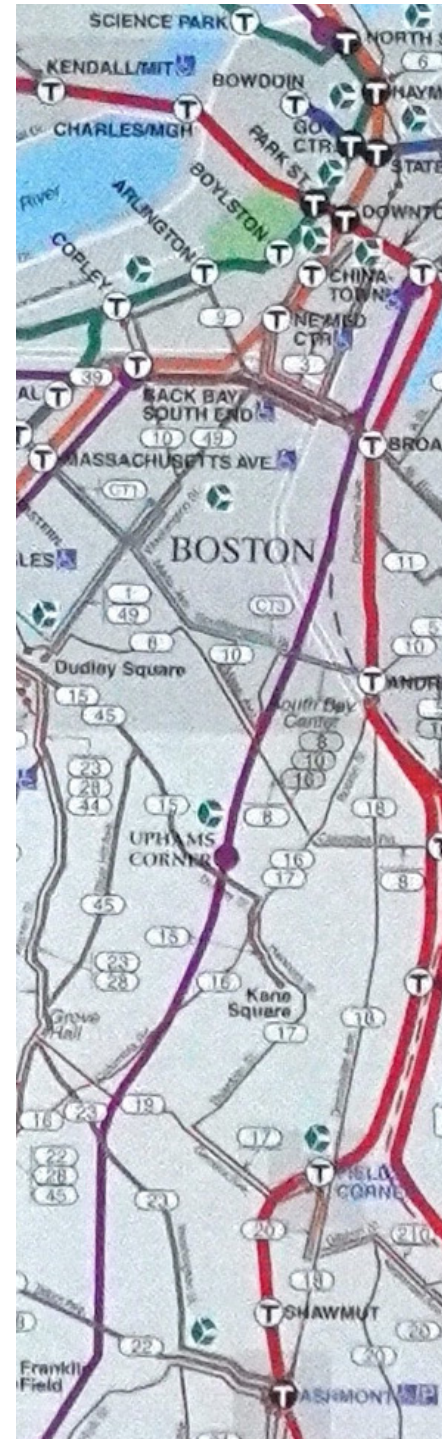


Figure 36: MBTA System Map 1977-1978



# 1996

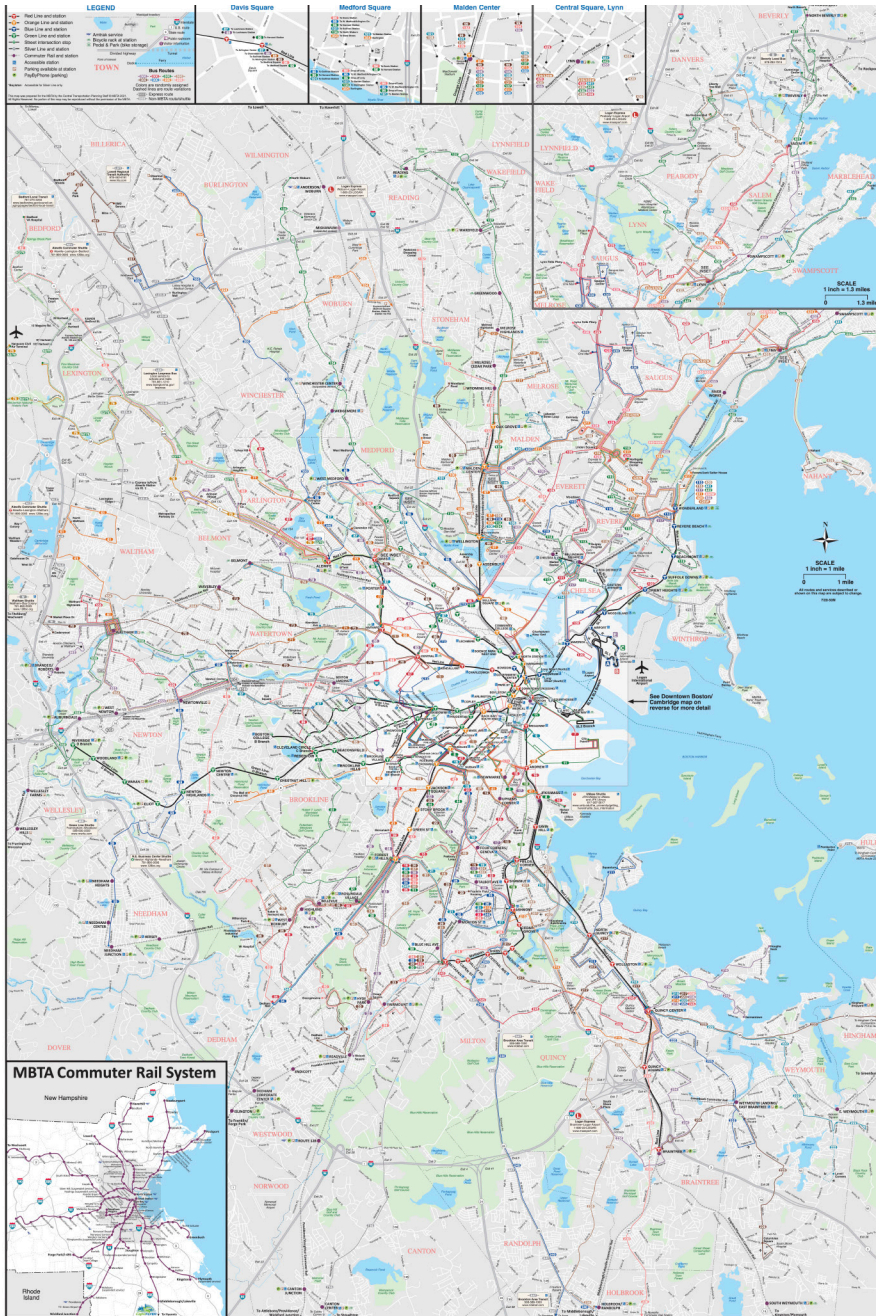
Figure 37: MBTA System Map 1996





# Current

Figure 38: Current MBTA System Map



### Bus Routes

000 - 000 - 000 - 000  
000 - 000 - 000 - 000

Colors are randomly assigned  
Dashed lines are route variations

- T Red Line and station
- T Orange Line and station
- T Blue Line and station
- T Green Line and station
- T Street intersection stop
- T Silver Line and station
- T Commuter Rail and station
- ♿ Accessible station
- P Parking available at station
- P PayByPhone (parking)





# Map Redesign Process

**Design Principles**

**Lines**

**Colors**

**Details**

**Draft Proposal**

# Design Principles

I'm centering the exploration of what a redesigned bus map could look like on the following two key principles.

## **Consistency With the MBTA's Brand**

While a new bus map has the opportunity to reimagine the bus brand, it should be consistent with the agency's core visual identity. Crucially, the current bus map diverges significantly from this identity. A more visually unified transit system is a more legible and accessible one.

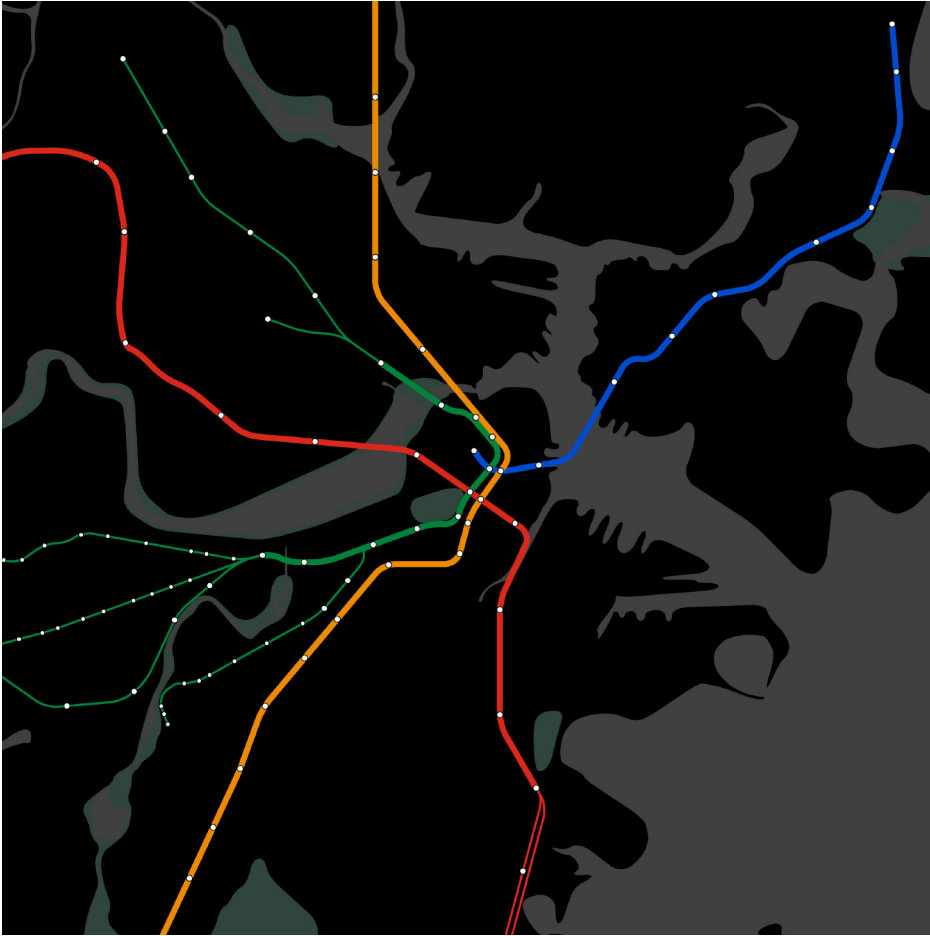
## **Highlighting Service Frequency**

Bus lines should be differentiated based on frequency. The network of frequent "key routes" should be most prominent so as to convey their greater usefulness.

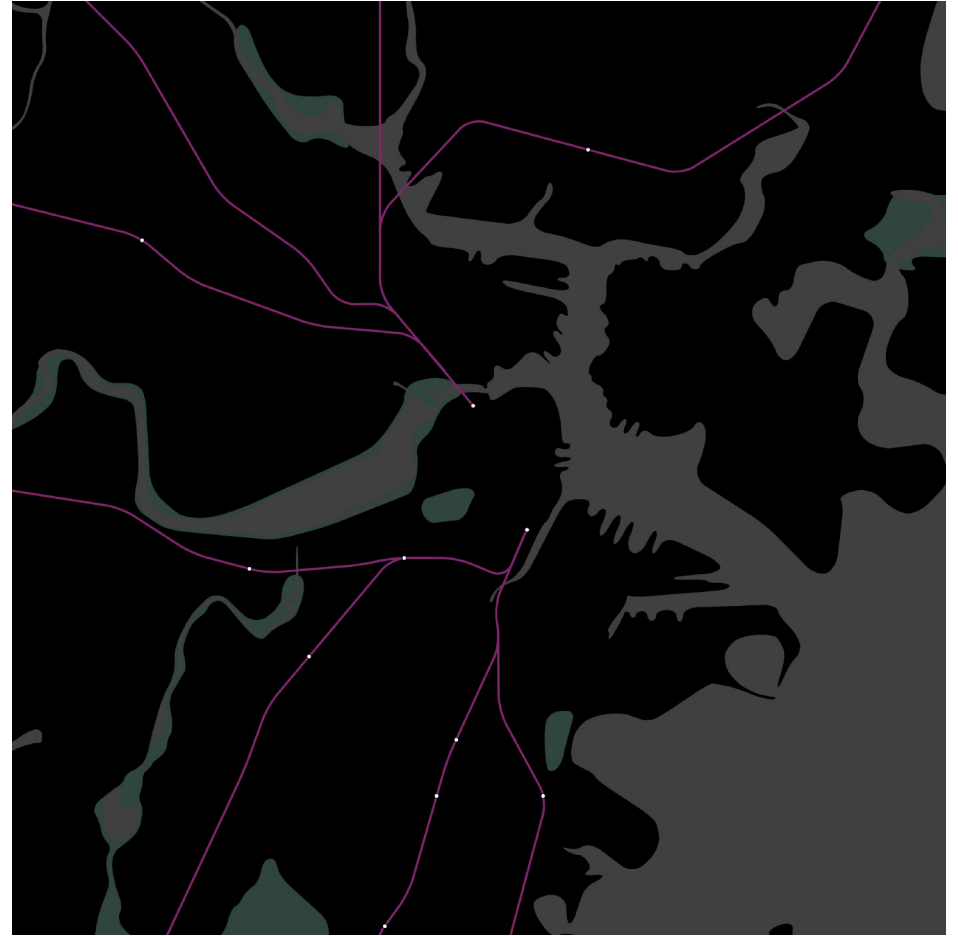
I also hope a new bus map can better facilitate discovery of the transit system by new and regular riders alike. It should assume no prior knowledge of the system and provide enough context to be used as a navigational tool.



# Lines

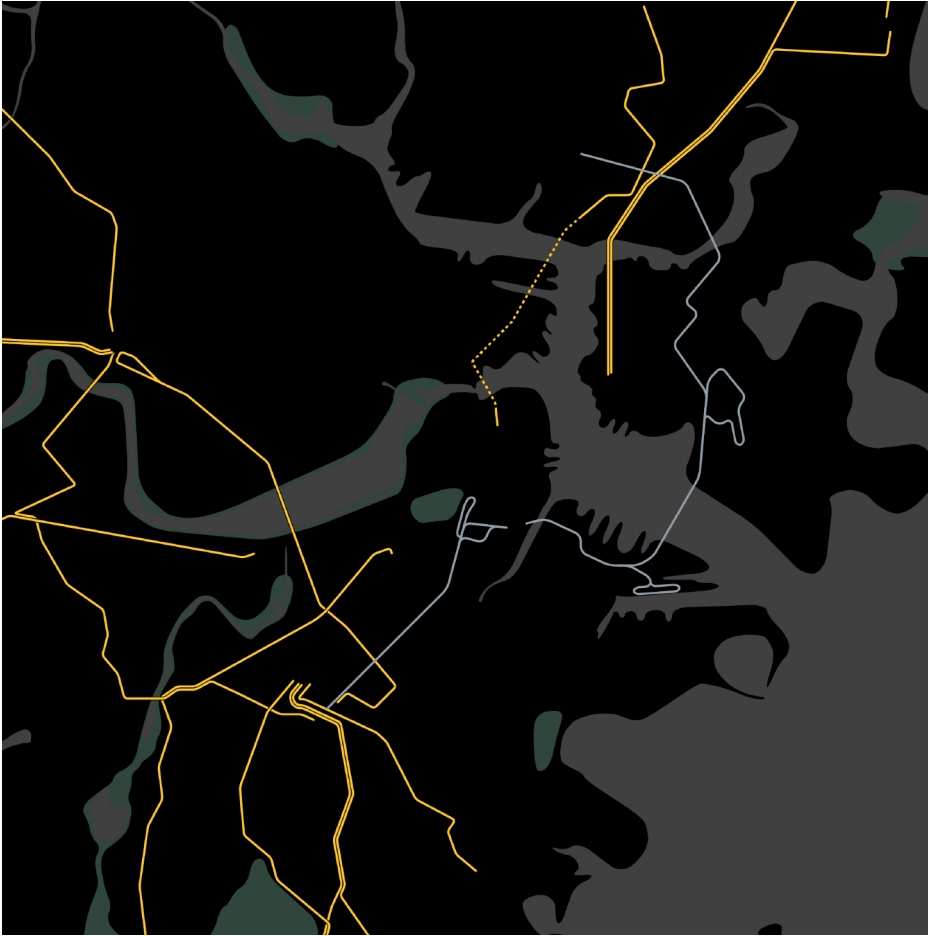


The four subway lines keep their official colors. I kept them relatively thick as they serve as the backbone of the network, but I decreased the thickness on any branches to show differences in frequency.



The commuter rail lines radiating out of North Station and South Station are all shown the same way. Unless the MBTA transforms these lines into regional rail, each line remains relatively infrequent and operates mostly independently.

# Lines



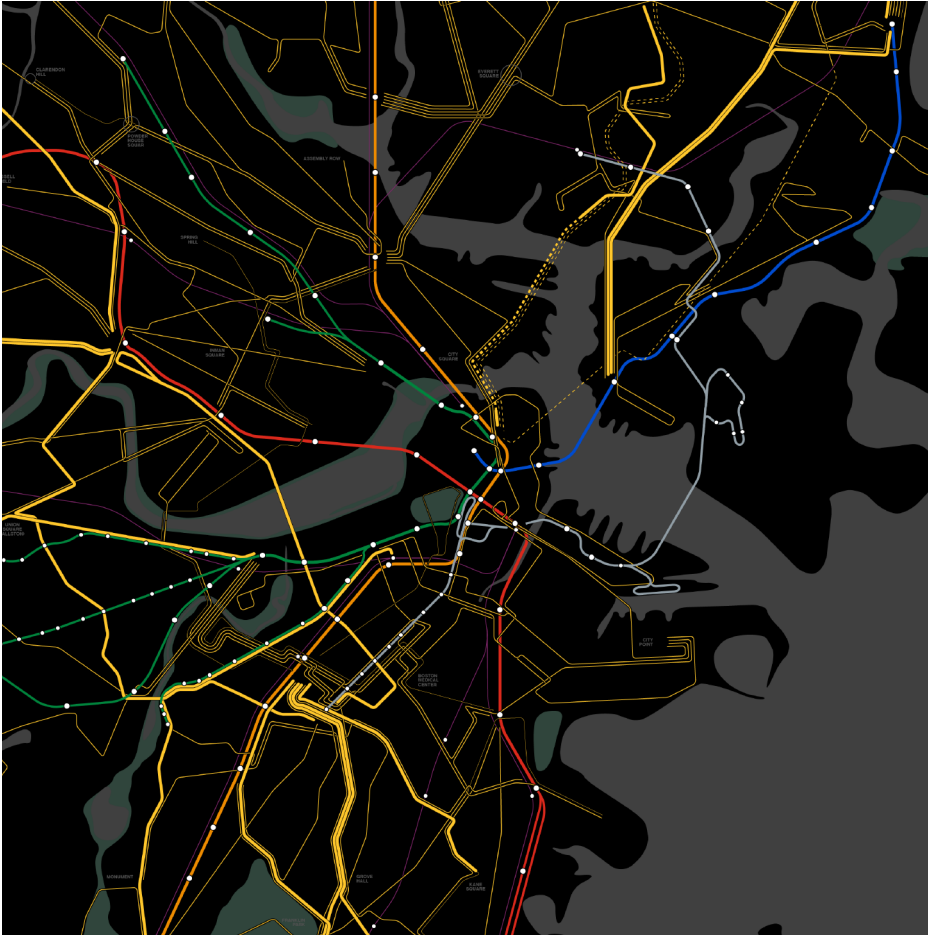
Frequent buses (also known as “key bus routes”) as well as Silver Line buses are highlighted as the backbone of the bus network. Frequent is defined as running every 15 minutes or better all day. Bus lines are depicted in the same shade of yellow used in real time bus information and on bus vehicles. Nonstop segments are shown as dashed.



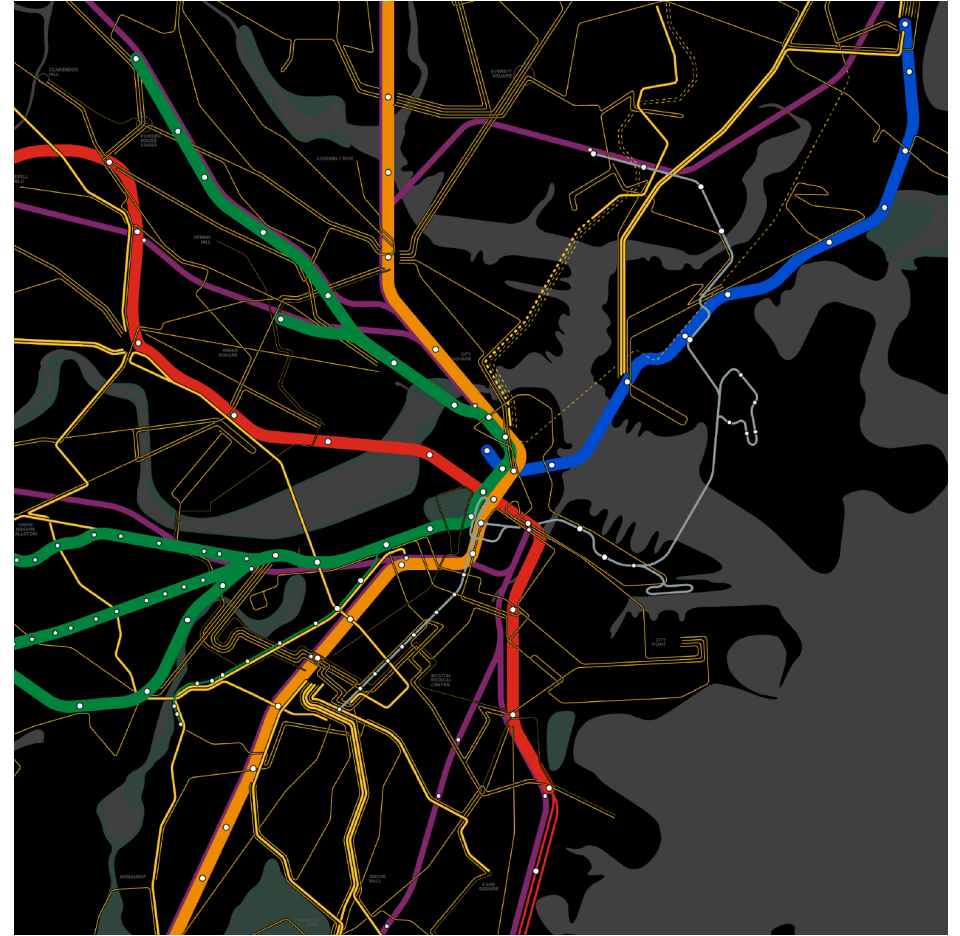
Less frequent bus lines (running less than every 15 minutes) still use the same yellow, but are drawn thinner to reflect less frequency. Nonstop segments are shown as dashed.



# Lines

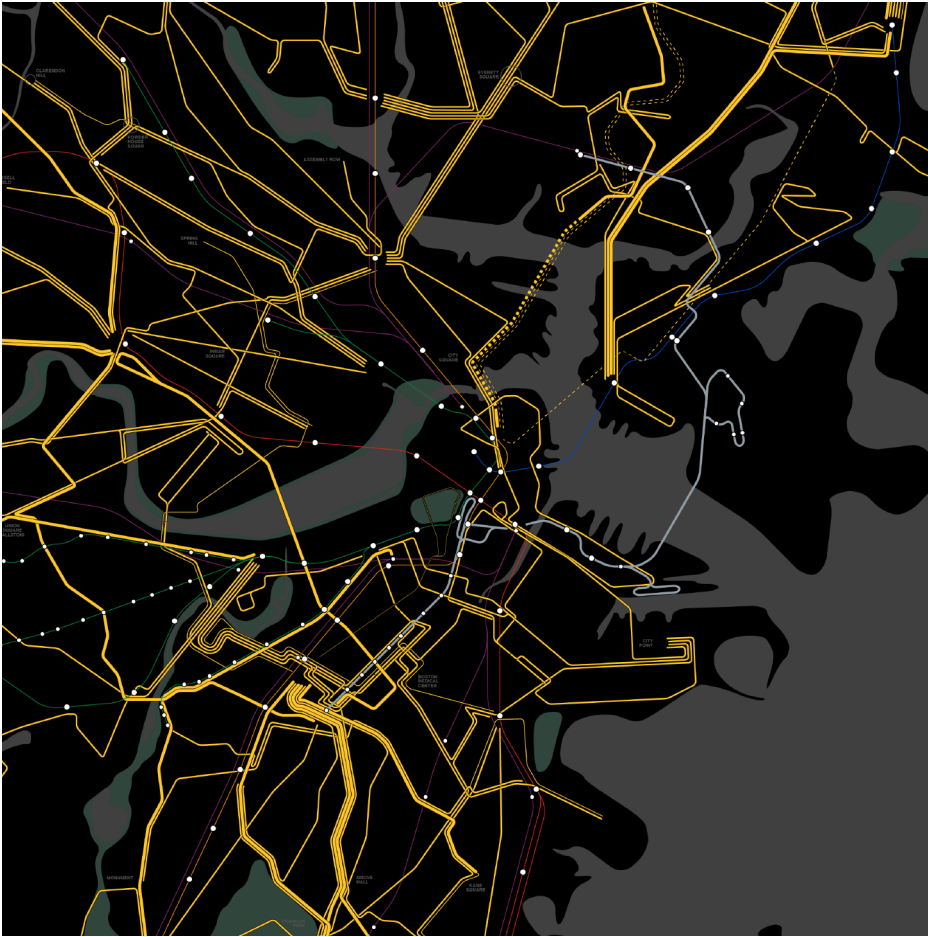


If we prioritize frequency agnostic of mode, frequent bus lines and subway lines would be the same thickness. The only mode distinction is based on color and station demarcation. This makes for a somewhat weak visual hierarchy.

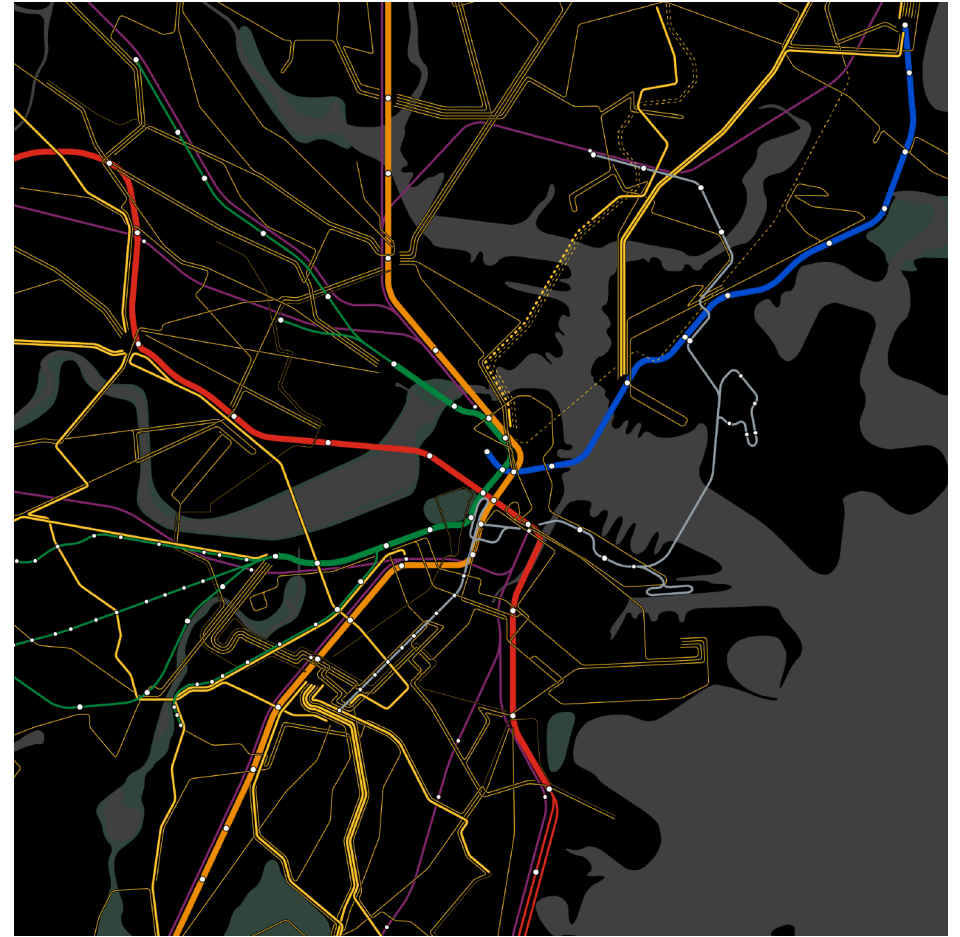


Prioritizing rail over bus leads to a stronger visual hierarchy, but somewhat overemphasizes subway lines by relegating buses to the background.

# Lines



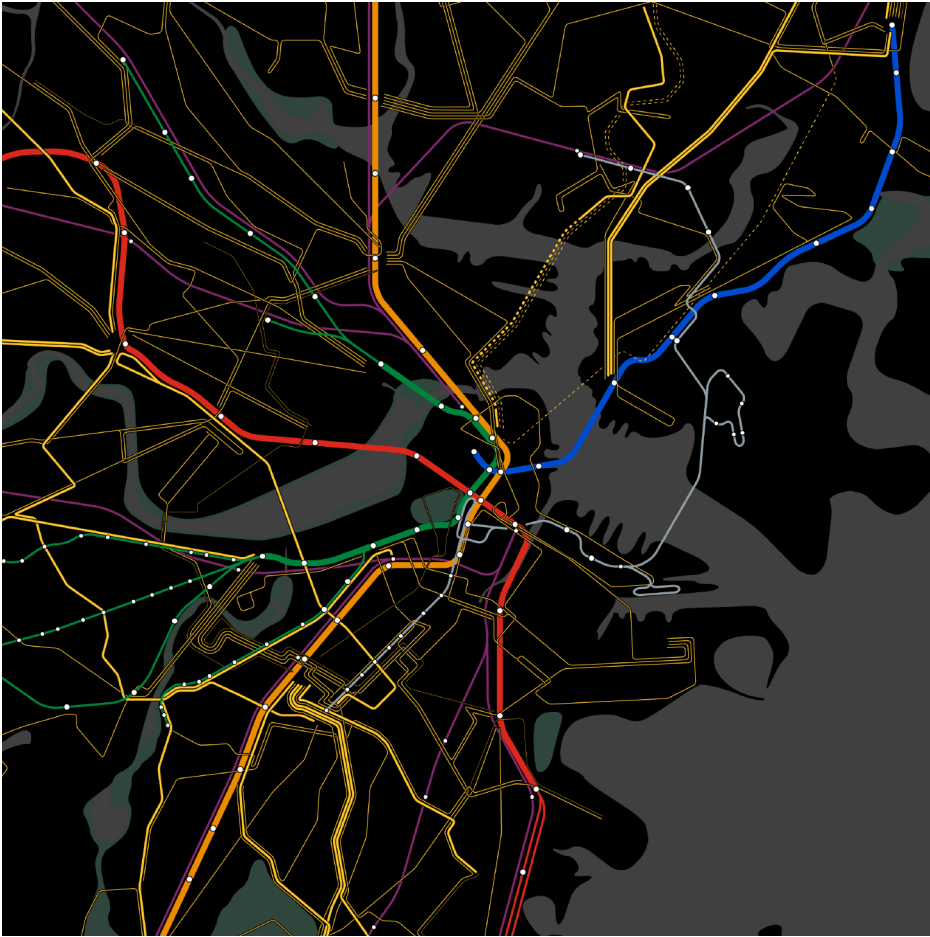
Prioritizing buses over rail certainly emphasizes the buses, but the recognizable look of the four subway lines is lost, overall leading to a more confusing map.



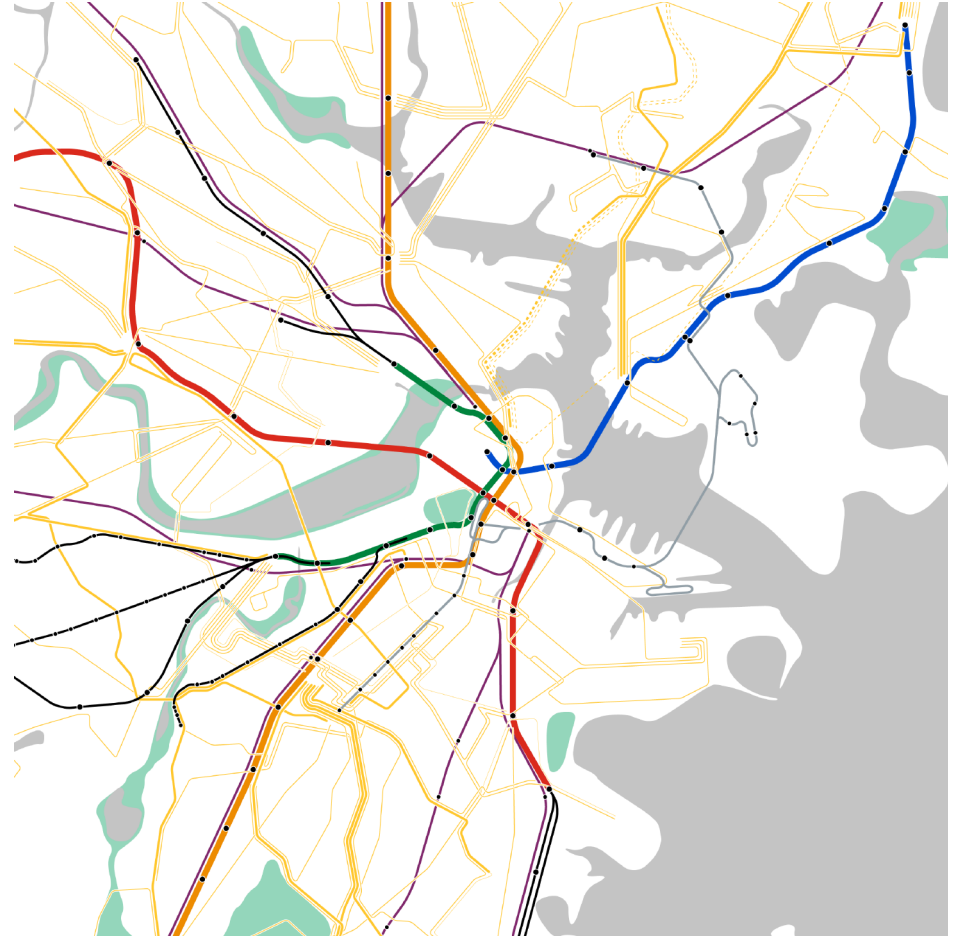
A mix of approaches where rail is slightly prioritized over bus, but frequency is still the organizing principle leads to a more balanced map.



# Colors

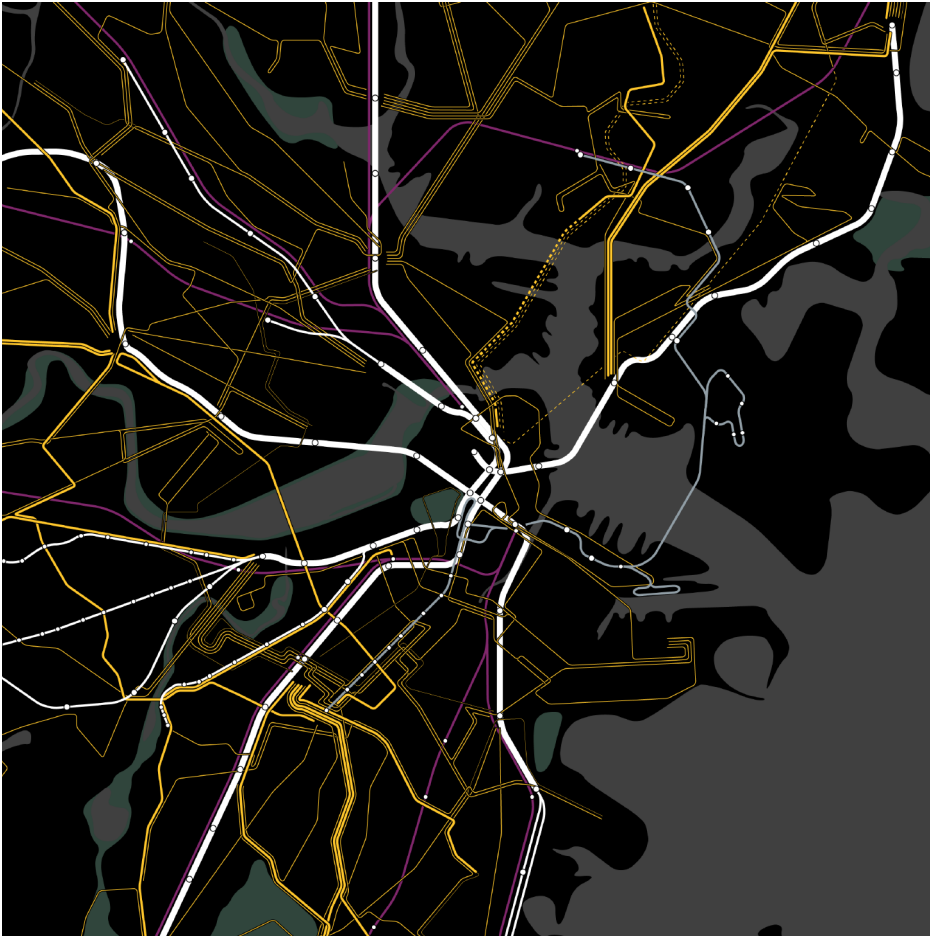


A black background helps allow the characteristic bus yellow to be used while ensuring legibility.

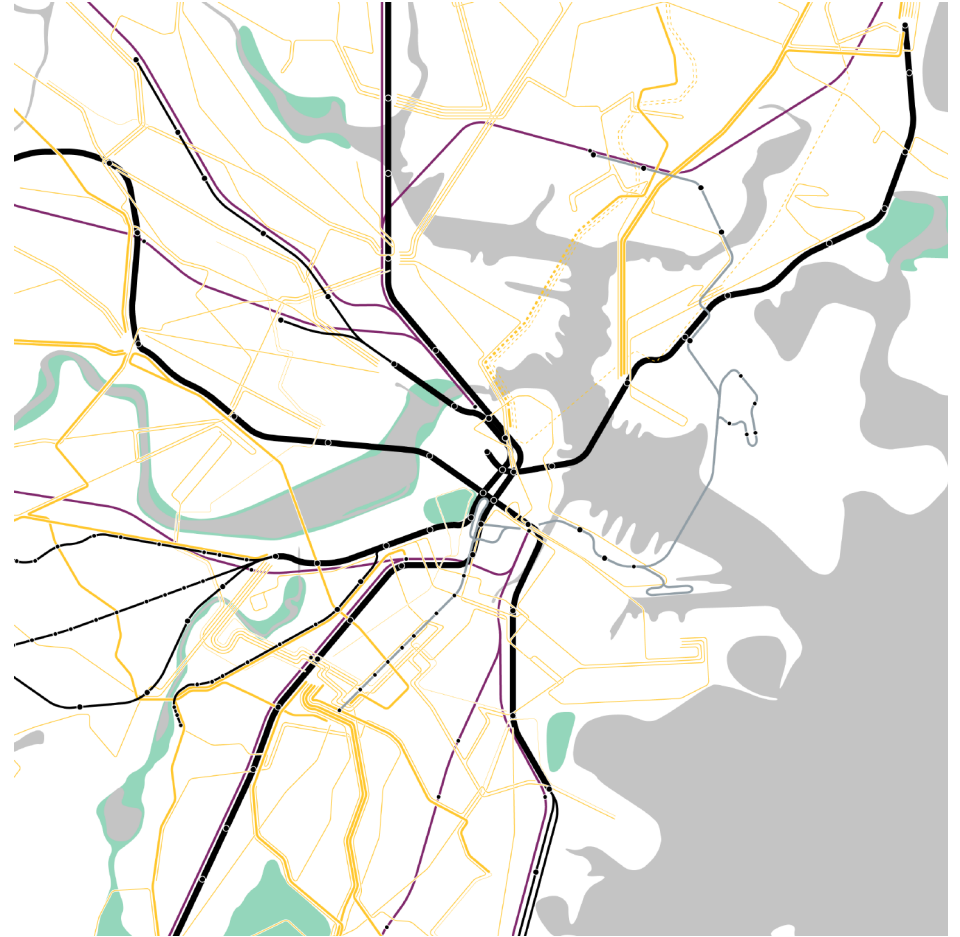


Yellow on white is much harder to read, but not impossible.

# Colors



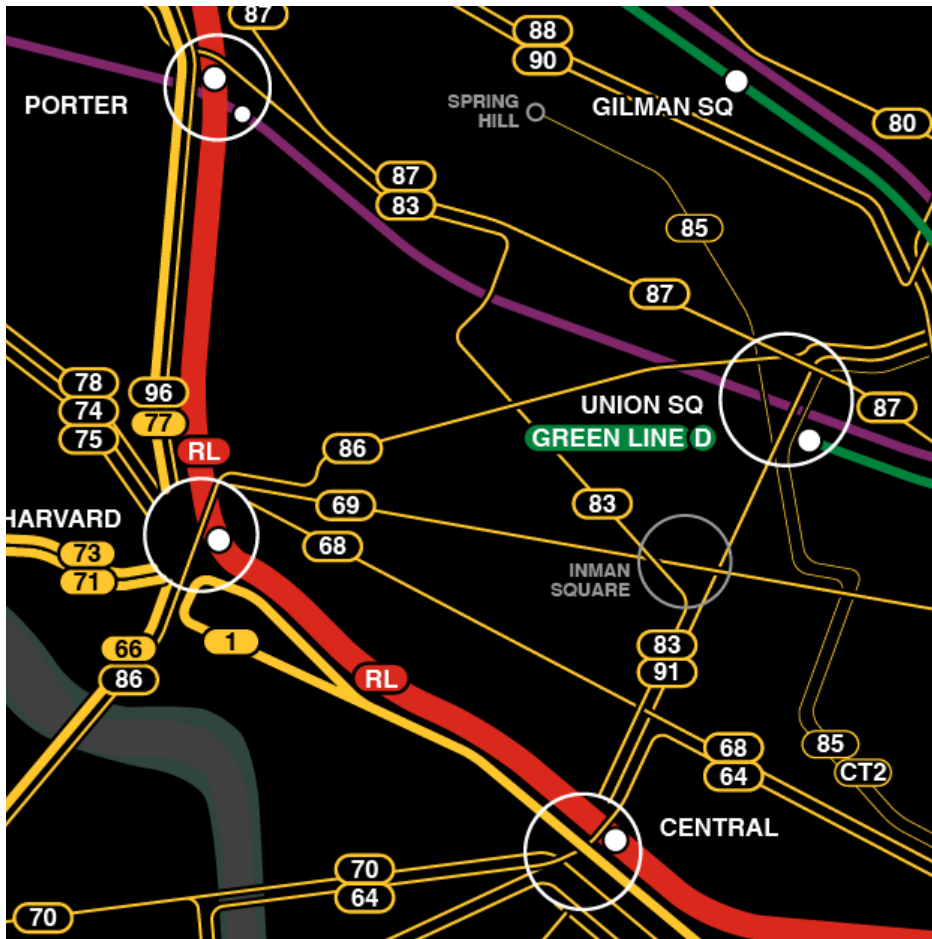
Removing color from the subway lines the way that the current MBTA map does can help reduce some complexity. The distinctiveness based on color and name (ex: Blue Line) is, however, lost.



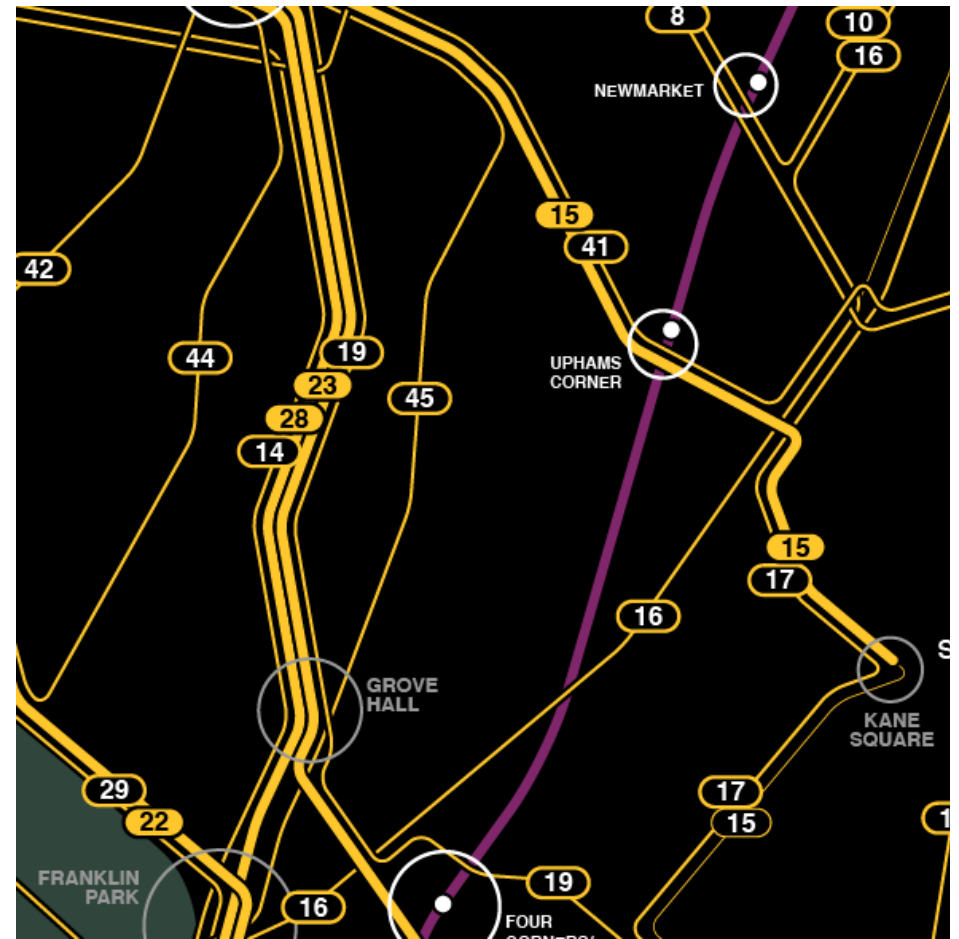
Yellow on white is much harder to read, but not impossible. Here, the subway is too emphasized compared to bus lines.



# Details

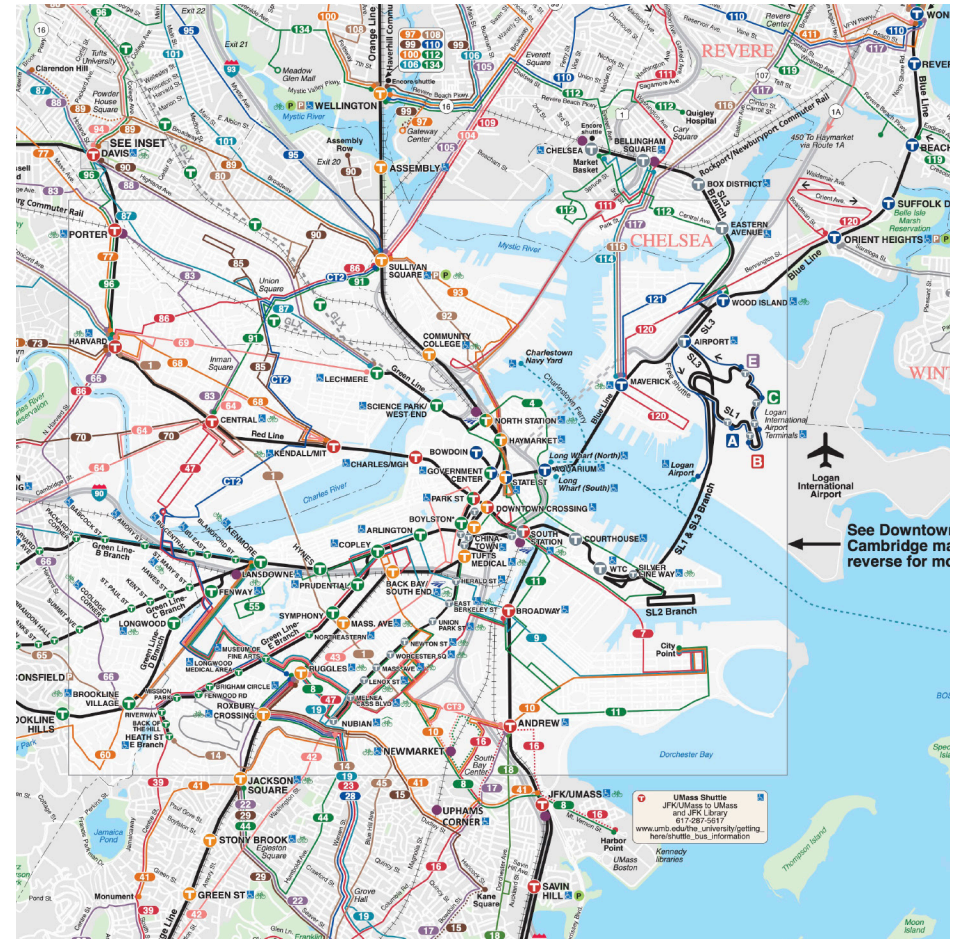
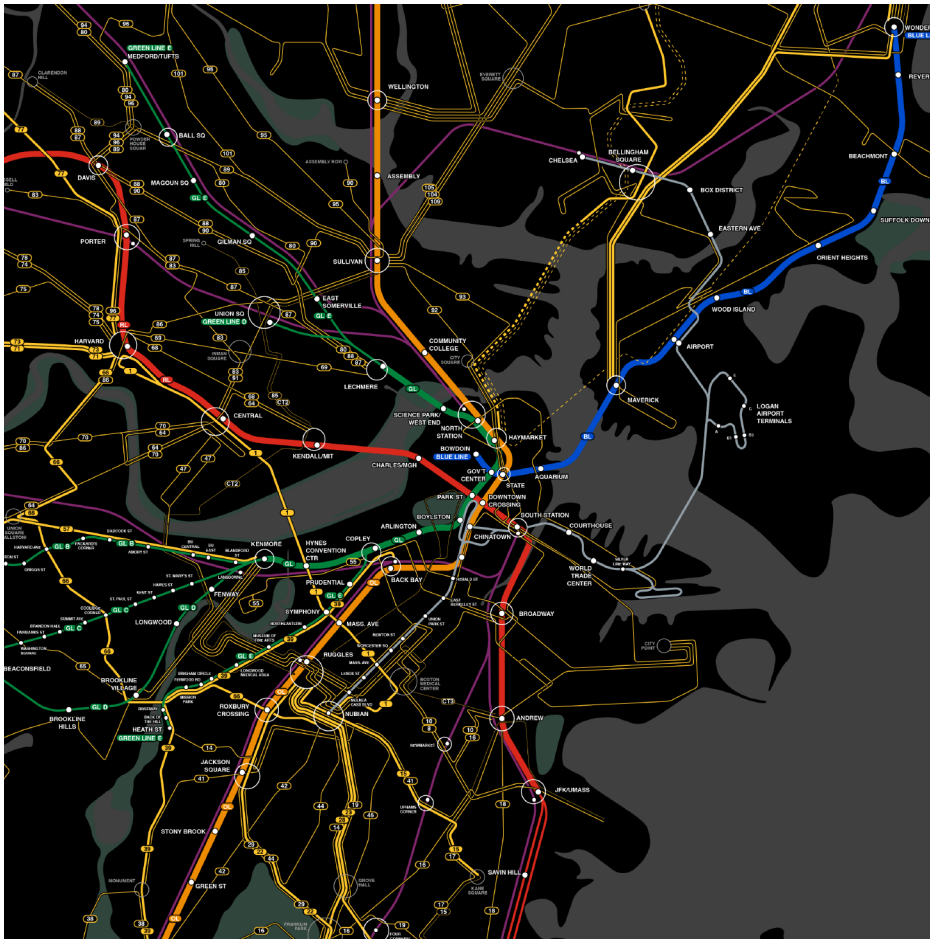


To reduce unnecessary complexity around subway/bus transfer hubs, I drew large circles around subway stations to indicate a hub. Bus Lines that terminate at that hub end at the edge of the circle while lines that go through are shown as such.



Line labels are shown as “pills”, the same way they are shown in bus real time information. To keep using yellow, but emphasize the frequency hierarchy, frequent line labels are filled yellow while less frequent line labels are just outlined in yellow.

# Draft Proposal



At a glance, the redesigned map has a clearer information hierarchy. Frequent lines pop while less frequent lines recede into the background. Hub circles around subway stations indicate the importance of certain places whereas those around locations only served by buses aid in navigation.



# Conclusion

# Conclusion

Clearly there are a multitude of possibilities for how transit agencies can depict their bus systems. This thesis explores how relatively simple mapping strategies can help the MBTA better unify its historic brand and uplift its neglected bus system as it works to fundamentally improve the experience of riding buses in Boston.

The impact of a new map may be hard to isolate and quantify, but the importance of a legible transit system can never be discounted. It's safe to say that any increases in ridership would only be helped by a clearer map which is able to effectively convey a new system to bus riders.

While the scope of this thesis is limited to historic and precedent research, user testing conducted with both the current system map and a redesigned map would greatly help illuminate questions about the usefulness of rider information as well as help evaluate how the two maps are performing. Ideally, such user testing would include not only current riders, but also non-riders to be able to determine how a new map might bring new riders into the transit system.

Finally, the success of any map lies not only in its design, but equally importantly in its distribution strategy. While replacing the current maps at bus stops is an obvious start, there are many directions distribution could take. The best use of a new system map at bus stops might be in addition to line-specific information for each stop (as seen in some newer stop displays). Foldable, printed materials might also help convey big changes in the system in a more tangible, tactile way, especially in the early stages of the bus network redesign rollout. A new system map could even be integrated into digital tools such as trip planning and real-time information through an interactive map or a basemap. In the end, the implementation of a new bus system map depends on the willingness of the MBTA and stakeholders across Greater Boston to translate a desire for better buses into a visual communication strategy.



# References

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Figure 24: Real-time information on an E-ink screen at a bus stop

[https://commons.wikimedia.org/wiki/File:MBTA\\_E-Ink\\_Display.jpg](https://commons.wikimedia.org/wiki/File:MBTA_E-Ink_Display.jpg)

Figure 25: Real-time information on an E-ink screen at a bus stop

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