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Complete Streets: An Inventory of Existing Recommendations and Gaps Analysis

**Roxbury Great Neighborhood
Partners**

Metropolitan Area Planning Council
MAPC.org

Executive Summary

Through funding made available by the Massachusetts Smart Growth Alliance (MSGa) as part of its Great Neighborhoods Program, the Metropolitan Area Planning Council (MAPC) was hired by Nuestra Comunidad Community Development Corporation to complete a review of existing plans along the Warren Street Corridor dealing specifically with transportation or those that have a transportation component. The purpose of this review was to compile existing recommendations under four categories (Pedestrian, Bicycle, Transit, and Vehicular) in order to develop a document which outlines all the recommendations that could be used to form a Complete Streets plan along Warren Street.

MAPC reviewed the following existing planning documents and studies as part of this report¹:

- Roxbury Master Plan (City of Boston)
- Dudley Square Transportation Action Plan (City of Boston)
- 28X Enhancements Project (MassDOT)
- Assessment of Dudley South Corridor (Central Transportation Planning Staff)
- Roxbury/Dorchester/Mattapan Transit Needs Study (MassDOT)
- MBTA's Key Routes Planning Initiative (MBTA)
- Dudley Station Improvement Plans (MBTA)
- Washington Street Corridor Coalition Bus Enhancements Project Recommendations (Washington Street Corridor Coalition)

Commonalities among Plan Recommendations

The plans that were reviewed through this process highlighted a number of common goals for making Warren Street more accommodating for all modes of transportation:

- Pedestrian safety and accessibility were two key goals noted in many plans and more specifically highlighted the need for wider and more visible crosswalks, reduced pedestrian wait times at signalized intersections and adding ADA accessible ramps at intersections.
- The Warren Street corridor is a vital transit link between Dudley Station and Blue Hill Avenue, but close stop spacing and traffic congestion slows buses down causing schedule adherence issues and bus bunching. Many of the plans reviewed highlighted potential solutions to these issues, including the consolidation/elimination of stops, creating bus only lanes and adding signal priority for transit vehicles all aimed at keeping service frequent and on schedule.
- Vehicular circulation recommendations focused on the area closer to Dudley Square and Dudley Station where conflicts occur between cars, buses, pedestrians, and cyclists. This activity center is important for Roxbury, and creating a safe environment for all modes is beneficial for both mobility and economic vitality. Recommendations in the reports focus on improving traffic flow and safety through adjustments in signal timing, traffic circulation, signage, and lane striping.

Gaps in Existing Plan Recommendations

Although the overarching goals of improving mobility and safety along the Warren Street corridor are mostly consistent among each of the plans, the specific recommendations on how to make the

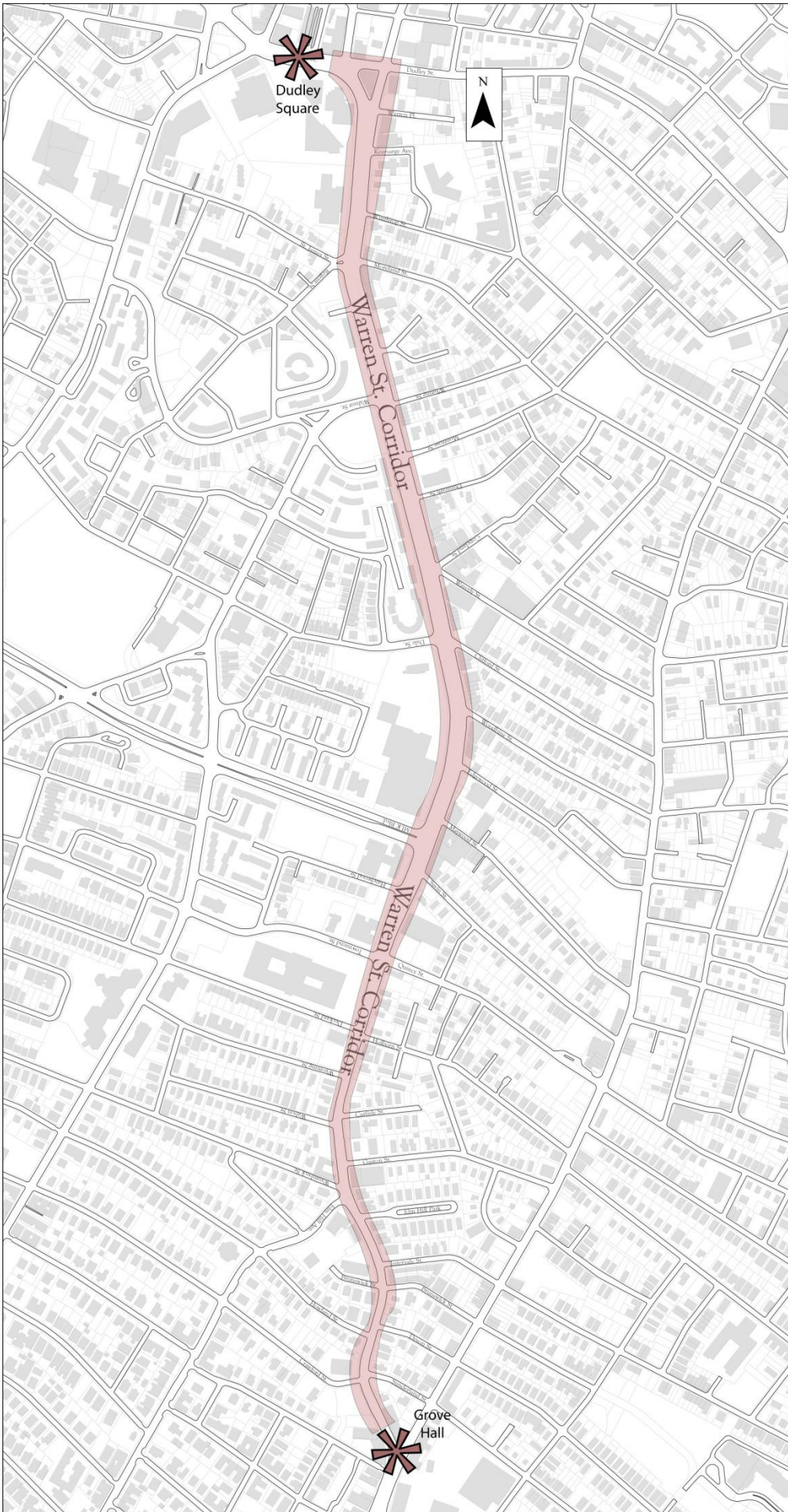
¹ For more information on these plans see report appendix.

improvements are conflicting in some instances. One of the major areas of discrepancy is in the overall width of Warren Street's cross-section. In order to accommodate all modes of transportation, some of the plans call for using the entire width of the roadway including the existing concrete median between Dudley Street and Quincy Street. Other plans call for a reduction in roadway width and in overall travel lanes to accommodate wider sidewalks and lessen crossing distances for pedestrians. The determination of roadway width will also establish the accommodations for bicycles along the corridor.

Next Steps

This report is the first step for informing a future community-based vision for how a Complete Streets approach can be accommodated along this corridor. The next step is for the Great Neighborhood Partners to work with key corridor stakeholders, area residents, and the City of Boston to determine the appropriate way to accommodate the travel needs of residents and businesses within the existing right-of-way along Warren Street.

Warren Street Corridor Location Map



The Warren Street Corridor is located along Warren Street in Roxbury between Dudley Square and Grove Hall. The study is looking at the entire 1.4 mile length of Warren Street.

Existing Complete Streets Recommendations

The following sections outline the existing recommendations and identify areas where gaps or conflicting recommendations exist under four topic areas: Pedestrian, Bicycle, Transit, and Vehicle.

Pedestrian Improvement Recommendations

Urban environments, such as those found along the Warren Street corridor, create high demand for walking and must provide high-quality sidewalks and pedestrian crossings for its residents. A strong sidewalk network links housing, jobs, parks, and shopping areas and can also be used to connect pedestrians to other modes of transportation. Sidewalks are often the first and last link in a transit rider's trip, and are an integral piece of Complete Streets. The sidewalk network along Warren Street is very complete with no missing gaps.

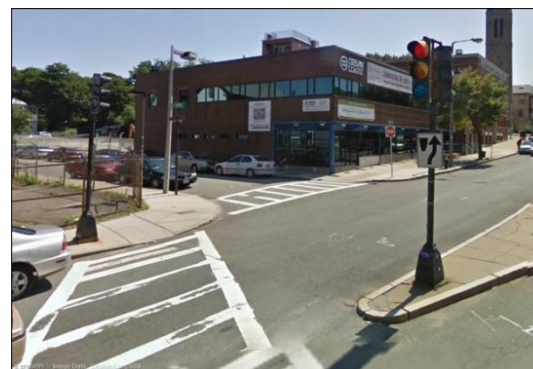
Although the sidewalk network itself is complete from the beginning of the corridor to the end, there are pedestrian accessibility and safety issues along the corridor that should be addressed to ensure walking is a safe and accessible option available to all residents. A scan of the corridor revealed the following issues:

- Crosswalk striping is faded and in need of re-striping, both at mid-block and intersection locations
- Crosswalks should be added at unsignalized side street locations to provide higher visibility and safer crossings for pedestrians
- Pedestrian ramps at most intersections are not ADA compliant and do not have the tactile detectable warning strips
- Pedestrian ramps are not located at the terminus of some crosswalks at both mid-block and intersection locations
- Trees, signs, and light poles are located at the terminus of some crosswalks blocking access to the sidewalk
- Median refuge islands end prior to the crosswalk preventing pedestrians from stopping midway through the intersection and having a safe place to stop
- Some pedestrian crossings at signalized intersections are missing pedestrian signals and countdown timers



Faded Crosswalks and Lane Markings

Source: Google



Missing Pedestrian Signals and Timers

Source: Google

Several plans and studies completed over the years looking at different parts of the Warren Street corridor have recommended both general and specific improvements for pedestrian safety and connectivity. MAPC reviewed the *Roxbury Master Plan* and the *Dudley Square Transportation Action Plan* for pedestrian improvement recommendations and to what degree they address the bulleted list of issues on the previous page.

- Roxbury Master Plan²
 - Provide safe accommodating streetscape designs that balance ROW needs for bikes, peds, autos, and transit. Different approaches should be taken based on the volumes of the roadways. Streetscape should not constrict or excessively reduce capacity.
 - Pedestrian signals should be timed to minimize pedestrian wait times and should include a concurrent walk phase where appropriate.
 - Wider crosswalks (8 foot minimum) and tighter corner radii should be considered where possible during intersection reconstructions.
 - Restripe travel lanes and crosswalks to enhance both vehicular and pedestrian safety
 - Add pedestrian scale street lighting along the corridor, especially at high pedestrian travel and crossing locations.
 - Reduce street widths where possible to reduce crossing distances and widen sidewalks.
- Dudley Square Transportation Action Plan³
 - Re-stripe crosswalks and lane markings to improve pedestrian and vehicular safety
 - Add ADA accessible pedestrian ramps at intersections
 - Re-align crosswalks at intersections to reduce crossing distances
 - Add crosswalks to side streets to emphasize pedestrian presence
 - Restrict parking within 20 feet of crosswalks to improve sight distance for cars and pedestrians
 - Reduce street widths where possible to reduce crossing distances and widen sidewalks.
 - Eliminate northbound Warren Street lane at Harrison Avenue. In its place, extend sidewalk and create public plaza space which will also reduce crossing distances on Warren Street

The recommendations for pedestrian improvements in these two plans provide some key short-term and long-term ideas for implementation, many of which can be addressed by small dollar investments.

Short-Term Recommendations

- Stripe crosswalks at all side street locations along Warren Street to provide added safety and visibility for pedestrians, stripe wider crosswalks (8') at major pedestrian crossing locations

² Roxbury Master Plan, Boston Redevelopment Authority, 2004. Recommendations applicable to entirety of Roxbury.

³ Dudley Square Vision Initiative Transportation Action Plan, Boston Transportation Department/Boston Redevelopment Authority, 2009. Recommendations specific to Dudley Square area.

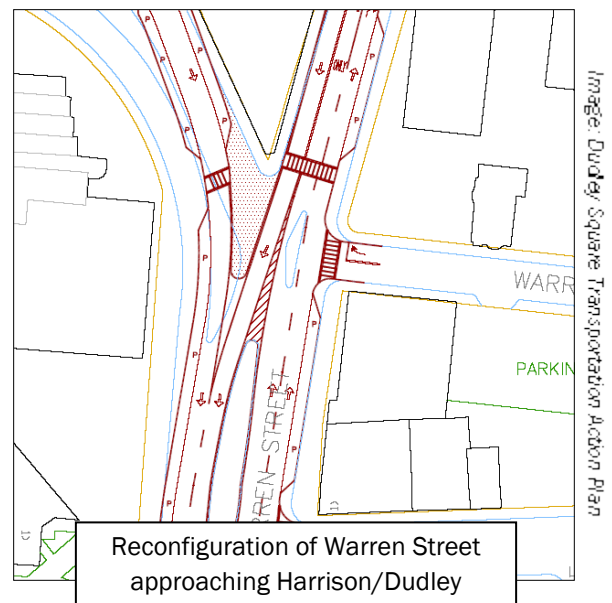
- Restripe and/or re-align existing crosswalks and vehicular travel lanes to increase visibility and safety for pedestrians and vehicles, stripe wider crosswalks (8') at major pedestrian crossing locations
- Re-time pedestrian signals at intersections to minimize pedestrian wait times, these should include a concurrent walk phase⁴ where appropriate and possibly a leading or lagging pedestrian interval⁵ depending on right-turn volumes at intersections.
- Restrict parking within 20 feet of crosswalks to improve sight distance for pedestrians and cars
- Ensure that new signals being installed by the City of Boston along Warren Street include pedestrian countdown signals and transit signal prioritization (TSP)⁶ technology

Long-Term Recommendations

- Incorporate ADA compliant pedestrian ramp designs at intersections during improvement projects
- Add pedestrian scale street lighting to light sidewalks and roadway crossings
- Reduce street widths where possible by minimizing travel lane widths or eliminating travel lanes. These reductions could increase the amount of right-of-way available for wider sidewalks and/or bike facilities
- Reconfigure the intersection of Warren Street and Harrison Avenue by eliminating northbound Warren Street approach to Dudley Street. In its place, create a larger pedestrian plaza with landscaping and street furniture. This would also reduce crossing distances on both Warren Street and Harrison Avenue.

Gaps in Existing Recommendations

While many of the recommendations in the existing plan documents are identical or very complementary to each other, there are still some remaining questions about how to balance the varying modes of transportation along the corridor. For instance, some plans recommend creating dedicated bus lanes and queue jump lanes along Warren Street, while others recommend reducing travel lanes and widening



⁴ Concurrent walk phase refers to pedestrian movements at a signalized intersection where pedestrians are crossing with the adjacent traffic movement. For instance, pedestrians would cross east to west as traffic crosses east to west.

⁵ A leading pedestrian interval allows the pedestrian signal to allow crossing prior to the vehicular traffic signal turning green to allow time for pedestrians to enter the crosswalk and provide greater visibility to vehicles. A lagging pedestrian interval signals vehicles to enter the intersection prior to the pedestrian signal allowing pedestrians to cross. This provides opportunities for right turning vehicles to clear the intersection queue before pedestrians enter the crosswalk.

⁶ TSP gives transit vehicles added green time or less red time at signalized intersections to improve transit flow and maintain schedule adherence.

sidewalks and adding bike lanes along parts of the corridor. While many of these recommendations could be accommodated within the existing right-of-way, there may be a need to remove parking and/or the center raised medians along the corridor to ensure room for the improvements. These trade-offs will have different impacts at different points along the corridor, therefore impacting residents and businesses differently along the corridor.

There appears to be consensus on over-arching goals for mobility and accessibility along the corridor around such items as better and more frequent transit service, better transit amenities, safer pedestrian crossings, improved sidewalks and intersection ramps, etc. The question that still remains is the design of the improvements the City, residents and area businesses determine priorities among modes and trade-offs.

Bicycle Improvement Recommendations

In our review of existing plans for the corridor, few noted specific recommendations for how to provide dedicated and safe provisions for bicyclists. Cycling, similar to walking, is a cost-effective healthy form of transportation that can connect residents to their destinations, and can also act as a “last-mile” travel link to and from transit stops and stations. The City of Boston recently striped “Sharrow”⁷ markings along Warren Street to raise awareness for drivers that the road is shared between motorists and cyclists.



Sharrow Pavement Markings

Source: tp.osu.edu

The *Dudley Square Transportation Action Plan* is the only plan that specifically recommended adding five-foot striped bike lanes along Warren Street (extent of study area is only as far south as St. James Street). The *Assessment of Dudley South Corridor*⁸ plan does make note that on-street bike lanes could be accommodated in the right-of-way if the medians were removed and travel lane widths were reduced under their recommended roadway cross-section.

Gaps in Existing Recommendations

There are significant gaps existing in regard to recommendations for bicycle accommodations along the corridor. From our review of existing plans, the design and type of bicycle facility has not been considered along the entire corridor from Dudley Square to Grove Hall. The *Dudley Square Action Plan* puts forth recommendations only as far south as St. James Street, leaving much of the corridor open to other recommendations. MAPC sees gaps in recommendations in the following areas:

- What type of bicycle facility is preferable and/or feasible along the corridor; on-street bike lanes, cycle track, Sharrows, or off-street paths?
- What types of signs should be placed along the corridor to raise awareness of bike facilities and can wayfinding signage be added as part of the City’s push for better bike signage?

⁷ Sharrows are a pavement marking which indicate to drivers and cyclists that the road is intended to be shared between vehicles and bicycles.

⁸ Assessment of Dudley South Corridor Bus Service and Potential Improvements, Central Transportation Planning Staff, 2009

- Where should bike parking be placed along the corridor? Should there be bike racks located at major transit stops along the corridor if possible?
- How will bike facilities be prioritized by area residents and businesses if accommodations for other modes and on-street parking are impacted?

Transit Improvement Recommendations

Transit service, especially buses, is a vital transportation component linking corridor residents to jobs, education, shopping, and recreation opportunities across the Boston area. The Warren Street Corridor is utilized by six MBTA bus routes⁹ serving destinations such as Dudley Square, Ruggles, Kane Square, Mattapan Square, and Jackson Square. These destinations are not only connections to housing and jobs, but also serve as transfer points for riders to access other regional bus routes or rapid transit lines. Two of the MBTA's top 15 highest ridership bus routes travel along the Warren Street Corridor (Routes 23 and 28). Improving transit service frequency, reliability and overall ease of use has been part of planning efforts and the Complete Streets dialogue along this corridor for many years.

Three separate plans for transit improvements along Warren Street have been proposed over the last five years: the *Assessment of Dudley South Corridor*, the *Route 28X Enhancement Plans*¹⁰, and the on-going *MBTA Key Routes Improvements*¹¹. These three transit improvement efforts have similar goals of improving service reliability, speed of service along the corridor and the amenities for riders (shelters, signage, trash receptacles, etc). There are key differences among each of the plans in terms of how stop spacing is handled and how travel lanes for transit vehicles are treated.

Stop Consolidation

A major component of the three transit plans along this corridor is recommendations for stop elimination and/or consolidation. Stop consolidation and elimination are solutions that can help reduce the trip times along a transit route by creating fewer stops and starts and lessening time for loading/unloading passengers. The existing average stop spacing along the corridor is currently below what most experts consider ideal stop spacing for an urban transit corridor (ideally 750' – 1,320'). The high number of stops along the corridor and close spacing add to the overall run time of the bus routes, cause delay during peak hours and add to instances of bus bunching (where two or more buses are arriving at or near the same time). The table below compares the three plans reviewed to the existing conditions currently experienced along the corridor.

⁹ Routes 14, 19, 23, 25, 28, and 44 travel along Warren Street. The Route 44 diverts at Walnut Street.

¹⁰ Route 28X Enhancement Plans, MBTA/MassDOT, 2009

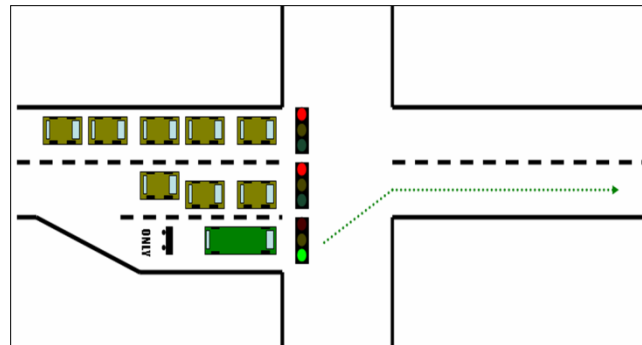
¹¹ MBTA Key Routes Program, MBTA, 2012

Existing and Proposed Stops and Average Stop Spacing

Plan Document	Inbound		Outbound	
	# of Stops	Avg. Stop Spacing	# of Stops	Avg. Stop Spacing
Existing Conditions	14	528'	12	580'
Dudley South Corridor	4	2,112'	4	2,165
28X Enhancements	8	900'	8	950'
Key Routes Program	7	1,056'	7	1,056'

The three plans reviewed had varying recommendations for stop spacing along the 1.4 mile corridor. The Dudley South Corridor plan recommended the farthest distances between stops at $\frac{1}{2}$ mile intervals. The purpose behind these recommendations was to combine stop spacing improvements with dedicated bus lanes and/or queue jump lanes¹² to create a bus rapid transit- like system along Warren Street similar to what can be found along Washington Street with the Silver Line. Recommendations also included larger bus shelters, and at certain high ridership stops adding fare vending machines to allow for fare payment before riders enter the bus.

The 28X enhancement plans, which were presented in 2009 but failed to gain traction with the community, recommended reducing inbound and outbound stops to 8 in each direction with an average stop spacing of around 900' - 950'. The 28X plans also called for the creation of a dedicated outbound bus lane along Warren Street from Dudley Street to Townsend Street, in combination with a series of outbound and inbound queue jump lanes at specific intersections. These plans attempted to create more rapid bus service for the Route 28 along Warren Street without eliminating and consolidating stops to a $\frac{1}{2}$ mile stop spacing average.



Example of a Queue Jump Lane for Transit Vehicles

Source: wikipedia.org/wiki/Queue_jump

The Key Routes Program draft recommendations along Warren Street also call for stop consolidation and elimination, but to a lesser extent than the Dudley South plans. The Key Routes Program recommends reducing the number of inbound and outbound stops to 7 in each direction, creating an average stop spacing of about 1,000'. The recommendations also cover stop amenities such as bus shelters, signage, trash receptacles, and lighting.

Several other plans and recommendations have come out over the years regarding transit service along the Warren Street corridor. These plans include: the Roxbury Master Plan, the Roxbury/Dorchester/Mattapan Transit Needs Study¹³, and the Washington Street Corridor Coalition's

¹² A queue jump lane is designed to provide an additional travel lane, typically a right hand lane at intersections, for transit vehicles. This added lane at an intersection allows the transit vehicle to jump ahead of queued traffic, thereby reducing delay typically experienced by transit vehicles at signalized intersections.

¹³ Roxbury, Dorchester, Mattapan Transit Needs Study, MassDOT, 2012.

Warren Street Bus Enhancements¹⁴. In general, these plans call for improved stop spacing, stop amenities, increased enforcement of parking in bus zones, improved access to fare payment machines, improved traffic signals, and adding more buses or an express service to the Route 28.

Short Term Recommendations

- Consolidate and eliminate bus stops along Warren Street consistent with public input and analysis through the Key Routes Program
- Add amenities to bus stops along the corridor including: shelters, lighting, updated signage, pavement markings, sidewalk improvements, and trash receptacles through the Key Routes program
- Improve enforcement of parking in bus zones along the corridor
- Improve snow removal at bus stops
- Implement transit signal priority at signals being upgraded along Warren Street so they can be coordinated with potential future efforts to create bus lanes or queue jump lanes
- Improve fare collection
 - Increase CharlieCard retail sales terminals (RST)
 - Better publicize RST locations
 - Increase the minimum CharlieCard upload value at on-board fareboxes

Long Term Recommendations

- Improve circulation in and around Dudley Station to reduce service delays
- Implement an express service/add more buses to the Route 28
- Improve overall service in the Roxbury/Dorchester/Mattapan area:
 - Increase frequency on the non-key routes
 - Prioritize major capital investments as money becomes available
 - Light rail extension to Dudley Station and beyond, or
 - Silver Line extension south of Dudley Station
 - Create bus lanes and/or queue jump lanes along Warren Street and/or Blue Hill Avenue to increase service and frequency

Gaps in Existing Recommendations

The transit planning work around increasing service and reducing delays has been extensive over the years in this corridor. The gaps that exist aren't from a lack of ideas for how transit can be improved, but rather a difference of public opinion on what is the most palatable option from the public's perspective. The 28X enhancements would have improved transit service in the corridor, but the speed at which decisions needed to be reached and the overall design of the improvements caused disagreement within the community. Commonalities exist among overall goals of improving service, having more frequent and reliable service, and creating safer well-designed facilities; what remains is to find the best way of improving service while balancing community interests.

¹⁴ Warren Street Bus Enhancements, Washington Street Corridor Coalition,

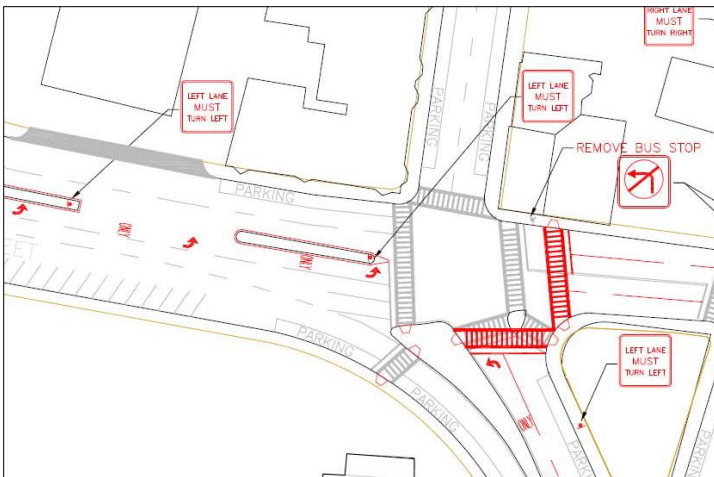
Vehicular Improvement Recommendations

Warren Street provides a connection point for both local vehicular traffic accessing the numerous residential neighborhoods along the corridor, and a regional connection between the Dudley Square area and Blue Hill Avenue. In our review of existing plans, there continues to be a juggling of right-of-way needs along the corridor within the various recommendations. There seems to be consensus among many of the planning documents that this corridor should be treated as a transit priority corridor given the high volumes of buses traveling to and from Dudley Station and Ruggles via Warren Street. There is also some consensus among the various plans about the need for congestion reduction at the intersection of Warren/Harrison/Dudley, and the need to maintain visible and instructive roadway striping for vehicular traffic.

Short Term Recommendations

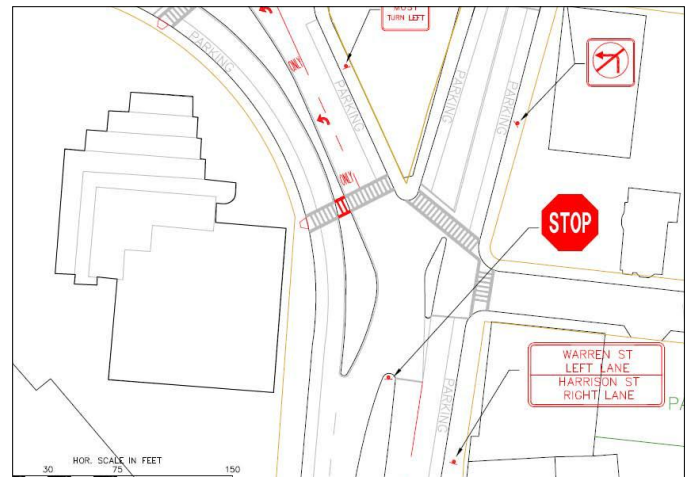
- Intersection of Dudley Street and Warren Street
 - Add pavement markings and signage to delineate left turn only lanes
- Intersection of Warren Street and Harrison Avenue
 - Introduce stop sign to the Warren Street northbound approach and give right-of-way to Harrison Avenue southbound instead. This is not expected to help congestion at this intersection, but it is expected to ease congestion at the intersection of Dudley Street and Harrison which has much shorter storage lanes than Warren Street northbound.
 - Add directional signage on Warren Street northbound to let drivers know which lane goes to Harrison and which goes to Dudley.
 - Re-stripe pavement markings along this roadway segment
- The City of Boston will be replacing several signals at intersections along Warren Street in the next few years.

Potential Improvements at Warren St/Dudley St Intersection



Source: Dudley Square Transportation Action Plan

Potential Improvements at Warren St/Harrison Ave Intersection

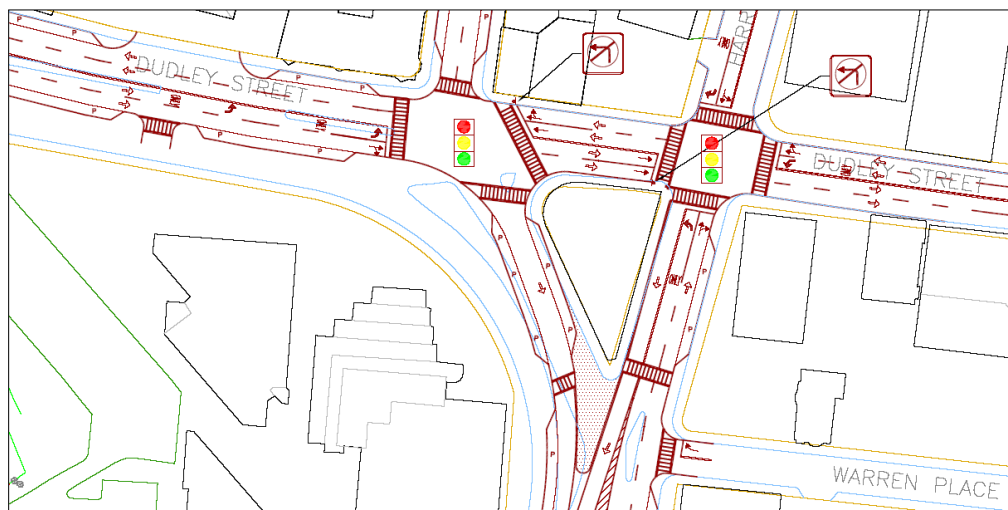


Source: Dudley Square Transportation Action Plan

Long Term Recommendations

- Intersection of Warren Street and Harrison Avenue
 - Prohibit northbound left turn on Warren Street, extend island separating Warren Street and Harrison Avenue to create large pedestrian area with landscaping and street furniture.
 - Maintain two northbound travel lanes on Warren/Harrison, and one southbound lane on Warren/Harrison up until the point where Warren and Harrison merge near the courthouse.
- The Dudley Square Transportation Action Plan calls for a reduced roadway width of Warren Street and Dudley Street to add parking in some locations, expand the sidewalk widths, and reduce pedestrian crossing distances.
- The Assessment of Dudley South Corridor calls for utilizing the full right-of-way to accommodate both bus lanes, queue jump lanes, vehicular travel lanes, and turn lanes at some signalized intersections. These recommendations apply to the full length of Warren Street from Dudley Street to Blue Hill Avenue.

Potential Overall Improvements along Warren St, Dudley St, and Harrison Ave



Source: Dudley Square Transportation Action Plan

Gaps in Existing Recommendations

There are many similarities in the recommendations for vehicular movement and safety along the corridor such as improvements to circulation patterns in Dudley Square and adding signage and striping to the roadways to improve driver decision making and awareness. Gaps exist, similar to those in the transit section, about how the right-of-way should be balanced among modes.

Conclusion

The numerous transportation plans and studies that have been undertaken along Warren Street over the last several years have laid out a number of short and long term recommendations. Many of the recommendations are viable in the short term, but many involve longer term infrastructure investments and community dialogue about the priorities given to the different modes of transportation and how to allocate the available right-of-way. This report provides a starting point which the community, CDCs, and the City of Boston can use to engage residents and businesses in a longer term conversation about how to accommodate all modes of transportation along Warren Street in a safe and efficient way.

Appendix

Information on transportation plans reviewed as part of this report:

Roxbury Master Plan

- Agency – Boston Redevelopment Authority, City of Boston
- Publication Year – 2004
- [Source](#)

Dudley Square Transportation Action Plan

- Agency – Boston Transportation Department and the Boston Redevelopment Authority, City of Boston
- Publication Year – 2009
- [Source](#)

28X Enhancements Project

- Agency – MassDOT
- Publication Year – 2009
- [Source](#)

Assessment of Dudley South Corridor

- Agency - Central Transportation Planning Staff, on behalf of the City of Boston
- Publication Year – 2009
- [Source](#)

Washington Street Corridor Coalition Bus Enhancements Project Recommendations

- Agency - Washington Street Corridor Coalition
- Publication Year – 2009
- Source – Requested memo from Washington Street Corridor Coalition

Roxbury/Dorchester/Mattapan Transit Needs Study

- Agency – MassDOT
- Publication Year – 2012
- [Source](#)

MBTA's Key Routes Planning Initiative (MBTA)

- Agency – MassDOT
- Publication Year – 2012
- [Source](#)

Dudley Station Improvement Plans (MBTA)

- Agency – MassDOT
- Publication Year – 2012
- [Source](#)