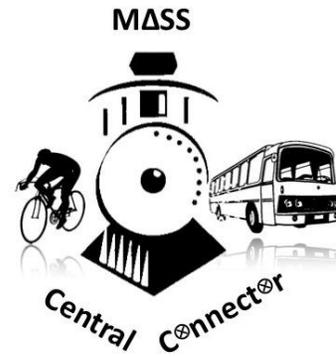


Mass Central Connector Study

The Minuteman Advisory Group on Interlocal Coordination (MAGIC) is a sub region of the Metropolitan Planning Council (MAPC). MAGIC is comprised of 13 municipalities: Acton, Bedford, Bolton, Boxborough, Carlisle, Concord, Hudson, Lexington, Lincoln, Littleton, Maynard, Stow, and Sudbury. MAGIC generated several transportation products throughout 2009 concerning priority comments from “MAGIC MOBILITY” meetings regarding suburban mobility services and constraints in each town. The region has voted to spend special assessment funds on two studies in 2010, including a suburban mobility study for the region’s towns and a feasibility study for a shared bicycle and bus rapid transit (BRT) path along the Mass Central Railroad right of way. A major goal of the studies will aim to reduce congestion in the region and dependence on the car as the major mode of ground transportation and increase use of public transport through shared trips and intermodal passenger transport.



The Mass Central Branch Study, extending west from Waltham to I-495 will examine the feasibility of the path to function as a shared bike and busway corridor. MAPC will take a broad look at the corridor and devote a significant amount of time to gathering data on the community level for support of these ideas. Components of the project include outreach, further research and literature review, site examination, use & ridership and final recommendations.

A central component of this study will be to engage the communities along the Mass Central Connector corridor to determine their level of support, understand community concerns, and coordinate all stakeholders to develop recommendations for the future use of the corridor. Coordination amongst the communities is an important factor in the outreach. The trail currently presents issues of bridge reconstruction, and numerous right of way constraints that have emerged over the years.

Design/Routes



Preliminary designs and endpoints are still being examined in efforts to develop the most connected and networked system for users. Exclusive facilities offer significant potential for speed, reliability and safety improvements since they physically separate BRT vehicles from the general stream of traffic, eliminating the potential for general traffic to encroach on the BRT lanes. Because other traffic cannot interfere with BRT vehicles, service can be operated safely at much higher speeds between BRT stations. The physical width of right of way and sections of the corridor will determine the feasibility for design options. Planning designs via examination of satellite and GIS maps, current planning projects, community meetings and past CTPS reports however, have presented a number of possible options. The Connector would serve as a relief from congestion by providing an alternative gateway for commuters to the



economic hubs along Interstate 495, the Route 128 corridors, and possibly beyond to Boston proper. The study will focus on the 16.5 mile distance between Interstate 495 and Route 128. Research will examine the shared bus/bike corridor between two possible multi-modal transportation hubs located at either end of I-495 and Rt-128. Due to the right of way's convergence with the Fitchburg commuter rail line in Waltham, the option of split service of bike and bus service to points further east along the right of way into Alewife or Boston will be considered for future service connections through separate bike or bus routes.

Currently, a Cavalier Coach Service from Northborough to Boston has been an option for the towns in the area acting as a shuttle (seating capacity is for 55 riders) to/from Boston twice a day during peak times. The route started as a demo project in January 2009, with a one-way fare of \$6 and an approximate one-way trip time of 60 minutes. There is a possibility that it may be consolidated with the Marlborough to Boston route (this route has been in service for over 30 years). However, Cavalier Coach does not know of its immediate future plans. A subsidy was taken away from Cavalier Coach over a year ago. There is a general average of 80-100 total riders per day for both routes. This service could be utilized as a private carrier to/from Boston and the proposed Rt-128 Hub.

The study design of the corridor will serve to foster both bicycle use and effective bus-rapid transit service. By incorporating busway service with a bike path, service will seek to capture greater ridership along the corridor, rather than a single bike path design. Environmental comments from both the towns of Sudbury and of Wayland, along with current and future plans for bike path connections with the Assabet River Trail running north and south through Hudson, and the southern portion of the Bruce Freeman Rail Trail (former Lowell-Subury Rail Trail- connecting from the north into Sudbury) have contributed to proposed station positions and limited BRT route stops. The Connector BRT will seek to intersect with the coexisting bike trails.

It will operate with longer distances between stations- roughly spacing one in each town, and as a result operate with longer headways. Headways would utilize ITS technology with the need for priority signalization at the over 50+ at-grade crossings, detection technology for passing and bus corridor safety. The run times would be dependant on path and bus-lane designs, however the path will give priority to bike path transit with the possibility for only peak-time bus operations or private shuttle operating use. The corridor will aim to utilize two bike lanes, with widths according to MassHighway design guidelines for standard bike lanes (4-5 feet), and the addition of a buffer to the bus/shuttle lane (13-15 feet wide minimum total with buffer). Station pulloffs would be utilized for stops and passing. Stations or stop areas would need an additional 15 feet to accommodate the right of way and station.

During peak times, more buses could be utilized or bus service could be bunched from 30 minute headways to 20-22 min headways. Ultimately, speeds faster than 30 mph (typical urban speed of vehicles operating between stations 1-2 miles apart) would need to be achieved. The Connector BRT trip would have to operate in less time, than driving the route in a personal vehicle (i.e. from downtown Boston without traffic a trip to Hudson is 47 minutes... a shorter trip along the corridor (between 495 and 128 points) via a local route (rt-62 to rt-20) according to Google maps, is 37 minutes. The headways would need to aim to complete the trip between the 495 Hub and 128 Hub in 20-25 minutes to make the route worthwhile for passengers.



Multimodal Hubs

We are proposing five stations total: two multimodal endpoint hubs and 3 town stations.

The first hub located at the furthestest point west in the corridor at Interstate 495, could sit in an open parking lot area adjacent to Blue Star Memorial Highway and Coolidge Road. This hub would serve commuters along the I-495 corridor, Route 62 running east through Berlin and overflow commuters from Route 117 just north of the possible hub location.

Additionally, the I-495 corridor anticipates increased traffic from the new 820,000-square-foot retail mall development along Route 62 in Hudson and Berlin, just off the Interstate. *Highland Commons* will consists of 87 acres in Berlin and 76 acres in Hudson, with 20 stores, a bank, a gas station and a 29,400-square-foot office facility. The hub would serve to alleviate congestion along Route 62 as well as I-495; and connect traveler to the Mass Central Connector for alternative transit or access to a safe bicycle route serving points east along the corridor.



The second hub would serve the Route 128 business corridor. This multimodal station has already been in discussions. This study suggests the 128 Hub to sit adjacent to Rt-128 on the west side in an open lot south of Jones Road, currently being used for parking and a ground stone business. The hub would serve commuters along the dense business corridor coming from Route 20 just south of the station, the Fitchburg commuter line, and travelers along the I-95/ Rt-128 corridor. A multimodal station would provide access and connections to the Fitchburg Line, bus or shuttle service to businesses along 128 corridor, continued bike path connections to point east through Waltham, and possible continued bus service into Boston proper. At this point the MCC Connector would split to alternative destinations depending on chosen route. This hub would also mean the consolidation of two of the commuter rail stops in Weston along the Fitchburg line.

Stations

The two hubs located at either end of the corridor will encompass two of the possible five stations along the Mass Central Connector. The remaining three stations would be suggested for the towns of Hudson, Sudbury and Wayland.

Hudson station could be situated on the east side of Cox Street, adjacent to the Assabet River Rail Trail, with access to Joseph L. Mulready School. The station would serve the more dense (both population and employment) Town of Hudson, and coincide with the existing and developing Assabet Trail.

Sudbury station, according to wetland and aerial maps- could be situated at the intersection of Station Road (along the actual MCC corridor) and Route-20 (Boston Post Road). At this point along Rt-20, the proposed Bruce Freeman Trail intersects with the corridor. This intersection is also roughly 250ft from a shopping center with stores and restaurants and a bed and breakfast just across the street along RT-20.



The route between Sudbury and Wayland station is close to wetland and other environmentally sensitive area. It has been suggested that the route deviate off the MCC corridor to utilize the adjacent RT-20 at these points, however this would dramatically efficiency of the BRT system based on a dedicated right-of-way. Another option would be to elevate the corridor above normal flood elevation. Once the route enters Wayland, it is suggested the BRT station be situated at the intersection of RT-126 and Rt-27 in a parking area east of both roadways, adjacent to the Wayland Public Library. This stop is also roughly 300 meters east of Wayland Shopping Center and within walking distance of the town hall.



Parking & Connections

There are currently two pre-existing and functioning Park and Ride's along the corridor: one along sits on the proposed 495-Hub, and the other is present at the proposed Sudbury stop, along Rt-20 and the proposed Bruce Freeman Rail-Trail bike path. However, due to the recreational focus of the route, it would be suggested that additional parking for the connector only exist at the other end Rt-128 Hub.

The current are of the study utilized a station service between the I-495 and Rt-128; however community outreach has breached the question of what happens at the end? Three suggestions have been developed to answer this as recommendations for future study and next step connections for service and destinations. They are:

1. The MCC bus service ends at the 128 Hub and connects with feeder bus service along the 128 business corridor.
2. The MCC bus service continues after the 128 Hub station stop moving north along Rt-128 diverting on Rt-2 east to Alewife Red Line MBTA station.
3. The MCC bus service continues after the 128 Hub station moving east toward central Boston along the MassPike (Rt-90) stopping at South Station in downtown Boston.

Buses

Vehicles utilizing the transit lane would be electric or clean-fuel, with suggested articulated buses to utilize on-board bicycle transport. The shared corridor design would entail speeds greater than 30 mph.

Key points for service and station selection will keep in mind:

- Focus growth and development expected in both I-495 & Rt-128 areas of the region.
- Alternative transportation options with service to surrounding communities and connections from transportation hubs.
- Physical feasibility of joint bus/bike service along the corridor.
- Increase use of both bus and bike-way



Examples

Alone, both bike and BRT designs and initiatives have been utilized around the globe. The use of a shared corridor, however has limited examples. More specifically, the suburban area that is presented with the Mass Central Connector presents the joint BRT/bike corridor along the abandoned rail trail as a first of its kind within the U.S. according to its location. Examples that mirror the innovative schemas most closely can be seen in the following cities:

L.A. (Orange-Line): is a two-lane, 14-mile, dedicated busway fleet of 60ft/57 passenger articulated vehicles powered by compressed natural gas that crosses 34 streets and five mid-block pedestrian crosswalks, with loop detectors installed at each of the signalized intersections. It uses rubberized asphalt and sound walls on portions of the busway to reduce noise impacts on adjacent neighborhoods. Metro also built eight miles of bicycle/ped paths adjacent to the busway, with designated on-street bike lanes for the remaining six miles. The line has 14 stations spaced roughly one mile apart and primarily located near major residential areas, activity centers and major north/south arterials. Stations feature variable message signs and real-time bus arrival information. Each station also offers bicycle racks and lockers, covered seating, telephones, lighting, and security cameras. Six stations have park-and-ride lots, supplying a total of 3,800 free parking spaces. The corridor runs parallel to US 101, also known as the Ventura Freeway. Initially, Metro considered building rail in the corridor, but this was deemed neither cost-effective nor politically viable similar to MCC.

Oakland, CA: Oakland's portion of the 17-mile East Bay Bus Rapid Transit line is proposed to include dedicated bus and bike lanes across its entire length accompanied by significant pedestrian improvements, creating what could be the longest complete street in California. It's not actually one street- it's two streets, and the middle portion (downtown) will not have dedicated bus lanes because buses already occupy most of the roadway during commute hours.

The BRT plan promises to be a radical improvement to an extraordinarily long transit corridor, potentially serving 40% of the city's population. This BRT is uniquely beneficial to bicyclists because without BRT, there would be no bike lane on Telegraph Road at all. Oakland's 1999 Bicycle Master Plan EIR was successfully challenged in court, and the 2007 Bicycle Master Plan had to abandon bike lanes on Telegraph (using instead the Webster-Shafter route). Oakland's transportation planners took advantage of the opportunity afforded by BRT to rethink Telegraph, and brought this much-desired bike lane back from the dead.

Bogota, Columbia: Has 350 km of dedicated bikeways –largest system in developing world. The bikeways and pedestrian ways work as intermodal connections to the BRT TransMilenio System. The BRT uses the operational scheme comprises trunk-route services including express services and ordinary services, and feeder services. The infrastructure comprises exclusive lines for the System's articulated buses; passenger access to stations through pedestrian bridges and tunnels; platforms, bays, small squares, and avenues. In addition, it has ways for feeder services, closed areas for bus parking and maintenance, and support infrastructures for system control.

The **Main Network** connects the main centers of the city in a direct manner, connecting the main work and education centers with the most populated residential areas, and receiving the flow from secondary networks. The **Secondary Network** leads riders to the main network, connecting housing centers/attraction centers & parks with the main network. The **Complementary Network** links and provides continuity to the network with additional bike paths to complete the mesh system and to



distribute bicycle traffic on specific areas. It includes a recreational network, local networks and a system of long green areas. Parking for cars restricted to end stations, the TM carries 1 million people per day on 66km of lines, 21% of users used to go to work by car, 70% of riders reach stations by bike or foot. However, there is limited access from peripheral areas beyond central city's flatlands, as well as incongruity between world-class bikeways and undeveloped surroundings, expansion is underway for overcrowding bus issues because of underdeveloped city bike network.

Curitiba, Brazil: The origin of Bus-Rapid Transit, Curitiba is currently experimenting with adding bypassing lanes on the dedicated BRT routes and smart traffic lights to prioritize buses. They are also constructing a new line which will have a linear park and 18km of bike lane that parallels the bus transit route.

Johannaesburg S. Africa: Partnering with the Clinton Climate Initiative, contractor ITDP is providing direct technical assistance to Johannesburg for planning the *Rea Vaya BRT system* to help accommodate World Cup Soccer visitors.

The system places over 85 percent of Johannesburg's population within 500 metres (547 yards or .3 miles) of a main or feeder bus corridor. Plans for Phase 1 of the new system call for a total of 94 kilometres (58.4 miles) of trunk corridors encompassing a total route length of approximately 148 kilometres (92 miles). Seven routes have been selected in order to give customers maximum flexibility and as few transfers as possible. Rea Vaya aims to incorporate many of the features associated with a full BRT system, including pre-paid boarding, dedicated bus lanes, and real-time bus arrival information displays for customers. An extensive effort will also be made to integrate the system with an array of other services, including feeder vehicles, pedestrian corridors, bicycles, metered taxis, and private cars.

Jakarta: TransJakarta has expanded to seven corridors and currently serves over 160,000 passengers a day. Travel time across the entire corridor has dropped by one hour during the peak period. Over 20% of TransJakarta passengers have switched from using private cars for some trips, and carbon dioxide emissions alone are being reduced at the rate of 20,000 metric tons a year. Daily ridership was expected to reach 300,000 as the system expanded to ten corridors by early 2008.

Local examples of studies that have taken place include the February 2004 VHB writeup of the "Connecticut River Crossing Transportation Study," the crossing looked at BRT vs. Light Rail alternatives along a populated area within commuting distance from a major Central Business District (CBD) and would replace the Route 9 Express Bus. It was to run on the existing Norwottuck Rail Trail or on a alignment north of Rt-9. This case is the most similar to the situation presented with the MCC, without having to consider at bike path.

Three new busways have also been examined in the Hartford area: The New Britain-Hartford Busway, Manchester-Hartford Busway and a possible study of the Griffin Corridor. The planned BRT services include local all-stop service, direct service (suburb to downtown), and airport service.

San Diego, CA is also updating their bus service incrementally to reflect BRT; and have a burgeoning bike culture which should be taken into consideration and anticipated with upgrades.

Appendices of Corridor maps attached.

