DESIGN PUBLIC HEARING

COMMENTS AND RESOLUTIONS FOR BEACON STREET PROJECT

Dated February 4, 2013

Patricia Leavenworth, PE., Chief Engineer
MassDOT - Highway Division
10 Park Plaza
Boston, MA 2116-3973

Project file #: 607209
Beacon Street
July 15, 2013

Attn: Shawn Holland, Project Management section

Dear Ms. Leavenworth,

As requested by MassDOT via e-mail, the City and their consultants, Design Consultants Inc. has had an opportunity to review and consider all written comments related to the above reference project received to date. As directed in the referenced e-mail DCI has not responded to each and every comment but has instead grouped comments into categories such as "stakeholder " and "key design concerns". Additionally, MassDOT asked that we address specific comments from Domenic Ruccio, Samantha Coren, David Olmsted, Bruce Kulik, Paul Schimek, John Allen, and Astrid Dodd. Our response is as follows:

Draft Summary of Public Feedback and Hearing Comments Received to Date

Residents

Concern about reduced supply of on-street parking and more competition of the limited remaining number of spaces not only on Beacon Street but surrounding streets. May have to walk a long distance to find an available parking spot.

Response: DCI's parking study dated July 2012 concluded that within zone one or the area where the cycle track is proposed, the average overnight occupancy was only 41%. Occupancy in close proximity to Oxford Street was significantly higher than average close to 80% and near Museum Street (2000 feet away) it was as low as 2%. Given the data that has been collected, it is anticipated that a slight inconvenience is anticipated. We estimate the worst case scenario to be approximately 500 feet or the length to access an average bus stop.

Residents on the north side will now have no on-street parking spaces. Some residential locations have insufficient or no on-site parking available to them. Concern about reduced property values and inability to rent apartments with loss of on-street parking in front of residential homes and apartments.

Response: Many streets in Somerville and surrounding communities have parking only on one side or no on street parking at all. The City acknowledges that this is a significant inconvenience to the tenants and property owners. To mitigate this inconvenience the City plans to review the parking regulations, evaluating loading zones and opportunities for off street parking.

Residents use on-street spaces to load and unload their vehicles with children, groceries, elderly or disabled parents, etc.

Response: All loading spaces currently designated as loading will remain in close proximity to their current location.

Feel that cycle track benefits primarily bicyclists, many who are not neighborhood or City residents. Bicyclists comprise only a small percentage of Beacon Street users and stakeholders.

Response: The concept is not a cycle track design, it is a Complete Streets design. This means that the City desires to redistribute the equity of the Right of Way by balancing its use between all modes. The City sees the underutilized parking as an opportunity to allocate more equity to the bicyclist. The cycle track concept is born from the fact that it allows individuals that may typically be outside the cycling demographics to ride. This includes older and younger riders as well as individuals that would typically not have the confidence to ride within the road in an urban condition. It is anticipated that these individuals are local first and regional second. Additionally, the limited economic studies that are available show increase revenues for businesses and the enhanced public amenities are anticipated to increase the value of the residential properties.

Residents and businesses feel the parking study is flawed and will still have a problem with parking during overnight hours. City conducted parking study concludes there is adequate parking for residents and businesses within a ¼ mile walking radius. Found that many parking spaces are being used all day by City residents who do not live in the area but come there to park and use nearby MBTA Red Line service. City believes with better parking management and possible public use of private parking lots, proposed elimination of on-street parking can be mitigated.

Response: Correct.

Handicapped Resident at 301 Beacon Street wants to know what happens to his HP space in front of his residence.

Response: The City is looking into relocating the accessible space to next closest location. It appears that the next side street which is approximately 100 ft from the dwelling. The existing space has no accessible route to the dwelling without traveling within the roadway to the next side street. The new space will be adjacent to a curb cut.

Business Owners

Rely on on-street parking for customers and deliveries. Customers will not frequent their businesses if they cannot find a parking spot close to their business. Special concern to businesses on the north side where on-street parking will be totally prohibited.

Response: Parking was shifted from the north side to the south side to accommodate the majority of the businesses. There are four active businesses on the north side of the street. Two of the businesses have significant off street parking and parking does not appear to be a problem. The other two businesses are located at street corners and the City is committed to adjusting parking and loading regulations on the side street to ease the inconvenience.

Received several comments from employees, Manager and patron of Dali's Restaurant at corner of Washington Street expressing concern how elimination of on-street parking will make it difficult for patrons, and some employees, to find an available space which could hurt businesses in that area and mean some employees may lose their jobs. They say they are not anti-cyclists, but their concerns are about job preservation and preserving their livelihood working in these restaurants. There are no public parking lots in that area and most on-street spaces are for residential permit parking.

Response: Dali is located at the very end of the cycle track section. This means that the cycle track will not affect any parking on 3 of the 4 approaches to intersection. The one approach that is affected is west of Dali and across the street. According to the parking study this area is one of the most underutilized (parked). The utilization may be attributed to the fact that this area is metered and given the transient parking environment the meters prohibit long term parking to and from other areas

A Petition expressing opposition to the elimination of parking was placed in three Beacon Street businesses. During a two-week period, over 780 people signed this petition. Those signatures represent residents, business patrons and business owners.

Response: Most projects have people in favor of them and people not in favor of the them. 780 signatures are significant and the City has not taken concerns lightly. The City however must weigh all modes of transportation and then distribute the R.O.W. equity accordingly. As present, the equity in the R.O.W. is overwhelmingly in favor of motor vehicles and redistribution is necessary.

How will deliveries be made to businesses on the north side? No place to park. Maybe forced to double park in the 11 foot travel lane or Cycle Track as witnessed by recent oil deliveries.

Response: For the two functioning businesses, the City is investigating loading zones on the side streets. Through the public process we found out that the loading zones are used for short term

parking as allowed by the City. As for double-parking of fuel trucks, this currently happens and will continue to happen in non-peak hours.

Businesses heard from include Laundromat, Hair Salon, Deli/Convenience Store and Restaurant. Know of only 1 business (Pet Supply) who believes the cycle track may be good for businesses. Bicyclists note some studies on West Coast that said more bicyclists is good for local businesses.

Response: We also heard extensively from the Biscuit that said he too is convinced that his business will flourish under the proposed plan.

Pedestrians

Removing parking on the north side means more people having to cross busy Beacon Street and the cycle track. Impacts residents and business patrons.

Response: Throughout the project new crosswalks were added. One was added at Oxford Street, and another at Prentiss Street. Additionally, a sidewalk has been added between Museum and Park Street on the south side of Beacon Street, which will reduce the need to cross at Museum Street, as pedestrians are currently forced to do.

Maintain existing and consider new crosswalks at Oxford Street, at Prentiss or Forest Street, O'Sullivans and Sacramento St/Shaws, and Museum Street. Existing and proposed crosswalks are spaced too far apart or not at desired pedestrian crossings.

Response: Need to spell out changes.

Potential Cycle Track/Pedestrian Conflicts and /Accidents with people walking cross or along/within the Cycle Track, getting in and out of parked vehicles, on/off MBTA buses, etc

Response: The proposed design incorporates a brick accent strip between the pedestrian space and bicycle space. This creates a color and textural contrast to help distinguish the areas. Additionally, in this space vertical elements are included to separate the two areas. The vertical elements include utility poles, trash receptacles, trees and benches. Pavement markings and signage will direct the different users. Pavement material will also be different, concrete for the sidewalk, asphalt for the cycle track. As for the buses, Beacon Street has no bus route for a large majority of the section of roadway that includes the cycle track. Elsewhere, the City is working with the MBTA to relocate stops away from the cycle track while maintaining service. The stops near Park Street are proposed to be moved to Park Street and the stops west of Washington Street are proposed to be moved east of Park Street. All bus stops will be outside the cycle track area.

Concern about speeding bicyclists who do not yield to pedestrians and bicyclists at night who are not very visible. Are there laws and rules pertaining to Cycle Tracks such as bicycle speed, giving audible warnings, yielding to pedestrians in the cycle track, make travel in same direction as roadway, etc. Legal grey area as Massachusetts law has no definition for cycle tracks.

Response: Laws that pertain to cyclist behavior in general apply equally on cycle tracks, including yielding to pedestrians and traveling in the designated direction. Speed limits for bicycles are uncommon (on cycle tracks and elsewhere) and difficult to enforce since most bicycles lack a speedometer.

Safety concerns for the elderly, children, and the disabled including hearing and visual impaired pedestrians.

Response: There will be a clear separation of space for the pedestrians and cyclist (As mentioned above) thereby eliminating these conflicts. In addition, providing cyclists with facilities that keep them separate from motor vehicles usually helps keep cyclists from riding on the sidewalk.

The cycle track will reduce the LOS for pedestrians.

Response: Pedestrian Level Of Service is a function of the volume of pedestrians and the width of the sidewalk. The work being proposed will not reduce the width of the sidewalk nor or significantly increase the pedestrian volume. Therefore no decrease in LOS for pedestrians is expected.

Concern cycle track users will use sidewalks if encounter cycle track obstructions and at the ends of the cycle tracks, instead on going on-road.

Response: If a cycle track user decided to use the sidewalk for travel along Beacon Street they would have to disobey signage and striping and negotiate the vertical elements to gain access to the sidewalk or pedestrian space. Some cyclists ride on the sidewalk today. The proposed improvements provide separate and distinct spaces for pedestrians and cyclists, which will reduce the amount of bicycles on the sidewalk.

Several comments about no brick or granite edging at crosswalks as they present a hazard to pedestrians and bicyclists.

Response: The City is currently reviewing their standard with respect to brick crosswalks.

Bicycle Accident Analysis and Cycle Track Justification

No information on the specific locations and causes of bicycle related accidents along Beacon Street. Are accidents along Beacon Street mid-block or more at intersection? Are accidents the result of car dooring, poor roadway pavement, drivers making right turns colliding with bicyclist they did not see, motorists running red lights, cyclists following vehicles to closely, and/or motorists and bicyclist ignoring traffic lights, signs and the laws of the road. How will this cycle track design and overall project address existing and potential future bicycle accidents, and improve overall safety of bicyclists.

Response: DCI garnered record information from MassDOT, as well as the City of Somerville Police Department. The level of detail was limited with respect to how the crashes actually occurred. All information that was available is now in the Functional Design Report.

With respect to how the cycle track will address these issues; cycle tracks are designed to reduce accidents especially at mid-block. For this project the design will reduce accidents at pedestrian/bicycle conflicts at the four bus stops by slightly relocating the bus stops. As for the intersection design, vehicles are moved back and away from the intersection by a low planted area specifically designed to enhance sight distance. The removal of these vehicles is required under MUTCD and hence must be removed regardless of whether a cycle track or a traditional bike lane is designed. Additionally, as the design progresses, raised crosswalks and cycle tracks will be investigated if raised crossings are used on the minor side streets the vehicles will be forced to make very slow and deliberate turn thereby reducing the conflict further.

Lack of documentation that Cycle Tracks will be safer than bike lanes. Is the City and bicyclists falsely assuming Cycle Tracks are safer? Are cycle tracks in this location really going to be safer than bike lanes? The need for cycle track users to cross a number of driveways and intersections (23 driveways and 7 cross streets on the north side of Beacon St) and to transition from the cycle track to bicycle lanes at two locations, may lead to decreased comfort and safety for bicyclists, esp inexperienced bicyclists including children.

Response: Because cycle tracks are relatively new in this country there is still a lack of quality studies. It is the opinion of many that the cycle tracks are safer at the driveways than bike lanes. This is because the speed at which a vehicle must negotiate the turn up and over the sidewalk and cycle track. Also with the bicycles on the inside of the vehicles exiting the driveways (many of which are backing up) this enhances the visibility for exiting vehicles. We spoke about the intersections above and the protocol for assuring safety at intersections.

Potential increase of right hook accidents between right turning vehicles and Cycle Track users, esp that side where there is on-street parking that obscures motorists visibility of cycle track users. Need adequate sight distance at intersections and driveways so motorists and CT users can see one another and properly stop and/or yield. Note – needed sight distance varies with bicycle speed. Need 165 ft sight distance at each side street and driveways if have 20 mph bicycle speed, 85-125 ft if have 10-15 mph bike speed.

Response: Please see the narrative above regarding intersections, driveways and sight distance.

The design does little to improve motorists visibility of bicyclists in the Cycle Track and provide little protection from vehicles inadvertently riding up the onto the cycle track. The Cycle Track on the north side has a 3 inch high, beveled and mountable curb. Could this be called a raised bike lane vs. cycle track?

Response: The terminology is not critical. What is critical is that the 3" now 2" reveal offers some definition between the bike facility and vehicular space. It is believed that the sloped surface will also offer some deflection properties and with a texture and color difference can offer audible and visual benefits to eliminate accidental encroachment by vehicles

Bicyclists

Most bicyclists seem to support this project including the cycle track. Several supports the idea of cycle tracks the entire length of Beacon Street. However, some bicyclists believe that the cycle track will be unsafe for both cyclists and pedestrians, and that wider bicycle lanes are preferable.

Response: The pedestrian space and the cycle space are well defined as stated above. This should eliminate the majority of the pedestrian and bicycle conflicts. At the 75% stage, design additional detail of the design will be available which should further clarify the separation. Many would prefer wider bike lanes in lieu of the cycle track. To accomplish this, the utility pole and the water and sewer would need to be relocated and hence is not economically viable.

It is worth mentioning that advocates for cycling often have different views of which approach to cycling is safer. The transcripts from the 25% DPH in 1999 mirror the argument of safety. Instead of the bicycling advocates disagreeing on which is safer, cycle tracks or bike lanes, the disagreement then was on which is safer, shared lanes or bike lanes.

Have not heard any comments from bicyclists who like to ride on-road. Will the proposed narrower travel lane/shoulder width of 11 and 13 feet reduce the LOS for bicycling on-road? This maybe important if people choose to ride on-road for a variety of reasons including if the cycle track is not convenient, safe or quick to use.

Response: LOS is not anticipated to be reduced with a 9-foot cycle track on one side and a 5+ foot cycle track on the other. There will be however individuals who prefer to ride in the road, they are called vehicular cyclists. These individuals may ride in the road if they wish, and can use alternative routes such as Somerville Avenue.

Bicyclists admit that pedestrian conflicts could be a problem but they could be eliminated or reduced by proper design/engineering and education.

Response: This is true, as the design matures the detail on signage, striping, channelization and separation of the space will provide ample visual cues to guide all modes along the arterial.

Cycle Track Maintenance is needed to deal with snow/ ice, placement of trash barrels, etc.

Response: The City is well aware of the additional maintenance required to support the cycle track facility and has committed to the maintenance of the cycle travel throughout all seasons.

Park and Washington intersections - the current cycle track proposed from Oxford the Museum street, coupled with regular bike lanes and no new turning lanes, will likely not reduce the actual crash rate for motorists and cyclists. Alternatives to the cycle track (such as turning lanes) should be considered for improving the safety for all users of the road. Washington and Beacon is the biggest site for both cycling and motor vehicle accidents, primarily because cars who wish to continue straight will often go around vehicles waiting to turn while hooking into the bike lane, ultimately putting cyclists at risk. Cyclists feel safer making left turns at busy intersections from actual turning lanes, just as if they were a car (aka vehicular cycling).

Response: Any time a left turn lane is justified by the traffic volume and accident data, vehicular left turn lanes are investigated. This promotes organization and channelization in the intersection which clearly minimize crashes. Additionally, the left turn lane provides an opportunity to design signals with protected movements another significant safety feature. The issue is typical of a lack of Right of Way (ROW). At the intersection of Beacon with Washington Street a left turn is proposed for the Washington Street eastbound approach. The left turning volume coming from Harvard Square in the PM peak is significant and the minimum ROW for a turning is available so a left turn is proposed.

Motorists

Haven't heard or received any comments from motorists. However, one potential concern is that motorists may not be expecting bicyclists swerving off the CT at the end of the cycle track or the mountable/dismountable 3-inch curb on the north side.

Response: Signage, striping and other control elements will be further developed during the 75% design to help illustrate and detail critical areas of concern. For instance we are proposing end islands at intersections to improve sight distance and bicycle boxes to help the motorist in anticipating the cyclists as two examples.

Other

Several comments about the lack of transparency and responsiveness from the City of Somerville. They feel their comments, views and opinions are falling on deaf ears at the City level, and the project will be foisted on citizens despite their stated opposition. It is hoped that this lack of transparency and responsiveness will not be repeated at the State level. They are looking to MassDOT to be more transparent and responsive which I assume to mean they are looking to MassDOT to review comments provided to the City and MassDOT before, during and after the Design Public Hearing, and to suggest or require appropriate and feasible changes to the design plans.

Response: Given initial funding time constraints associated with this project a 25% design was submitted to MassDOT for review and comment in April of 2012. The initial submission had to take place immediately to assure funding. From the original submission MassDOT and the City

agreed that removing of the utility poles and consequentially relocating the water and sewer was not practical or feasible. As a result, a second 25% redesign was submitted in July of 2012. Shortly after that the City started the public meeting process. Initial meetings were not well attended until November of 2012. After that meeting the City decided to hire an independent facilitator to moderate design charrets which occurred in late 2012 and early 2013 with a MassDOT hearing on Monday February 4th, 2013. Throughout this process the City and their consultants have made numerous changes. Most notable changes are: Changing the parking side from the north side to the south side of Beacon Street to accommodate business, making the cycle track 9 feet adjacent to parking to eliminate door zones and vertical transition concerns, creating a 6 foot track on the non-parking side. Additionally, crosswalks were added, bus stops were relocated and the city is looking for off-street parking opportunities. The City feels that these are significant and substantial changes resulting from the community and review process.

The City has not considered, or at least publicly presented for review/discussion other design alternatives that does not eliminate or minimizes the loss of existing on-street parking. This includes the buffered bike lanes alternative suggested by David Olmsted and others.

Response: The City has reviewed Mr. Olmsted's proposal and finds it not to be feasible. We have specifically addressed Mr. Olmsted's proposal later in this letter.

COMMENTS BY DOMENIC RUCCIO

Petition

A Petition expressing opposition to the elimination of parking was placed in three Beacon Street businesses. During a two-week period, over 780 people signed this petition. Those signatures represent residents, business patrons and business, owners. A copy of this petition was mailed to Mayor Curtatone by Certified Mail with a request that the Mayor indicate how this articulated opposition to the Planning Department's plan would be factored into the re-design of the plan. That request was not answered nor was a second request for an answer. A copy of the letter to Mayor Curtatone is attached. A copy of the petition will gladly be furnished to you upon request.

Response: The City of Somerville is in receipt of two petitions one in favor of the cycletrack and one against. The City remain committed to a design that includes a cycletrack and will continue to work with the community to address concerns.

Resolution of Board of Alderman

At its regular meeting on Nov. 20, 2012 the Board of Alderman voted a Resolution, Agenda item 193977, as follows:

"That the City of Somerville's Office of Strategic Planning and Community Development consider alternative plans to deal with the public safety and traffic concerns of pedestrians, business owners, residents and cyclist regarding the Beacon Street reconstruction

project, specific to the proposed "cycle track" installation detailed at the November 13, 2012 community meeting."

This resolution can be found at the City of Somerville web site at

http://Somervillecityma.igm2.com/Citizens/Detail Meeting.aspx?ID = 1578

Response: The City remains committed to a design that includes a cycletrack and will continue to work with the community and the Board of Aldermen's concerns.

Design Review Meeting Nov. 13, 2012

Prior to the design review meeting of Nov. 13th, the City of Somerville has done a conspicuously poor job of notifying the residents and business owners of design review meetings. Notice was given through a posting on the City's web site and through emails sent out to a mailing list. The City also maintains that it made automated calls giving notice of design review meetings. However, until notice was given by a group of private citizens at their own expense, you would have had to search long and hard to find a neighborhood resident or business owner who knew anything about this project. Whatever notice the City allegedly gave was clearly not effective.

Prior to the meeting on Nov. 13th a group of private citizens, at their own expense, mailed notice of the meeting to the Beacon Street neighborhood. Consequently, the Nov. 13th meeting was the first meeting at which there was a meaningful representation of residents and businesses from Beacon Street. That representation expressed strong opposition to the removal of parking from their neighborhood. A videotape of that meeting is available for view at www.BeaconStreetSomerville.org.

It is particularly disingenuous that the Planning Director has represented that this plan was greeted with enthusiasm at prior meetings. The truth of the matter is that those meetings were heavily attended by cycling advocates who were much better informed of this plan and the design review meetings for the plan than the citizens of Beacon Street. Beacon Street residents, by and large, didn't know those meetings were even taking place. Any alleged enthusiasm came from cyclists who may spend 10 minutes a day riding through Somerville, not the people who live and work in Somerville seven days a week, year in and year out. They have only recently learned of this plan and are unequivocally unenthusiastic about it.

Response: The City has had 7 public meetings regarding the project to date. All meeting were advertised using available social media, the City's cable wheel and community notices in the local papers. Over 400 people have signed into these meetings

Neighborhood opposition to this plan centers on several factors:

Flawed Parking Study: The Plan is premised on a flawed parking study that indicates, incorrectly, that there is excess parking capacity on Beacon Street.

Cycle Safety Concerns: Somerville Police Department accident statistics do no support the safety rationale for the current plan configuration.

Response: Very little detailed accident data was available along Beacon Street. The most detailed bicycle related crash data was at Washington Street and improvements were made to mitigate future accidents.

Unanswered questions: regarding snow removal, trash removal, parking restrictions, etc.

Response: This question has been addressed in numerous public meetings and in several locations in this letter.

These issues will be addressed in more detail by other concerned residents who will follow up with you in their emails.

For a representative sampling of pubic opinion regarding this project, I would refer you to the Somerville Patch which has done several stories on this matter. Additionally, a story in the electronic version of the Boston Globe will shed light on the general sentiment of the neighborhood regarding this project. Please see

http://www.boston.com/yourtown/news/Somerville/2012/11/businesses object to proposed.html

In conclusion, it is incumbent on MassDOT to appreciate the high level of opposition to this current plan for the reconstruction of Beacon Street. This plan does not enjoy the support of the majority of residents of, and none of the business owners on, Beacon Street. There is a general feeling in the Beacon Street neighborhood that the City is determined to push this plan through over their objections, regardless of the volume of that opposition and despite the fact that they are the people most significantly impacted by this project.

Response: There has been significant public comment in favor and opposed that has been taken into consideration by all agencies involved in the design review of the Beacon Street project.

It remains a mystery to most of the neighborhood why their best interests are being discounted by the government that supposedly represents them. We all sincerely hope that MassDOT will hear our objections to this plan and call for a redesign of this plan more consistent with the best interests of all involved. Thus far, the design process of this plan as conducted by the City of Somerville, has not been a paragon of representative governance in action; quite the opposite. I write to you in the hope that this regrettable lack of responsiveness to the concerns of its citizens will not be repeated at the state level.

Response: This comment is heard.

COMMENTS BY SAMANTHA COREN

Perceived Safety vs. Actual Safety

The bike accident data provided by the city in their submissions provides no narrative concerning the type of bike accidents that have occurred on this street, only numbers which indicate that the current accident rate is below the national average. There is no data to support how exactly the cycle track will improve the actual safety of cyclists when there is no demonstrated understanding or analysis of why, how or, where these accidents have occurred on this particular street.

Response: The initial Functional Design Report did not contain crash diagrams because detailed information from accident reports was unavailable. Since that time we have received reports that give us a greater level of detail, however we did not receive all of the reports that are registered on the incident report summary list, we only received about half of the detailed reports.

Even without the full benefit of all the reports we were able to shed light on several key elements that impact crashes along Beacon Street. First, of the 34 bicycle related crashes on Beacon Street in a 3-year period from 2009-2011, eight (8) occurred at Washington Street and only 2 others at major intersections. The remainder of the crashes occurred at either minor intersections, driveways or along the road edge. What we can conclude from the Washington Street intersection in particular is that as many as 3 of the collisions involving bikes resulted from a lack of a left turn bay on Washington Street. Vehicles turning left from Washington Street east bound failed to yield to the opposing through bike. Additionally, vehicles edged over on this same approach to proceed around left turning vehicles and encroached on the bike lane on Washington Street hitting a cyclist. Two other types of crashes that occur can be potentially mitigated by utilizing bike boxes at the intersection. A left turn lane and bike boxes are part of the proposed 25% design.

Instead, the explanations for the value of the proposed cycle track design focus more on making cycling more appealing to people who are too timid or inexperienced to bike on the roadway. While I generally support efforts to get more people in my city to bike, I cannot support a type of poorly designed infrastructure that can put them at a larger risk of injury or death. I am ashamed of my local government for valuing the perception of safety over the actual safety of cyclists and their desire to support a design that could create more safety hazards than it mitigates.

Response: The idea that cycle tracks increase risk of injury and death is frequently asserted by a small branch within the bicycle advocacy movement known as vehicular cyclists, who oppose all efforts to segregate bicyclists from motor traffic as a matter of principle. However, this idea is

not supported by the vast European experience with cycle tracks, research, or the experience of other American communities with cycle tracks. By providing physical separation of bicycle, pedestrian and motor vehicle traffic, the proposed project makes a safer environment for all users.

Increased Likelihood of "Hooking" Motor Vehicle/Bicycle Collisions

The cycle track sections will make it extremely difficult for turning motorists to see cyclists who are traveling on the south side when there are parked cars blocking them from view. Since Beacon is lined by a number of cross streets and driveways, the risk of "hooking" style motor vehicle/bicycle accidents is higher compared to a street with few cross streets and driveways. The cycle track study on Copenhagen, which the city cites in the design exception report, shows a dramatic increase of these style collisions after cycle tracks are implemented. For a cyclist to safely travel behind parked cars on a cycle track, they must bike along at an excruciatingly slow speed in order to be able to stop themselves from being "hooked" from turning vehicles that cannot see them.

Existing bike lane and sharrow accommodations on Beacon provide much better overall visibility between cyclists and motorists compared to the cycle track design that's currently being proposed.

Response: Beacon Street in the stretch where the cycle track is proposed has six (6) locations where a potential conflict could exist. Those locations are Oxford Street, Forest Street, Prentiss Street, Sacramento Street, Beckwith Circle and Museum Street. All six of these intersections are anticipated to have a detailed design at the 75% stage to assure sight distance is adequate for a vehicle making a right turn into a minor street. Additionally the design will be comprehensive incorporating signage, striping and landscape elements, thereby enhancing the bicycle awareness.

As for the numerous driveways along the cycle track section, most are residential with minimum trips generated. It is believed that bicyclists are safer on the cycle track than in a bike lane with parking because the exiting vehicles backing from the driveways can see bikes clearly on the inside of the parked cars.

False Sense of Security for Cyclists

The "incompleteness" of the track forces cyclists to transition through alternating sections of cycle track and narrower bike lanes multiple times as they travel end to end on Beacon Street. New cyclists who are comfortable riding in the cycle track may not be comfortable riding in lanes and opt not to continue cycling the entire stretch. Those who do choose to continue biking may be unfamiliar with safe cycling practices for riding in bike lanes and on the roadway with cars, thus putting themselves at a higher risk of injury. Cyclists traveling east on Beacon will not

be fully relieved of the "dooring" risk since motor vehicle passengers exiting onto the cycle track may not be accustomed with the practice of check "blind spots" before opening car doors.

Response: Although parking data confirms that the cycle track could continue to Washington Street (a major cross connector) the trail does break between Museum Street and Scott Street. Given the existing historic wall and the lack of sidewalk the City and their consultants have proposed retaining the wall and providing a sidewalk, which only leaves enough space for bike lane in this area. With respect to urban bicycling, education is the key to safety. The City is considering education with their bicycle committee to introduce Beacon Street and discuss safe biking.

Lack of Safe Roadway Accommodations for Cyclists

The mountable curb section of 6' cycle track will create major hazards for cyclists of all levels as delivery vehicles will regularly have to mount the track in order to not block traffic. This will force cyclists to descend into the roadway and into the travel lane with motor vehicle traffic. The narrowness of this section of track will also force cyclists who wish to pass one another down into the roadway. Inexperienced cyclists descending into the roadway on a frequent basis will put their lives at risk if they do not signal and look for motor vehicles traveling behind or beside them. For motorists, many motor vehicle drivers will not be anticipating this type of movement from cyclists if they carry the belief that cyclist will only ride in the cycle track along these sections of the street.

Response: The section referenced above closely emulates a bike lane. The major difference is that the elevation provides more definition of the bicyclist's space. The sloped mountable section is flat enough for a bike to safely negotiate however with color and texture contrast alert the vehicles that they are out of their lane. As for delivery vehicles particularly fuel truck the condition will be almost identical to the existing condition of the bike lanes today. There will be an interruption of service.

Should the track be built, cyclists will continue using the roadway as it is within their legal right to do so, especially if they do not view the sections of cycle track as safe or if the cycle track is blocked with pedestrians, trash cans, snow, or unloading vehicles. The physical narrowing of the roadway in the proposed design will provide a severely reduced level of service to cyclists since shoulder width for the travel lanes will be virtually nonexistent. The extremely narrow shoulder also poses a serious risk to parked motorists and their passengers exiting on the driver's side since the road is a high volume arterial. The city and its designers have not accounted for this. Cyclists using the roadway in a legal fashion could also be subjected to harassment from frustrated motor vehicle drivers who cannot safely pass them.

Response: The plan is to provide a safe environment for all modes of travel. For cyclists the infrastructure is proposed to be a cycle track. If a cyclist prefers to ride in the roadway, they have

more than one option. The travel lane and parking lane widths proposed are adequate for people exiting and entering parked cars.

Decreased Pedestrian Study

Most alarming to me is the lack of attention to the possibility of dramatically lowering pedestrian safety from both the city, its designer, and cycling advocacy groups. The famous Copenhagen cycle track study the city cites even points out that Cycling/Pedestrian collisions dramatically increase after the installation of their cycle tracks. Additionally, the south side of the road with retained parking and 9' wide cycle track is at the same grades as the sidewalk which could exacerbate these pedestrian/cyclist conflicts.

As both a residential and a commercial street, Beacon has several pedestrians of all ages who will need to cross the cycle track sections on a regular basis:

- residents and visitors entering and exiting motor vehicles
- pedestrians crossing the street
- pedestrians navigating around blocked sidewalks
- joggers/runners passing those who walk
- trash removal workers
- city parking enforcement, etc.

There are no laws that prevent pedestrian usage for "cycle tracks" in Massachusetts - pedestrians would legally be allowed to walk in the cycle tracks. Pedestrians should feel safe in sidewalk areas and not be subjected to having to feel anxious about getting hit by cyclists as they go about their regular activity. Cyclists should not have to worry about avoiding pedestrians on a piece of infrastructure that's designed specifically for their use.

Response: As for the Copenhagen study, if one looks carefully at the statistics they would find that many of the pedestrians/ bicycle collisions occur at transit stops. When someone boards and alights the statistics change dramatically. This is particularly true for alighting passengers who walk directly in front of an oncoming bicycle. For this reason the City and their consultant have been working with the MBTA to relocate the bus stops away from the cycle track without compromising service.

With respect to the pedestrian space and the cyclist, we agree that pedestrians should have their own space and not have to worry about cyclists sharing it. That is why the proposed design has a distinct sidewalk and cycle track, not a shared use path. The sidewalks afforded are wide – the same as the current large sidewalk on Beacon Street that cannot be moved due to utility poles and subsurface utilities. The sidewalks are 10+ feet, which is spacious given the volume of

pedestrians along the cycle track. This provides ample room for the furniture zone discussed earlier and a comfortable width for walking. As stated earlier the furniture zone provide for much of current need including trash, snow, poles, trees, bike racks and benches.

No Public Vetting of Design Alternatives

While not necessarily a safety issue, I feel it is important to point out that Somerville's Board of Aldermen passed a resolution in November requesting the city planners to put forth alternative designs to the cycle track for Beacon Street. This was in reaction to a petition of nearly 800 residents, business owners, and business patrons against the parking elimination aspect of the cycle track design.

These "alternative designs " which appear in the PDF of the design exception report, were not presented publicly during public meetings in October, November, or January. It is misleading when the city and their design firm state that the cycle track design is the one that is preferred by the community when no other designs were formally presented for public consideration.

Response: Several alternatives were created and vetted internally through MassDOT. An example of the alternatives may be the initial 25% design which included relocating all utility poles. Unfortunately, it was determined that because of the utility poles location to existing water and sewer mains located in both sidewalks, that the alternative was cost prohibitive. Moving the poles would require relocating the water and sewer mains.

In closing, I would like to state that I believe that the Beacon Street Reconstruction is certainly a project that is worthy of state and federal funding. It is an extremely vital street in the city of Somerville, not only to the people who live and earn a living here, but also to a large number of commuters in the Commonwealth. However, it would be grossly irresponsible of MassDOT to let it materialize with the cycle track design that is being proposed by the city of Somerville. There are several viable alternative designs for reconstructing Beacon Street to improve safety for all users of the road that are far more worthy of our time and consideration. Please request these from the city of Somerville in order to move forward with this much needed revitalization project.

Response: At least 6 public meetings were held and numerous changes occurred as a result of these public meetings. Changes included: switching of parking from the north side of Beacon Street to the south side, addition of crosswalks, relocation of bus stops are just a few of these changes. Additionally, alternatives such as the Olmsted alternative below was reviewed and evaluated (see comments below).

COMMENTS BY DAVID OLMSTED

Please take a moment to review the following safety concerns I have with the current Beacon Street re-design, which is seeking its 25% approval from your engineers. Below are some bullet points and an attached diagram which illustrates these hazards:

- Studies show cycle tracks cause a large increase in intersection collisions:

  Northbound: 6 cross streets, 28 driveways
  Southbound: 4 cross streets, 21 driveways

Response: Parking is proposed to be removed on the northbound side hence the cycle track emulates a bike lane condition. Southbound intersections were discussed earlier in this letter; each cross street is proposed to be individually designed to enhance site distance and awareness of the cycle track.

- Turning motorists cannot see bicyclist, especially those coming from behind parked cars.

Response: As previously stated there is an entire protocol for the intersection design to enhance visibility and awareness.

- Bicyclists are at risk from cars pulling into and backing out of driveways.

Response: As stated earlier it is believed that bicyclists are in greater danger at driveways from vehicles backing out on to a bike lane verses a cycle track. With the cycle track the bicycle is visible on the inside of the parked cars to backing vehicle. Additionally as you are pulling in a driveway its easier to see the cyclist because they are in front of you. Once the public is educated to cycle tracks it is believed that accidents at driveways will be minimized.

- Pedestrians will walk in the cycle track and stand in it while waiting and exiting the bus - they are legally allowed to do so.

Response: As stated earlier, the sidewalks are ample and the delineation of space significant to minimize conflict.

- Trash cans and snow will be stored on the cycle track

Response: As stated earlier, snow and trash cans will be located in a designated area called the furniture zone.

- Delivery vehicles will park in and block the northbound side cycle track.

Response: As stated earlier, delivery vehicles particularly fuel trucks will emulate the existing condition. Like today there will be momentary interruptions of service, typically in off peak hours.

- Bicyclists will continue to use the roadway when the cycle track is blocked or snowy, or because they find it to be slower and more dangerous.

Response: The majority of the users will use the cycle track as intended. Some type "A" riders will always prefer to ride in the road. If they do decide to ride the road, they have an option, a new bike lane on Somerville Avenue which parallels and complements this proposed infrastructure. Those who prefer to ride in the road may do so, on Beacon Street or on alternative routes.

- No proper accommodations will be provided for bicyclists using the roadway, which is required by state design guidelines.

Response: The accommodation is the cycle track, which satisfied state guidelines.

- Slow cyclists are legally permitted to use the sidewalk.

Response: Where space permits, it is preferred to provide cyclists with a protected space of their own rather than having them share the sidewalk with pedestrians. Beacon Street provides this opportunity.

- Also shown in the attached diagram is a "suggested" design which merits consideration. In this design, sidewalks are narrowed from 10ft to 7ft, and bike lanes are widened from 5ft to 8ft. Creating **buffered bike lanes** outside of the "door zone" can provide ample room and do not prevent bicyclist from using all of the roadway when necessary to pass, prepare for a left turn, etc

- It will be cheaper to implement than the city proposed idea because the road crown does not have to change, nor do the intersection elevations need to be blended, and drainage can remain largely the same.

- This concept makes sense from a cost point of view, if the original line of curb is maintained as the low point for drainage.

- The sidewalk and street pitches do not have a change, because the sidewalk is merely "cut-out".

- The pavement below the parking spaces (along the original cub line) pitched up in both directions, maintaining the original pitch toward the street and pitching up toward the sidewalk.

Response: Several months ago the City's consultant reviewed the buffered bike alternative and completed the following:

DCI took a look at the PEDSAFE Recommended Guidelines/Priorities for Sidewalks and Walkways put out by the US Department of Transportation, Federal Highway Administration. The guidelines state that for arterials and major streets, the minimum sidewalk width is 6 to 8 ft. The guidelines state that for "other major pedestrian generators" the minimum width is 8 to 10 ft. When the sidewalks abut a storefront, the guidelines call for an additional 2' of sidewalk width. This would make the minimum sidewalk width 8 to 10 ft.

The 7' sidewalk in the buffered sidewalk proposal would result in poor service to pedestrians. The effective width of the sidewalk will be narrower than the nominal width because the 7' includes the door area of the parked cars. During the snow season, snow banks will consume the 2' of sidewalk closest to the curb. Along the building side of the sidewalk, pedestrians tend to shy away to avoid damaging clothing. A 7' sidewalk would make any on-sidewalk seating or amenities very difficult, as there would only be a few feet for pedestrians to pass while staying on the sidewalk.

To get an idea of parking, the City's consultant sketched out the proposed section from Oxford Street to Museum Street wrapping the curbing around the utility poles and hydrants (as called for in the handout). This is the portion of Beacon Street that is most impacted by the parking removed for the cycle tracks. This section of roadway currently has approximately 125 parking spaces. The buffered bike lane proposal would retain roughly 70% of the parking. The City's proposed section from Oxford to Museum Street retains about 45% of the parking. (It appears from the review that the buffered bike lane would provide more parking than the current cycle track proposal at the expense of the pedestrian.)

The City's consultant next looked at how the proposal distributes the available right of way relative to the users. The overall conclusion was that if the buffered bike lane over distributes the ROW to bicyclist while taking it away from pedestrians.

The curb-to-curb dimensions are enlightening. The existing curb-to-curb width is about 46'. This is the perceived roadway width when parking spaces are not occupied. Our proposal reduces the curb to curb to 31', which will serve to slow traffic, etc. The buffered bike lane increases the curb to curb to 52', which would likely increase the speed along Beacon Street, which would not be safer for cyclists.

The construction of bump outs required to facilitate the design will be extremely costly and difficult to construct. On linear projects, such as Beacon Street, long runs of straight curb is anticipated and productivity is high with the proposed design, the average run is less than 10 feet prior to a series of reverse cub curves.

Nearly all of the existing trees will need to be removed with the buffered bike lane proposal. There are at least 5 trees over 12" caliber that would be removed under the buffered bike lane proposal requiring a MEPA Plan. Street furniture placement will also be very limited (only at intersections or at utility poles) or parking spaces will be lost.

Plowing will be very difficult. Snow removal vehicles will need to swerve in and out between every utility pole. This might necessitate the need for snow removal to be via Bobcat instead of plow truck. Snow storage will also be very limited. The buffered bike lane scheme has a 7' sidewalk. If 2' of this if temporarily used for snow storage, the sidewalks will only be 5' wide, which is very narrow for a city sidewalk.

For utilities, we found that that an additional 12 utility poles would need to be relocated as their location next to driveways would be too awkward with the curb bumping in to allow parking. There are also some manholes which would need to be remodeled (vs. an adjustment).

We think the bottom line is the buffered bike lane is not a viable alternative. We think that in this situation the impact on pedestrians (and therefore residents and businesses) would be very substantial. We also think the buffered bike lane does not distribute the ROW in an equitable way, like our current proposal does.

COMMENTS FROM BRUCE KULIK

1. The cycle track is a legal grey area that leaves liability and right of way rules undefined.

Massachusetts's laws have no definition for cycle tracks. As currently designed, the proposed cycle track is part of the sidewalk, and therefore considered a pedestrian facility.

Response: The cycle track is NOT designed as part of the sidewalk, it is clearly defined and separated and described in numerous locations elsewhere in this letter.

Massachusetts's law does not specify how a bicycle should operate on a sidewalk, except to say that bicycles must yield to pedestrians, that sidewalk riding is prohibited in commercial districts, and that sidewalk riding is permitted outside of commercial districts unless explicitly prohibited by cities or towns.

Response: The cycle track is not part of the sidewalk, it is only at the same elevation.

Massachusetts's law does not specifically extend the rights and responsibilities of pedestrians to bicyclist operating on the sidewalk.

Massachusetts law goes on to say that motor vehicles must yield to pedestrians within a crosswalk, but also indicates that a pedestrian must not step into the path of a motor vehicle that is so close as to constitute an immediate hazard.

This means that bicycles operating on a cycle track will need to be prepared to stop at every intersection whether there is a green light in their favor or not.

When a collision between a motor vehicle and a bicycle occurs where the bicycle track crosses a street, liability will be uncertain, and will likely be declared the bicyclists fault.

Response: The commenter states that the cycle track is part of the sidewalk and although it is at the same elevation at the sidewalk on the south side it clearly defined and not part of the sidewalk. The sidewalk area is at least 10 feet for all of the cycle track length. The cycle track is 9 feet on the south side. The two spaces are clearly defined by pavement material color contrast, signage pavement markings and more importantly physical vertical elements. The physical elements included in this furniture zone are trees, utility poles, trash receptacles, benches, bike racks, signs, meters and in winter potentially snow and on trash-day, trash cans. The demarcations and the physical constraints create two separate spaces not one sidewalk.

With respect to the statement that bicycles operating on a cycle track will need to be prepared to stop at every intersection whether there is a green light in their favor or not. Whether one is operating a bicycle or a motor vehicle there is always the potential for a pedestrian to emerge from between parked vehicles or at an intersection and the operator must be prepared to stop. And, yes at an intersection with a green light one may experience a pedestrian crossing against the light and vehicles must be prepared to stop. Ultimately, it is anticipated that the all modes will become familiar with and adapt to the new lane arrangement with a heighten awareness and respect for all users.

2. The cycle track has numerous dangerous driveway and intersection crossings.

   Even if the liability issues were resolved by changes to Massachusetts law, there will still be a problem with motor vehicle traffic not expecting faster moving bicycle traffic in a separate stream of the sidewalk.

   In Cambridge there is a bicycle track along Concord Avenue near Fresh Pond that is held up as an example of what this cycle track will be like. I recently traversed that area to see that what it would be like, and within two streets, I was right hooked by an automobile turning right and crossing my path. It was necessary for me to take evasive action to avoid a collision.

   I expect even more problems of this nature on the proposed cycle track due to the larger amount of traffic turning onto side streets.

Response: Beacon Street in the stretch where the cycle track is proposed has six (6) locations where a potential conflict could exist. Those locations are Oxford Street, Forest Street, Prentiss Street, Sacramento Street, Beckwith Circle and Museum Street. All six of these intersections are anticipated to have a detailed design at the 75% stage to assure site distance is adequate for a vehicle making a right turn into a minor street. Additionally the design will be comprehensive incorporating signage, striping and landscape elements, thereby enhancing the bicycle awareness.

As for the numerous driveways along the cycle track section, most are residential with minimum trips generated. Because of the geometric characteristics of the driveway, it is believed that many of the vehicle drivers are required to back out. Many of cycling community feel that the bicyclist is safer on the cycle track than in a bike lane with parking because the exiting vehicles backing from the driveways can see bikes clearly on the inside of the parked cars.

3. The cycle track behind parked cars keep bicyclist out of view of motorist who are about to initiate conflicting maneuvers.

Response: The parked cars protect the cyclist from motor vehicle traffic.

Bicyclists traveling along the cycle track will be obscured by parked cars, and will not be visible to overtaking or oncoming traffic. Right and left turns will be made without being able to determine whether the way is clear.

This will make the problems described above even more serious.

Response: See the response above #2

4. I strongly doubt that the track will be kept clear of pedestrians, debris, garbage cans, and snow.

Response: As discussed throughout this letter, the design includes a furniture zone demarcation of the zones and a commitment from the City to maintain.

Because the cycle track is legally a sidewalk, there is no law prohibiting pedestrians from walking or standing on the path. Instead, we will need to rely on their courtesy to keep the track clear.

Response: The City and the City's consultants believe that the cycle track will be defined well enough so that pedestrians and bicyclists will understand that it is the bicycle facility, not a sidewalk.

On garbage day, trash and recycling container will no doubt obstruct the track.

Response: See above.

Although we have been promised that the cycle track will be kept clear of snow in the winter, I do not believe it. I look to the same promises made regarding Concord Avenue facility in Cambridge. After a recent snowstorm, the roadway was clear, while the cycle track remains with a couple of inches of snow. Ironically portions of the sidewalk had been cleared by abutter and were free of snow.

Response: The City has publicly commented that they are aware of the added maintenance and are prepared to maintain the cycle track.

5. The roadway will not conform to Massachusetts DOT bicycle accommodation standards.

Massachusetts law does not require that bicyclist use a bicycle lane or any other bicycle facility. Bicyclists who understand the risks of the cycle track will continue to ride in the street.

The Department of Transportation has specific guidelines regarding bicycle accommodations (MGL Ch 87). Separate accommodations are defined as a bike lane or should, or combination parking lane/shoulder that is a least 13' wide. Shared bicycle and pedestrian accommodations are defined as a shoulder, in absence of a separate sidewalk for pedestrians.
The guidelines specifically state:
"Where on-street parking is provided, shoulders or bicycle lanes should be maintained between on-street parking and the travel lane."

Response: A separate path for cyclists satisfies state requirements regarding bicycle accommodation.

6. The cycle track will be an uncomfortable ride due to changes in level at street crossings and driveways.

Unlike many of the cycle tracks in Copenhagen, this cycle track will cross numerous private driveways. Again, using the Concord Avenue track as a local example, the track or driveway will need to be adjusted to have corresponding levels. It does not appear that the design of the driveway crossings will be sufficient to allow for an un-interrupted cycle track, which will require a continual up and down motion.

Response: The cycle track on the south side was expanded to 9 feet to create a door zone thus eliminating that potential accident conflict but as an added benefit it provided addition space for the vertical transitions at the driveways. As a result the cycle track will not be undulating up and down at every driveway. At the 6 minor street crossing as stated prior the City and their consultants are looking into the feasibility of raising the crossing thereby eliminating the issue as stated by the commenter and slowing turning vehicular traffic there by reducing the potential for right hooks.

7. The mountable curb will be dangerous to cyclist who need to transition between the track and the street.

   Although the separation between the cycle track and the street - where there is not parking - will be a so-called "mountable curb". This structure will be dangerous for cyclists who need to depart the track for various reasons, such as passing slower traffic, avoiding obstructions, making left turns, or controlling a right turn lane for safety. Crossing the curb in either direction will be an awkward maneuver, but particularly while trying to remount the track.

   Additionally, cyclist on the track who inadvertently drifts toward the street will be met with an unpleasant surprise when their wheel is diverted by the sudden slope of the track.

   Additionally, the curb will be extra slippery in wet or snowy weather.

Response: Initially the mountable curb was proposed to be a 4:1 (4 horizontal for every 1 vertical) that has been modified to 6:1 as part of the continued public input process. Additionally, the city and their consultant will be looking into non-skid surface material for the sloped segment. Also, the experience of other cities that have mountable curbs between street and cycle track (Bend and Eugene, Oregon) does not indicate any problem with cyclists losing their balance. Comments regarding the durability of brick as a paving material for the mountable curb will be considered in later stages of design.

8. The design speed of the track is significantly less than the design speed of the vehicle.

   The design speed of a bicycle should be at least 15-20 MPH. Faster if there is any sort of downhill, even a slight one, as there will be eastbound from Oxford Street.

   It appears that the cycle track design speed will be no greater than 10-15 MPH at best, which will severely impact the effectiveness of bicycle travel.

Response: The cycle track will be built to accommodate the speeds that most cyclists use on an urban road such as Beacon Street. It would be unreasonable to design an urban cycle track in an environment with pedestrians, parked cars, and children for the maximum possible speed that a bicycle can travel.

> In addition to the previous points, if the cycle tracks are built, I would like to see modifications to the design to insure the safety of three streams of traffic.
>
> At each intersection, there will need to be separate phases for the traffic on the main way, and traffic on the cycle track to avoid the conflicts between through bicycle traffic and turning motor vehicle traffic.

Response: See below.

> Even if it is decided that separate phases will not be implemented, the bicycle tracks must be equipped with sensors to trigger the signals, the same as motor vehicle traffic.

Response: See below.

> Alternatively to allow for better sight lines and merging of right turning traffic, the cycle track will need to be discontinued some distance before each intersection to allow for a safe and comfortable merge area. This will likely require that even more parking spaces will be need than is currently contemplated.

Response: There are only 2 signalized intersections adjacent to the cycle track. The two intersections are at Park Street and Washington Street. On all approaches the cycle track ends prior to the intersections and transitions to a bike lane. Bike boxes and bicycle loop detectors are provided. Separate phasing is not need or warranted.

> Finally, I would like to point out that although the separated cycle tracks are claimed to be needed due to high accident rates, that most automobile/bicycle collisions occur at intersection, and not mid-block. In fact the vast majority of fatal bicycle accidents in the Boston area have been "right hooks" caused by traffic turning into the cyclist's path. These cycle tracks will make these types of accidents even more prevalent, not prevent them.

Response: Fatal right hook collisions most often involve a turning truck. A cyclist riding close to the travel lane is often in the blind spot of a turning truck. The additional offset between vehicle lane and cyclists afforded by cycle tracks help reduce the chance of a cyclist being in the blind spot of a turning truck.

COMMENTS BY PAUL SCHIMEK

I would like to point out the following items in this comment letter:

- The known hazards of cycle tracks that have emerged from the research have been deliberately misinterpreted by the City of Somerville's consultants, DCI.

Response: The City and their Consultants have not deliberately misinterpreted available data. This is a slanderous statement and the commenter should consider his statements more carefully.

- Recent bicycle crash data from Cambridge show that cycle tracks do not address the safety problem, and would make things worse.

Response: See below.

- Because of the known issues concerning paths adjacent to roadways, MassDOT's design guidelines do not permit the design that DCI has proposed.

Response: MassDOT guidelines clearly permit the proposed design.

- The intersection hazards of cycle tracks have been addressed to a certain extent by New York City, but the DCI design does not even include these features.

Response: Because of space constraints, the cycle tracks do not continue all the way to signalized intersections as they do in New York.

- Adding cycle tracks as proposed would create an ambiguous legal situation for bicyclists, and would expose them to greater harassment and assault from drivers of motor vehicles.

Response: With the proposed cycle tracks, cyclists will feel far less harassment and assault from motor vehicles when they are physically separated from each other.

- There are much better alternatives to the currently proposed design.

Response: It is understood that no design will please everybody.

Known Hazards of Cycle Tracks

The Design Exception Report submitted by DCI to the City of Somerville references two studies relating to cycle track safety:

1. **S.U. Jensen study on bike lanes and cycle tracks in Copenhagen.**
   DCI states that the reported crash statistics in the study represent "only a comparison between a predicted model value and the actual observed value. A much more appropriate comparison would be to compare the crash results from before the installation of the cycle tracks to the crash results after the installation of the cycle tracks. "This statement from DCI is false: as is well known, it is not appropriate to compare before and after numbers of injuries or crashes without adjusting for known confounding factors such as change in the number bicyclists and the tendency of improvements to be added at location where there have previously been crashes.

Response: As the commenter notes, using predicted values of "after" crashes attempts to account for confounding factors. At the same time, using a predicted number of crashes introduces uncertainty into the results by virtue of the prediction model used. There are, in fact, small differences between the number of after crashes and the "predicted" number of after crashes, and so this is a minor issue.

In fact, this careful and large study showed a 10% increase in overall crashes due to installing cycle tracks, after controlling for citywide trends and the regression to mean effect. Notably, it showed a statistically significant 24% increase in bike crashes at intersections, and the reason that the overall increase was not higher, is that the data showed an unusually high percent of crashes not at intersections (which had a statistically insignificant 13% decrease). The study showed a 129% increase in right-turning bike-motor vehicle collisions. There was also an 80% increase in bicycle and pedestrian crashes (these are from Table 4 of the paper included in the Design Exception Report). This careful study does not support safety benefits of cycle tracks. Jensen says bluntly, "Bicyclists' safety has worsened due to these facilities." Moreover, there is reason to believe that the results would be worse in Massachusetts, because Copenhagen drivers are trained to yield to bicyclists before turning right, and because Copenhagen has worked hard to improve intersection safety of cycle tracks, such as by prohibiting parking anywhere near intersections.

Response: The increase in crashes found by this Copenhagen study (10%) is very small, within the margin of error that arises from incomplete and inconsistent reporting; most people would consider a 10% change in reported crashes as a neutral result. What's more, this overall result is

an average over many projects, many of which saw reductions in crash risk while others had increases. Some of the factors that led to an increase in risk do not apply on Beacon Street.

While this study found that replacing bike lanes with cycle tracks led to an increase in right hook collisions, it also found a large decrease in rear-end collisions, the collision type generally regarded as the most deadly.

Finally, this study found that replacing bike lanes with cycle tracks led to a 20% increase in cyclist usage. Several studies have shown that the general health gains from increased cycling (as a form of exercise) far outweigh the health losses associated with injury risk.

2. **Lusk, Furth, et al. Study on Cycle Track in Montreal**

DCI instead points to this study as showing that cycle tracks improve safety. This study compared cycle track streets with selected nearby control streets with no cycle tracks (and no bike lanes). However, the "control" streets were not comparable to the cycle track streets in terms of lane width, parking, traffic volume, and traffic speed. The study concluded that relative risks of cycle tracks is only 0.72 that of control streets - about 28% fewer crashes. However, the study also found that on three of the six cycle tracks studied the risk was lower, but on the other three there was no statistically significant difference. Why is this? The authors do not explain, except to say that "the sample of six cycle tracks was too small to determine which factors make some safer." They found crash rates of 2,3,14,16,16 and 19 per million bicycle km for the 6 different cycle track segments, a nearly 10-fold increase in risk between the safest and the most dangerous. Why is that? They don't address this. What kind of crashes are these? Intersections? Turning cars? Bike-bike? Bike-ped? They do not know from their data. All other studies that have looked at collision types (such as the Jensen study) show a large increase in right hook crashes. Given that they do not look at crash types, did provide comparable controls, found that only 3 out of 6 cycle tracks were safer than the selected control, and found that there was a nearly 10-fold difference in crash rates on the safest cycle tack compared to the least safe one, we can have no confidence at all in the conclusions of this study.

Response: This study compared six representative streets with cycle tracks in Montreal with a comparison street that was an alternative that cyclists use, parallel to the cycle tracks and therefore of the same length and subject to similar cross traffic, and as similar as possible in terms of traffic. Underlying environmental danger, measured by number of auto crashes, was equal overall between the cycle track streets and the comparison streets, although site constraints made it such that for some pairs, one street had substantially more underlying danger than the other. It is remarkable that for not one of the comparison pairs – even those in which the cycle

track street had greater environmental danger than its comparison street – was the cycle track found to involve significantly more injury risk to cyclists than the comparison street.
This study was prompted by the enormous inconsistency between experience in the Netherlands, in which cycle tracks are immensely popular, used literally millions of time per day with a cyclist fatality rate 7 times lower than America's and the injury rate 20 times lower, and claims made by proponents of Vehicular Cycling that segregated paths must be avoided in North America because they would be very dangerous. Montreal, which has had a network of well-used cycle tracks modeled after the Netherlands since about 1990, was the only place in North America in which this claim could be tested with a long-term sample. Its results confirmed European experience: 2.5 times as many cyclists used the cycle tracks as the comparison streets, and the injury rate was lower overall by 28%. And while specific details of the Montreal streets and designs were not covered in this paper, the people who know those details best (City of Montreal authorities) are confident enough that cycle tracks promote bicyclist safety that they have built at least three more since 2010.

3. **Teschke, et al, "Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study.**

A more recent study of bicycle facilities in Toronto & Vancouver can be found at http://alph.aphapublications.org/doi/pdf/10.2/AJPH.2020.300762. This study has been citied to show the safety benefits of cycle tracks, but it was done when there were no cycle tracks in Toronto and hardly any Vancouver. Almost all the "cycle track mileage at the time of the study consisted of an ordinary bike path on the 1-mile Burrard Bridge, a segment which has no intersections or driveways. Their conclusions were based on finding 2 injuries on cycle tracks but predicting 10 injuries based on their subject's travel routes. However, this study did find, with strong evidence, that streetcar tracks increase the risk of bicycle injuries by 300% (95% confidence interval of 180% to 510%), riding downhill increases the risk by 230% (95% confidence interval of 170% to 310%) and that on-street parking increases the risk by 40%.

Response: This study used a statistical technique that was carefully designed to avoid biases that often affect traffic-based studies. The finding was clear: cycle tracks had much smaller risk than other bike infrastructure as a whole. The contention that the only cycle track in the study was a short bridge has no support; the published report indicates that there were 10 observed sites that were cycle tracks.

The commenter asserts that safety studies indicate that cycle tracks are more dangerous than riding in bike lanes in road. In fact, the preponderance of evidence indicates that cycle tracks are safer than bike lanes. The basic mechanism upon which they are based – physically separating people from the danger of motor traffic – is simple and straightforward, and has been a basis of industrial safety in the United States for 50 years. Many European cities have been using cycle tracks for decades, with (literally) millions of users per day, including many more vulnerable users (children, seniors) than one commonly sees in the U.S., and on the whole, these countries

have a far better cycling safety record than the United States. The American and Canadian cities that have experience with cycle tracks – well publicized facilities used by thousands of people – has not led to any noticeable decrease in cyclist safety, and most of the cities that have installed them, including Montreal, Vancouver, New York, Washington, Portland, Chicago, and San Francisco, continue to develop additional cycle tracks.

One American relative risk study that at first glance appears to find that separated paths are less safe actually supports the safety of segregated one-way cycle tracks. A study of relative risk between riding in the road and riding on sidewalks that were designated as bikeways performed in Palo Alto, CA (Wachtel and Lewiston, 1994) found 80% greater risk of a collision with a motor vehicle when riding on the sidepath compared to riding the street. However, this study concerned itself only with crashes occurring at intersections. An analysis of the same dataset by Lusk et. al. showed (2011) that when crashes that occur between intersections are also accounted for, there was no difference in relative risk between the sidepaths and the road; furthermore, if the analysis is limited to cyclists riding in the same direction as nearby traffic, as would be the case with unidirectional cycle tracks as proposed for Beacon Street, the relative risk for the sidepaths was 50% compared to riding in the road.

Recent Bicycle Crash Data from Cambridge

Cambridge did a study of all police-reported car-bike collisions between 2004 and 2008. Beacon Street in Somerville is likely to have very similar collision circumstances as in adjacent Cambridge.

The study classified the collisions into the follow types:

Crash Types	Count	Percent
Motorist left turn*	93	21.6%
Bicyclist hits door of parked car	87	20.2%
Bicyclist fails to yield at sign or signal	25	5.8%
Motorist fails to yield at sign or signal*	5	1.2%
Other "angle"crash at intersection*	27	6.3%
Motorist right turn*	45	10.5%
Motorist sideswipes bicyclist	22	5.1%
Bicyclist wrong way (not otherwise indicated)	23	5.3%

indicated)		
Bicyclist in crosswalk	22	5.3%
Bicyclist turns left into motor vehicle*	11	2.6%
Other (driveway, rear end, U-turn	70	16%
TOTAL	430	100%
*Bicyclist could have been on the wrong side of the road.		

These results show that the large majority of crashes are intersections related, and that 1/3 involves a motorist turning right or left at an intersection or driveway (21.6% + 10.5%=32.1%). "Doorings"- where a suddenly opened door hits a bicyclist riding in "the door zone" - account for fully 20% of car-bike collision in Cambridge. Sideswipe collisions account for only 5% of crashes. Bicycling on the wrong side of the road is also a major factor among collisions, since many of the collision types other than 5% labeled "bicyclist wrong way" also involve wrong-way bicyclist.

Based on this data, cycle tracks are likely to increase crashes to the extent that they:

- Constrain cyclists to ride to the right of right-turning vehicle at all times.
- Reduce the visibility of bicyclists to turning and entering motorists.
- Encourage wrong-Way ride.

On the other hand, removing on-street parking can reduce car-bike collisions by:

- Eliminating the door zone.
- Providing more width on the street so that novice cyclist is not afraid to ride outside the door zone.
- Provide more overall road width to reduce sideswipe collisions.

Response: The only collision type that is directly affected by the proposed design is dooring. By putting cyclists on the outside of parked cars, with a buffer for doors that open on the passenger side of the vehicle, the proposed design offers a large safety benefit compared to typical designs. There is no reason to expect that the proposed design will increase any of other collision types. The argument that the cycle track will lead to wrong-way riding ignores the short length of the

cycle track and its direct transition to one-way bike lanes, which will make the one-way discipline self-enforcing.

The Proposed Design does not Follow MassDOT Standards

The MassDOT Project Development & Design Guide does not include cycle tracks as proposed for Beacon Street as an approved bike accommodation. Given the hazards of urban paths alongside ordinary roads, this gap is not an oversight but a deliberate policy, as can be seen from the language of the Guide.

Response: The MassDOT Guide includes shared use paths along a road as an approved bike accommodation, and also acknowledges that shared use paths may involve distinct parallel paths for pedestrians and cyclists. Thus, cycle tracks as proposed on Beacon Street are certainly accepted as an approved bicycle accommodation. The Guide states Clearly that "Approaches to bicycle accommodation include bicycle lanes, the use of shoulders, and shared roadway." However, "Off-road shared-use or bicycle paths (see Chapter 11 for more details) are also an option for bicycle accommodation in some cases. (p.5-19)" These "shared use paths" are not cycle tracks, since "Shared use paths are facilities on exclusive right-of-way with minimal cross flow by motor vehicles." This is not the case for Beacon Street, which has 4 cross streets and 22 driveways on the northbound section of proposed cycle track and 4 cross streets and 17 driveway on the southbound section.

Furthermore, shared use paths are not acceptable "accommodations" for bicyclists on city streets, who will have ample reason (and legal right) to continue using the street, not the path. The Guide specifically sates that "Shared use paths should be thought of as complementary system of off-road transportation routes for bicyclists and others that serves as a necessary extension to the roadway network. The presence of a shared use path near a roadway does not eliminate the need to accommodate bicyclists within a roadway. (p. 5-25)" Echoing the AASHTO Bicycle Guide, Chapter 11 provides some more detail on this point:

"Shared use paths are not a substitute for street improvements, even if there is sufficient space to locate the path adjacent to the roadway. Some operational problems with paths adjacent to roads are:

- Bicyclist will be riding against the normal flow of traffic, contrary to the rules of the road. When a path ends, bicyclists riding against traffic may continue riding on the wrong side of the street.
- At intersections, motorist entering or crossing the roadway often do not notice bicyclists approaching from the right, as they are not expecting any traffic from that direction.
- Barriers used to separate motor vehicle traffic from path users can obstruct sight lines along both facilities and can reduce access to and across the path.

- Snow plowed from the adjacent roadway can obstruct the path (p. 11-8)"

Response: Massachusetts guidelines make it clear that a bike path is an acceptable form of accommodation, and that where a bike path is provided there is no additional need for accommodating bikes the in street. MassDOT Engineering Directive E-09-005 explicitly states "Alternatively, a separate shared-use or bicycle path provides desirable accommodation."

Even if one ignores the fact that Beacon Street is not a suitable place for an off-street path per the design guidelines, the proposed design does not meet the requirement for off-street paths, which require separation from an adjacent road: "wide separation between a shared use path and the adjacent highway is desirable. This demonstrates to both the bicyclist and the motorist that the path functions as an independent facility for bicyclists and others. This separation area also acts as a "recovery zone" for path users. A 7-foot separation between the edge of the shoulder and the shared use path is recommended with the minimum being 5 feet. (p. 11-9)". Furthermore, although the Guide contemplates on-way paths "rarely" and only in a special situation, such as to circumvent mature trees or connect to parallel paths," the Guide adds that "It should be recognized that on-way paths often will be used as two-way facilities unless effective measures are taken to assure on-way operation. Without such enforcement, it should be assumed that shared use paths would be used as two-way facilities by both pedestrians and bicyclists and designed accordingly. (p.11-9)" The proposed Beacon Street design does not meet the width requirement for two-way paths.

Response: The guidance quoted here by the commenter about the need for a 5 ft buffer is meant for paths alongside high speed rural highways. On city streets, sidewalks often abut a street without barrier or buffer, and bike lanes are allowed with only a stripe separately them from a travel lane. The argument that the cycle track should be designed as a two-way path fails to account for the self-enforcing nature of the facility as a one-way bike path, thanks to its short length its direct transitions to one-way bike lanes.

Design Details

On-Street Parking Side

The current design proposal does not give sufficient details of intersection treatments. It appears, however, that on the side where it is permitted, on-street parking will continue all the way up to driveways and most of the way up to intersections. These details are specifically contrary to the practices of Copenhagen and New York City, which have found that providing either separate bicycle signals or at least sufficient sight and merging distance at intersections is essential to making the facilities at least moderately safe (although, as noted, the most careful recent study found that the net effect was to increase collisions despite these efforts). Having parked cars block the view of bicyclists at intersections and driveways will be extremely dangerous. Yet improving the situation would require the elimination of significantly more parking than would otherwise be necessary just to provide sufficient width for parking. Moreover, the City of

Somerville is essentially admitting that it will be politically impossible to remove enough parking to make those intersections safer.

Response: In the proposed design, there are no cycle tracks approaching signalized intersections. At unsignalized intersections and driveways, there will be adequate sight distance for the low speed at which motor vehicle will be going when they cross the cycle track. The higher elevation of the cycle track relative to the travel lane also improves the visibility of cyclists.

No-Parking Side

The current design calls for a small (3 inch) mountable curb between the travel lane and the cycle track on the side where there is no on-street parking. By intent, motorists will be able if necessary to mount this small curb and thus enter the cycle track (e.g., for temporary parking). If so, there is nothing to prevent a texting or drunk driver from mounting this curb and running into a bicyclist-which apparently is the reason for having a cycle track in the first place. At the same time, DCI says that cyclist will be able to cross the curb to move from cycle track to travel lane. But what about moving back in the other direction? The curb could produce a "diverting" fall, which is the kind that occurs when a bicycle wheel tracks along a longitudinal bump or joint, and the rider is unable to balance. Are there any existing examples of such curbing that could be tested for their safety in this regard?

Response: From the experience of two Oregon cities with raised cycle tracks and mountable curves, there are no operational problems with cyclists crossing the curb. We believe that a mountable curb will lead to far less encroachment of the bicycling zone than if were separated from traffic by only a striped line. Moving vehicles that encroach inadvertently will feel the curb (which will also help redirect them back to the road), and vehicles encroaching to park will be very aware that they are entering a zone in which they are not allowed and are at obvious risk of getting a large parking fine.

Laws

Under current law, bicyclists are permitted to use sidewalks outside of business districts unless otherwise restricting by local ordinance. Somerville traffic laws list sidewalk-bicycling prohibited areas, and none of these include Beacon Street. However, bicyclist riding on the sidewalk must follow the rules for pedestrians. One of these rules is: "No pedestrian shall suddenly leave a sidewalk or safety island and walk or run into the path of a vehicle which is so close that it is impossible for the driver to yield the right of way." This means that bicyclists on the sidewalk should pause at every single crosswalk and driveway to make sure no vehicle is coming close. For children riding slowly on the sidewalk this is acceptable. For adults bicycling to work, it is not. Bicyclists who know of the additional risk will be forced to ride very slowly, and many more bicyclists will unwittingly take on additional risks.

Response: The cycle track is not a sidewalk.

Although with the cycle track it is expected that bicyclist will use the "track" and pedestrians will use the "sidewalk," there is no law requiring this. Somerville rules say that "Pedestrians….are permitted to use bicycle paths." People will be able to walk along the cycle track, even three abreast, stand on it to wait for a buss, store trash cans on it, or temporarily place furniture and hand trucks on it. Even if Somerville attempts to prohibit this behavior, it will occur anyhow. By contrast, pedestrians are specifically prohibited from walking on roadways, and practice generally follows this law (except in snow emergencies).

Response: The provision of ample, distinct, and clearly delineated space for pedestrians and cyclists will lead to each group using their intended space; this has been clearly demonstrated in hundreds of cycle tracks around the world. It is true that with a cycle track further from moving cars and abutting a sidewalk, some pedestrians might walk there, forcing cyclists to adapt in order to avoid a collision. This nuisance is considered far smaller than the problem cyclists face when cars drive or park in bike lanes.

At the same time, under Massachusetts law, bicyclists have a legal right to use the travel lanes of public roads, even if there is an adjacent bicycle path. Many cyclists will find that the cycle track is too dangerous and slow, or is blocked by snow or trash cans. Yet if they choose to ride on the roadway, they cannot help but occupy all of the single travel lane in the current design. Many motorists, seeing the adjacent bike path, will honk and scream at bicyclist, and in some cases will assault them (including by deliberately passing too closely, or pulling in front and stopping short).

Response: The chief effect of the proposed design is to protect cyclists from the harassment and assault from motorists that the commenter describes by giving them a physically separated zone to ride. For the vast majority to be so protected while a few who eschew the protected path provided for them and prefer to ride in the street to be subject to possible harassment seems like an acceptable tradeoff.

Alternatives

Approving this design would create a bad precedent. I would point out that Illinois DOT recently has told the City of Chicago to wait for further study before adding cycle tracks. According to a press account, IDOT said, "We don't want to make decision on a scattershot basis. Our traffic engineers want to see more data on the impact of protected bike lanes" including these concerns: the visibility of cyclists at intersections and operational issues like maintenance and snow-removal around protected bike lanes. Approving protected bike lanes for Chicago would open the floodgates to allowing all other local governments in the state to do the same, according to IDOT.

Source:

http//www.chicagotribune.com/classified/automotive/ct-met-getting-around-021120130211,0,5097859.xcolumn?track-rss&utm_source-buffer_share-7cd9c

Response: Putting a categorical hold on cycle tracks when they have proven so successful in Europe, Canada, and several American cities and are clearly in great demand by the public would not serve the public interest. If there are concerns about operations such as snow plowing and intersections, the best way to learn about how to deal with them is to gain local experience.

The above discussion should make it amply clear that cycle tracks increase collision rates for urban bicycling, that cyclists who continue to exercise their right to use the road will not be accommodated, contrary to MassDOT's own policies, and that an effort to make the cycle track behind the parking lane even moderately safe would require the elimination of far more parking than the community is willing to tolerate. Moreover, on the other side cyclists are no more protected from errant motorists than they would with an ordinary bike lane.

Response: (No response needed; commenter's paragraph is only a summary of points presented earlier.)

To the extent that there is merit in the plan compared to the current condition of narrow bike lanes next to parked cars, it comes from removing on-street parking. This removes the threat of "dooring"on one side and provides enough room to add a buffer zone between the bike lane and the parked cars on the other side. If politically feasible, this is clearly the safest design for bicycling, given the figures cited above on the frequency of dooring collisions and intersection collisions. Merely removing parking on one side and using the remaining space for improved bike lanes (adjacent to sidewalk and adjacent to buffer zone rather than adjacent to parked cars) would require significantly less parking removal than that needed for cycle tracks. As has been noted by others, there are opportunities to increase the effective amount of car parking available by increasing the number of metered spaces, meter rates and time restrictions, and by sharing available off-street parking.

Response: Wide bike lanes buffered from parking are certainly preferred to narrow bike lanes next to parking. However, even buffered bike lanes and bike lanes along a curb are often blocked by illegally parked cars and by people getting into and out of cars. The proposed cycle track design provides more reliable separation from traffic than wide bike lanes.

In areas where parking removal is not possible, the second-best solution is to use shared lane markings sufficiently far away from parked cars to encourage cyclists to ride outside of the door zone.

Response: Shared lane markings offer cyclists not only no physical protection from motor traffic; they don't even offer cyclists their own zone for bicycling, making them clearly inferior to a bike lane both in terms of traffic safety and traffic flow. The commenter's preference for this kind of treatment is quite distant from most of the population's preferences concerning separation from traffic when cycling.

Purpose of this Memorandum

This memorandum offers technical comments on the cycle tracks proposed for the Beacon Street, Somerville reconstruction project, as described in the Design Exception Report (revised December 2012), the draft 25% design (dated 1/28/2013), and the comments by DCI staff at public meetings. It will be apparent from the details below that the proposal does not meet the existing standards nor does it adequately accommodate bicycling, and there are better alternatives that do. Cycle tracks are urban side paths, which are, for good reasons, not permitted under applicable design standards. The safety record of urban side paths is poor, the proposed intersection design does not include mitigations used elsewhere, and approving the plan in its current form would set a bad precedent.

Response: The commenter says that side paths, his preferred term for cycle tracks, are "not permitted under applicable design standards." In fact, there is no prohibition against cycle tracks or side paths in state or federal design standards.

Recommended Alternative Does Not Follow Governing Design Standards

According to MassDOT Highways Engineering Directive E-09-005:"Bicycle accommodation shall be in accordance with Chapter 5 of the [Project Development & Design] Guide and the 1999AASHTO Guide for the Development of Bicycle Facilities."1In the draft Design Exception Report dated December 2012, all the alternatives in the Alternatives Analysis reference MassDOT and AASHTO standards, except for the recommended alternative:

- The "DESIRABLE ALTERNATIVE (10 ft shoulder width)" references Chapter 5 of the MassDOT Project Development and Design Guide.
- The "MINIMUM ALTERNATIVE (4.0 ft shoulder width/similar to existing)"also references Chapter 5 of the MassDOT Project Development and Design Guide.
- "ALTERNATIVE 1 (5 ft Bike Lane Alternative)" references the "AASHTO 'Guide for the Development of Bicycle Facilities, 2012 4th Edition'.
- The "RECOMMENDED ALTERNATIVE (cycle track / 6 ft shoulder)" references only "the City and Community", but no standards.

1Available here:http://www.massdot.state.ma.us/Portals/8/docs/engineeringDirectives/2009/e-09-005.pdf

The project proponents fail to describe how the recommended alternative meets the governing standards, namely the MassDOT Project Development & Design Guide (PDDG) and the AASHTO Guide for the Development of Bicycle Facilities (GDBF). As described below, the proposed design plainly fails to conform to these standards.

Response: Unlike some of the other alternatives, the state and AASHTO guidelines provide no sample drawings of cycle tracks that the design report could reference. However, that doesn't mean that they are prohibited. The proposed design complies with both state and AASHTO guidelines as either a bike lane slightly raised in elevation (for the side with no parking), or as a bike path along a road (for the side with parking). In addition, it conforms to the national guideline called the *Urban Bikeway Design Manual* published by the National Association of City Transportation Officials, which includes sample drawings of cycle tracks.

A "Cycle Track" is a "Bike Path"

Under state and Somerville traffic regulations, the proposed "cycle track" is a "bike path" ("A route for the exclusive use of bicycles separated by grade or other physical barrier from motor traffic", MGL Ch 90E Section 1 and Somerville Traffic Regulations, Section 13-2). Therefore, the project must follow the design guidelines for bike paths. It is incorrect to suppose that a cycle track is a new kind of a facility that must be added to "out of date" guidelines. There have been isolated examples of sidewalk-style bicycle facilities and bike paths/lanes behind parked cars in the U.S. since the 1970s. Based on the poor operational experience with these experiments, the design guidelines discourage designating sidewalks as bicycle facilities and permit bike paths to be located within a highway alignment only in some particular, specified cases. The current AASHTO GDBF (4thEdition, Section 5.2.2) refers to bicycle paths as "shared use paths"(recognizing that they are shared with pedestrians, roller skaters, and other types of users besides bicyclists), explicitly defines a "sidepath" as a shared use path adjacent to a roadway, and specifies that "a sidepath should satisfy the same design criteria as shared use paths in independent rights-of-way."

Response: The commenter says that cycle tracks are shared use paths, and should be treated as such. While cycle tracks, bike paths along a road, physically separated from motor traffic and distinct from the pedestrian footpath - are similar to shared used paths in some respects, they also differ from them in important respects. First, the cycle tracks proposed for Beacon Street will not be shared with pedestrians. Second, they will carry one-way bicycle traffic. It is reasonable to expect that the Beacon Street cycle tracks will operate as uni-directional facilities because they transition at either end to bike lanes, naturally placing through riders on the right side of the road. In addition, because Beacon Street is easy to cross, cyclists turning onto Beacon Street have little incentive to ride along the wrong side of the road. Because of these differences, guidelines for "shared use paths" are not always applicable; however, they have been considered insofar as they apply to the type of bicycling facility proposed.

Wrong Location for a Sidepath

The MassDOT PDDG states that "Shared use paths are facilities on exclusive right-of-way with minimal cross flow by motor vehicles." An urban street with frequent driveways and intersections, such as Beacon Street, is not an example of "minimal cross flow." Examples of appropriate bike path locations cited in the PDDG include active or abandoned railroad corridors, waterfront areas, utility corridors, open-space networks and parkland, and limited-access highways.

In the same vein, the current AASHTO GDBF says (emphasis added): "The first and most important step in the design of any sidepath is to objectively assess whether the location is a candidate for a two-way sidepath. . . . At-grade intersections of roadways and driveways with sidepaths, especially those with two-way sidepaths, have inherent conflicts that may result in bicycle-motor vehicle crashes." The Guide spells out exactly where sidepaths may be considered:"

Although paths in independent rights-of-way are preferred, sidepaths may be considered where one or more of the following conditions exist:

- The adjacent roadway has relatively high-volume and high-speed motor vehicle traffic that might discourage many bicyclists from riding on the roadway, potentially increasing sidewalk riding, and there are no practical alternatives for either improving the roadway or accommodating bicyclists on nearby parallel streets.
- The sidepath is used for a short distance to provide continuity between sections of path in independent rights-of-way, or to connect local streets that are used as bicycle routes.
- The sidepath can be built with few roadway and driveway crossings.
- The sidepath can be terminated at each end onto streets that accommodate bicyclists, onto another path, or in a location that is otherwise bicycle compatible." These special conditions do not apply to Beacon Street.

Response: The first condition certainly applies, in that Beacon Street has levels of traffic and traffic speed that discourage bicyclists from riding in the road. Most of the reasons the Guide gives cautioning against side paths is based on their hosting bidirectional traffic, which does not apply.

One Way or Two Way?

The proposed cycle tracks are presumed to be one-way facilities, but it is highly likely that they will be used in both directions, particularly the one behind parked cars. The MassDOT PDDG says, "It should be recognized that one-way paths often will be used as two-way facilities unless effective measures are taken to assure one-way operation. Without such enforcement, it should

be assumed that shared use paths would be used as two-way facilities by both pedestrians and bicyclists and designed accordingly"(p. 11-9). This assumption is reasonable even in the case where separate paths are provided for each direction of travel. Because bicycle paths, even those within a highway right-of-way, are not legally part of the "roadway," the traffic law requiring drivers (including bicyclists) to keep to the right half of the roadway does not apply, so that there is no law in Massachusetts that makes a "one-way" path legally one-way, and thus there is not even the possibility of enforcing one-way operation.

Response: The proposed cycle track will have a uni-directional design that is self-enforcing. The cycle tracks on either side of the street will transition to and from (uni-directional) bike lanes at the two ends of the cycle track. The short length of the cycle track section, and the relative ease of crossing the street (only 2 lanes) give cyclists who join Beacon Street in the midst of the cycle track section little incentive to ride on the wrong side of the street. In addition, the cycle tracks will be signed, striped and marked to dissuade individuals from using them in the wrong direction. Additionally, the city is considering an education program through their bicycle committee on proper use of the cycle track.

Operational Problems with Sidepaths

The PDDG calls out "Some operational problems with [bike] paths adjacent to roads":

- Bicyclists will be riding against the normal flow of traffic, contrary o the rules of the road. When a path ends, bicyclists riding against traffic may continue riding on the wrong side of the street.
- At intersections, motorists entering or crossing the roadway often do not notice bicyclists approaching from the right, as they are not expecting any traffic from that direction.
- Barriers used to separate motor vehicle traffic from path users can obstruct sight lines along both facilities and can reduce access to and across the path.
- Snow plowed from the adjacent roadway can obstruct the path. (p. 11-8)"

The AASHTO GDBF (4thEdition, Section 5.2.2) provides more details about the problems of sidewalks and side paths as urban bicycle facilities:

"Utilizing or providing a sidewalk as a shared use path is undesirable. Section 3.4.2 highlights the reasons sidewalks generally are not acceptable for bicycling. It is especially inappropriate to sign a sidewalk as a shared use path if doing so would prohibit bicyclists from using an alternate facility that might better serve their needs. In general, the guiding principle for designing sidewalks should be that sidewalks intended for use by bicyclists should be designed as side paths. Paths can function along highways for short sections, or for longer sections where there are few street and/or driveway crossings, given appropriate separation between facilities and attention to reducing crashes at junctions. However before committing to this option for longer

distances on urban and suburban streets with many driveways and street crossings, practitioners should be aware that two-way side paths can create operational concerns.

These conflicts include:

1. At intersections and driveways, motorists entering or crossing the roadway often will not notice bicyclists approaching from their right, as they do not expect wheeled traffic from this direction.

2. Bicyclists traveling on sidepaths are apt to cross intersections and driveways at unexpected speeds (i.e., speeds that are significantly faster than pedestrian speeds). This may increase the likelihood of crashes, especially where sight distance is limited.

3. Motorists waiting to enter the roadway from a driveway or side street may block the sidepath crossing, as drivers pull forward to get an unobstructed view of traffic (this is the case at many sidewalk crossings, as well).

4. Attempts to require bicyclists to yield or stop at each cross-street or driveway are inappropriate and are typically not effective.

5. Where the sidepath ends, bicyclists traveling in the direction opposed to roadway traffic may continue on the wrong side of the roadway. Similarly, bicyclists approaching a path may travel on the wrong side of the roadway to access the path. Wrong-way travel by bicyclists is a common factor in bicycle-automobile crashes.

6. Depending upon the bicyclist's specific origin and destination, a two-way sidepath on one side of the road may need additional road crossings (and therefore increase exposure); however, the sidepath may also reduce the number of road crossings for some bicyclists.

7. Signs posted for roadway users are backwards for contra-flow riders, who cannot see the sign information. The same applies to traffic signal faces that are not oriented to contra flow riders.

8. Because of proximity of roadway traffic to opposing path traffic, barriers or railings are sometimes needed to keep traffic on the roadway or path from inappropriately encountering the other. These barriers can represent an obstruction to bicyclists and motorists, impair visibility between road and path users, and can complicate path maintenance.

9.Sidepath width is sometimes constrained by fixed objects (such as utility poles, trashcans, mailboxes, and etc [sic]).

10.Some bicyclists will use the roadway instead of the sidepath because of the operational issues described above. Bicyclists using the roadway may be harassed by motorists who believe bicyclists should use the sidepath. In addition, there are some states that prohibit bicyclists from using the adjacent roadway when a sidepath is present.

11. Bicyclists using a sidepath can only make a pedestrian-style left turn, which generally involves yielding to cross traffic twice instead of only once, and thus induces unnecessary delay

12. Bicyclists on the sidepath, even those going in the same direction, are not within the normal scanning area of drivers turning right or left from the adjacent roadway into a side road or driveway.

13. Even if the number of intersection and driveway crossings is reduced, bicycle-motor vehicle crashes may still occur at the remaining crossings located along the sidepath.

14. Traffic control devices such as signs and markings have not been shown effective a changing road or path user behavior at sidepath intersections or in reducing crashes and conflicts. For these reasons, other types of bikeways may be better suited to accommodate bicycle along some roadways."

All of the concerns enumerated above except for numbers 5, 6, and 7 apply equally to side paths where all bicyclists are traveling only in the direction of traffic. And as noted above, two-way use of the nominally one-way paths should be expected.

Response: The commenter cites operational issues listed in the MassDOT Project Development & Design Guide and the AASHTO Guide for the Development of Bicycle Facilities related to sidepaths. Many of these issues do not apply on Beacon Street because the cycle tracks will be unidirectional. Others do not apply because the proposed cycle tracks will not require cyclists to yield at every driveway and cross-street, and will have no barrier separating it from traffic. Some of the listed issues apply equally with bike lanes. It should be noted that at the time those guidebooks were written (before 2007), there was virtually no American experience with cycle tracks that could be drawn on, and international experience was considered inapplicable. Since 2007, many cycle tracks have been installed in American cities, using design techniques and maintenance practices that resolve those operational issues. Those cities' experience indicates that none of those remain as a serious obstacle to either safety or user convenience.

Separation from Roadway

The proposed plan calls for only 1 foot of separation between the bicycle facility and the roadway on the side without parking, and no separation on the side with parking. This is in contradiction to the express guidelines of both manuals. The MassDOT PDDG says: "wide separation between a shared use path and the adjacent highway is desirable. This demonstrates to both the bicyclist and the motorist that the path functions as an independent facility for bicyclists and others. This separation area also acts as a 'recovery zone' for path users. A 7-foot separation between the edge of the shoulder and the shared use path is recommended with the minimum being 5 feet. (p. 11-9)"

The AASHTO GDBF says:

"a wide separation should be provided between a two-way sidepath and the adjacent roadway to demonstrate to both the bicyclist and the motorist that the path functions as an independent facility for bicyclists and other users. The minimum recommended distance between a path and he roadway curb (i.e., face of curb) or edge of traveled way (where there is no curb) is 5 ft (1.5m). . Where the separation is less than 5 ft (1.5 m), a physical barrier or railing should be provided between the path and the roadway. Such barriers or railings serve both to prevent path users from making undesirable or unintended movements from the path to the roadway and to reinforce the concept that the path is an independent facility. A barrier or railing between a shared use path and adjacent highway should not impair sight distance at intersections, and should be designed to limit the potential for injury to errant motorists and bicyclists."

Response: AASHTO guidance regarding lateral separation and barriers is meant for two-way paths along high-speed highways, not for paths on urban streets with 30 mph speed limits where bike lanes are commonly used with no lateral separation beyond a painted white line, and where sidewalks are allowed with no lateral separation.

Path Width

According to MassDOT Highways Engineering Directive E-09-005, the desirable bike path width is at least12' plus graded shoulders of 2 ft on either side. However, a minimum path width of10' may be used with sufficient justification and a path width of 8' may be allowed under unusual circumstances that must be supported with a Design Exception Report. The proposed Beacon Street design does not meet the stated minimum width of 10 ft. On the side without parking, the proposed path is only 5 ft wide with a 1 ft buffer on the roadway side and no buffer on the sidewalk side. On the side with on-street parking, the proposed path is nominally 9 ft wide, but will be adjacent to a drop-off curb on the parking side and a raised (3 inch) curb on the sidewalk side, both of which require shy space. Also, doors of parked cars open into the bikeway on the side with parking, effectively reducing its width by 4 feet. In any case, it certainly does not meet the standards for bicycle paths, which require at least10 ft plus a 2 ft shoulder on either side.

Response: AASHTO guidance on path width assumes two-way bicycle traffic; it is not applicable to one-way paths. The path widths conform to cycle track guidelines in NACTO's Urban Bikeway Design Guide.

Design Speed

The project proponents claim that a 10-15 mph design speed is sufficient. They should be required to measure the actual 85thpercentile speed of bicyclists on Beacon Street (in a flat or downhill section) and demonstrate that their proposed alternative can safely accommodate that speed. Attempts to design for a lower speed than the existing 85thpercentile may be partially

successful (in which case they will significantly delay bicyclists) and they may also be partially unsuccessful (in which case some bicyclists will be going too fast for the conditions, putting all path users at risk).

Response: The commenter asserts that a 10-15 mph design speed is insufficient. Cyclist along Beacon Street will be afforded the alternative of riding the cycle track or if they find it to be too slow they can divert to the bike lanes on Somerville Ave. Somerville Avenue is current used by many commuting cyclists that avoid Beacon Street due to the condition of the pavement. Although the Alternate route is not exactly parallel it does offer an option. In terms of measuring the existing 85th speed for bike lanes and comparing it to a cycle track speed it would be like comparing apples to oranges. They are two different types of facilities with different characteristics, constraints and features.

Proposed Brick Mountable Curb (Side with No Parking)

The current design calls for a low (3 inch) mountable curb between the travel lane and the cycle track on the side where there is no on-street parking. By intent, motorists will be able to mount this low curb and thus enter the "cycle track" (e.g., for temporary parking). There is nothing to prevent a texting or drunk driver from mounting this curb and running into a bicyclist--which apparently is the reason for having a "cycle track" instead of an ordinary bike lane in the first place. At the same time, DCI says that cyclists will be able to cross the curb to merge from cycle track to travel lane. When cyclists merge back in the other direction, the curb could produce a "diverting" fall, which occurs when a bicycle wheel tracks along a longitudinal bump or joint, and the rider is unable to balance. The curb would also create ponding and icy conditions at the roadway edge (but to the left of the "cycle track"). Brick is an inappropriate choice for this sloped area, since bricks frequently move or dislodge over time, causing significant hazards to bicyclists moving in or out of the "cycle track".

Response: The commenter criticizes the brick mountable curb. The experience of other cities that have mountable curbs between street and cycle track (Bend and Eugene, Oregon) does not indicate any problem with cyclists losing their balance. Comments regarding the durability of brick as a paving material for the mountable curb will be considered in later stages of design.

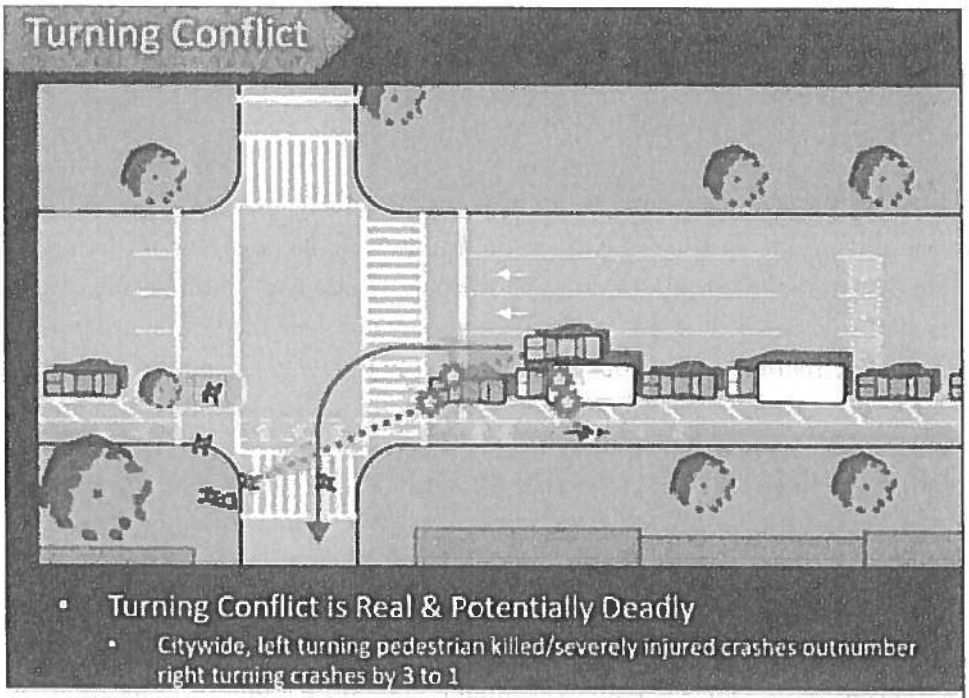
Intersections

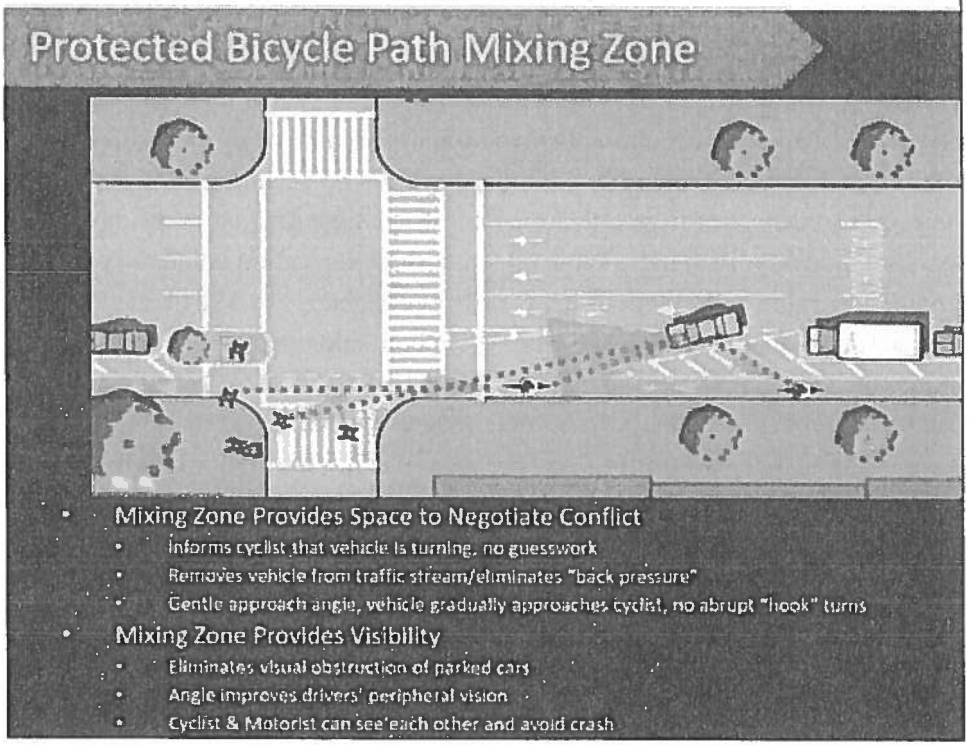
In its review of the Design Exception Report, MassDOT rightly pointed out that "Cycle track design at driveways and side streets is vital for bicyclist safety and comfort. Poorly designed treatments may lead to decreased safety." The relevant design guidelines spell out why it is very difficult to reduce intersection conflicts between cyclists on a sidewalk or sidepath and motorists on the roadway. The current AASHTO GDBF says: When approaching an intersection, drivers focus their attention in certain specific directions, depending on the planned maneuver through the intersection. If planning to turn left from the parallel roadway, drivers focus their attention ahead to watch for a gap in oncoming traffic and to the left to watch for potentially conflicting

traffic on the side road. When turning right from the parallel roadway, drivers focus their attention ahead and to the right, as this is the direction from which they expect conflicting traffic. When turning onto the parallel roadway (or crossing the parallel roadway) from a side road or a driveway, drivers almost exclusively focus on traffic approaching from the left, in order to look for a gap and to avoid conflicting traffic. Sidepaths, especially two-way sidepaths, insert path users into intersections at locations that do not match with the ingrained scanning behaviors of motorists, which can in effect create virtual "blindspots" even in locations with no actual restrictions on sight distance or visibility. For example, a driver turning left from the parallel roadway across the sidepath might do a very conscientious job of looking for potentially conflicting traffic from the parallel road and crossroad, but completely miss a path user approaching from behind and to the driver's left, a location from which a driver is not conditioned or trained to expect conflicting traffic. It is nearly impossible for a driver turning left from the parallel roadway across the sidepath to accurately monitor the presence, location, or speed of sidepath traffic approaching from behind and to the left without compromising the ability to look for potential conflicts from other directions. Similar mismatches between scanning behavior of roadway traffic and arrival locations of sidepath traffic can be found with right turns from the parallel roadway and movements from the crossing roadway. On multilane streets with higher speed limits, the situation can be more challenging, due to narrowing field of vision, shorter reaction times, and the screening effect of other traffic in adjacent lanes. Sidepath users typically take their right of way cues from either the pedestrian signalization or the signals controlling the parallel roadway. Path users typically enter the intersection when the parallel roadway has a green indication. Some path users, mainly pedestrians, observe the pedestrian signal and enter under the Walk phase, but bicyclists often continue to enter and cross the intersection well into the "DONT WALK" phase. Conflicts between roadway traffic and sidepath users can be complicated by the perception among some path users that turning and crossing drivers will yield to sidepath traffic when the path user has the right of way (e.g., when given a green signal or "WALK" signal) and the potentially conflicting vehicle is visible to the path user; however, due to scanning patterns, the vehicle driver may not look in the direction of the path user. Conventional signalization may not be effective in mitigating these conflicts."

Response: These comments are not relevant, because the proposed paths will be for one-way bike traffic (in the same direction as the nearest travel lane) and because the proposed paths transition to bike lanes on approaches to signalized intersections.

According to what were represented as design drawings at the 25% public hearing, on-street parking will continue all the way up to driveways and within one car length of the intersections. This lack of clearance at turning conflict areas is contrary to the practice of places that currently have urban sidepaths, such as Copenhagen and New York City, which have found that providing either separate bicycle signals or at least sufficient sight and merging distance at intersections is essential to making the facilities at least moderately safe. For example, New York City produced the following illustrations in January 2013 2.



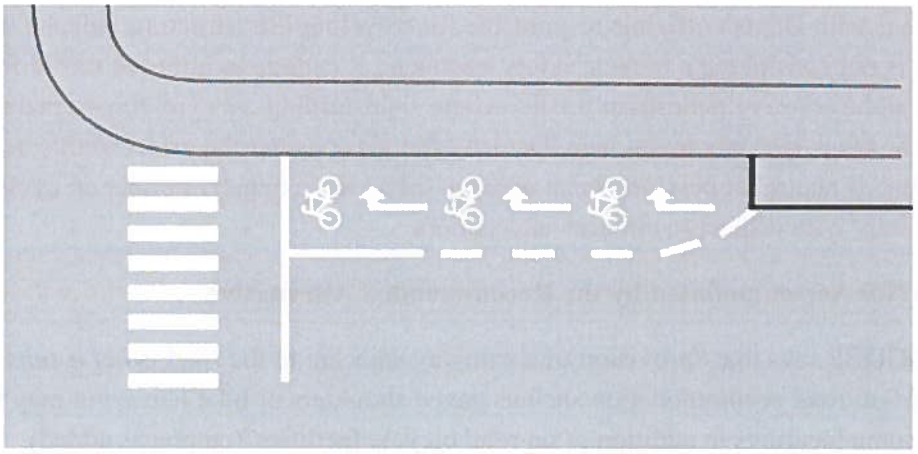


2 Available here: http:// www.nyc.gov/html/dot/downloads/pdf/2013-01-columbus-outreach-cb-7.pdf

The first figure above illustrates that an urban bike path behind parked cars is "potentially deadly" because turning drivers cannot see bicyclists until it is too late. The second figure shows New York's solution: provide a "mixing zone" of 100 feet in length that has no parked cars, clear sight lines, a short left-turn only lane, and a yield line for left-turning cars (this could equally be a right-turn only lane if it were on the right side of the street).

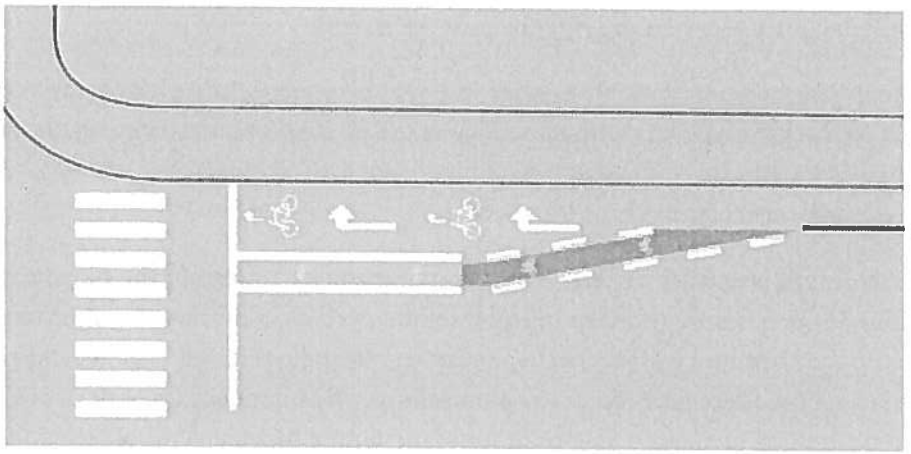
Response: The guidance from New York is for left-side bike lanes, in which the driver of a car in a lane adjacent to the bike lane has a much reduce angle of sight (because he / she is sitting so close to the bike lane) compared to a right-side bike lane. The proposed cycle tracks will be on the right side of their respective side of the road.

Another Danish design is similar to New York's mixing zones: "interrupt the bicycle path 15 to 25 meters [50 to 75 feet] before the stop line and let the cyclists continue in a right-turn lane, together with the right-turning traffic. This solution lets straight-through cyclists and right-turning motorists merge together before the intersection, which reduces the risk of accidents. The stretch up to the stop line is marked as a right turn lane with a bicycle symbol."(See figure below, taken from the same source.)



3 [Prevent Right-Turn Accidents:Measures to prevent accidents between right-turning trucks / cars and straight-through cyclists in traffic signal-regulated intersections]
http://www.vejdirektoratet.dk/DA/viden_og_data/publikationer/Lists/Publikationer/Attachments/9/2011_Undg%C3%A5%20h%C3%B8jresvingsulykker.pdf
4Right-turn on red is not permitted in Denmark.

The Danes also provide another option; "The shortened cycle path can be combined with a bike lane between the straight and right-turn lanes for the straight-through and left-turning bicycle traffic."(See figure below.)



Response: The commenter cites the Danish treatment of transitioning the cycle track to a bicycle lane. Discussions with Danish officials responsible for bicycling infrastructure indicate that in Denmark, this is not considered a bicycle safety treatment; it is done to improve traffic flow at intersections that have heavy pedestrian traffic, where right-turning cars yielding to pedestrians would otherwise block the only travel lane. Danish officials consider the effect of this treatment on bicycle safety as neutral at best, and acknowledge that it has a negative effect on cyclist comfort, especially with respect to children and seniors.

Bicyclists are Not Accommodated by the Recommended Alternative

The AASHTOGDBF says that "provision of a pathway adjacent to the road is *not a substitute* for the provision of on-road accommodation such as paved shoulders or bike lanes, but may be considered in some locations in addition to on road bicycle facilities"(emphasis added). Elsewhere, the GDBF repeats, "Shared use paths are not a substitute for street improvements, even if there is sufficient space to locate the path adjacent to the roadway" and "Shared use paths and trails are not a substitute for adequate on-street facilities. Shared use paths and trails are a complementary, non-motorized extension to the street network and should not preclude shared use of streets either by regulation or design."

The PDDG specifically states (emphasis added) "Shared use paths should be thought of as a complementary system of off-road transportation routes for bicyclists and others that serves as a necessary extension to the roadway network. The presence of a shared use path near a roadway does not eliminate the need to accommodate bicyclists within a roadway.(p. 5-24)" Under Massachusetts law, bicyclists have a legal right to use the travel lanes of public roads, even if there is an adjacent bicycle path. Many cyclists would find that the "cycle track" is too

dangerous and slow, or is blocked by snow or trashcans, or prevents them from making left turns. With a cycle track as proposed, if they choose to ride on the narrowed roadway, they cannot help but occupy the entire single travel lane. Many motorists, seeing the adjacent bikepath, will honk and scream at bicyclists and in some cases will assault them (including by deliberately passing too closely, or pulling in front and stopping short).

Response: The commenter cites AASTHO guidance that a shared use path adjacent to a road is "not a substitute for the provision of on road accommodation." This guidance is contrary to governing Massachusetts guidelines. MassDOT Engineering Directive E-09-005 explicitly states "Alternatively, a separate shared-use or bicycle path provides desirable accommodation." The AASHTO guidance is based on the assumption that bike paths along roads will prove unsatisfactory to a large fraction of cyclists who will then be forced to ride in the road. Experience in cities with cycle tracks both in North America and in Canada is that this assumption is false; the vast majority of cyclists use their cycle tracks rather than ride in the road. Moreover, because Massachusetts does not have a mandatory sidepath law, cyclists who prefer to ride in the roadway will still be allowed to do so. The few cyclists who will prefer not to ride in the protected cycle tracks provided are likely to be those who prefer being integrated with traffic and are well trained in riding this way. In that sense, an on-road accommodation is in fact provided for them.

Research on Urban Bicycle Safety

Crash type breakdown

A recent Cambridge study of car-bike collisions provided results that are very similar to research going back to the 1970s (citations available). These all find that the large majority of urban car-bike crashes are intersection-related and that few involve overtaking motorists. Cambridge found that 1/3 involves a motorist turning right or left at an intersection or driveway and that "doorings" account for fully 20% of car-bike collisions.

Response: The proposed design directly addresses (nearly eliminates) the dooring threat. It also (nearly) eliminates the threat of sideswipes and overtaking vehicles which, while less frequent, tend to be more severe.

Relative risk studies

There have been a number of studies that attempt to quantify the relative risk of different types of bicycle facilities. The difficulty in these studies is finding a large database of crashes, of controlling for exposure, and of controlling for confounding factors through the study design. Two recent Danish studies have provided all of these elements of a high-quality study and have both found that urban cycle tracks increase the risk of car-bike collisions. These findings are despite the fact that Denmark has decades of experience with cycle tracks and his been incorporating designs that reduce the intersection risk (discussed above), and despite the fact that

many Danish drivers are also cyclists and are trained to look for bicycle traffic to their right when turning right.

One of the Danish studies concluded: "Through the years many studies have shown that bicycle paths in built-up areas impair traffic safety. A new Danish study presented in this article confirms these results. It covers bicycle paths in built-up areas in medium and large towns in the western part of Denmark in a before and after study with comparison group . . .. The change [increase in injury accidents] was mainly caused by an increase in the number of injury accidents with vulnerable road users i.e. moped riders, cyclists and pedestrians by 25%(Significant). Moreover, the number of injury accidents with vulnerable road users in intersections had increased by 34% (Significant), while the effect on sections was small and uncertain."

The other Danish study showed a statistically significant 24% increase in car-bike crashes at intersections, and the reason that the overall increase was not higher, is that the data showed an unusually high percent of crashes not at intersections (which had a statistically insignificant13% decrease). The study showed a 129% increase in right-turning bike-motor vehicle collisions. There was also an 80% increase in bicycle and pedestrian crashes. The author concludes, "Bicyclists' safety has worsened due to these facilities."6

A recent study of bicycle facilities in Toronto and Vancouver7claims to show that cycle tracks provide dramatic safety benefits. However, the study was conducted when there were no cycle tracks in Toronto and hardly any Vancouver. Virtually all of the "cycle track" mileage at the time of the study consisted of an ordinary bike path on the Burrard Bridge in Vancouver, a segment which has no intersections or driveways and is heavily used as one of the few bike routes to access the downtown area. The study's conclusions were based on finding two injuries on "cycle tracks" but predicting 10 injuries based on their subject's travel routes. These numbers are too small to have statistical validity, yet the authors make extreme claims of safety, contradicting other studies, and unsupported by their own data.

Response: The Toronto / Vancouver study states that 10 cycle track sites were observed.

Both New York City and Long Beach, Calif. have claimed substantial reductions in accidents following the introduction of cycle tracks. However, neither place has released an actual study with details (such as the actual number of bike accidents, types of accidents and controls for confounding factors). Moreover, the reduction cited is usually in all accidents, which in both places are overwhelmingly accidents that do not involve bicycles (that is, those that involve motor vehicles only, or motor vehicles and pedestrians). Also, in both places an entire lane of traffic was removed, which led to some reduction in speed, which in turn may explain most or all of the changes noted.

Response: The commenter states that safety studies indicate that cycle tracks are more dangerous than riding in bike lanes in road. In fact, the preponderance of evidence indicates that cycle tracks are safer than bike lanes. The basic mechanism upon which they are based – physically

separating people from the danger of motor traffic – is simple and straightforward, and has been a basis of industrial safety in the United States for 50 years. Many European cities have been using cycle tracks for decades, with (literally) millions of users per day, including many more vulnerable users (children, seniors) than one commonly sees in the U.S., and on the whole, these countries have a far better cycling safety record than the United States. The American and Canadian cities that have experience with cycle tracks – well publicized facilities used by thousands of people – has not led to any noticeable decrease in cyclist safety, and most of the cities that have installed them, including Montreal, Vancouver, New York, Washington, Portland, Chicago, and San Francisco, continue to develop additional cycle tracks.

Relative risk studies on the whole also support segregated bikeways. The only peer-reviewed study finding that cycle tracks increased risk is from Denmark, where they found a 17% increase in crashes involving a bicycle and a motor vehicle (MV) on roads converted from bike lanes to cycle tracks, comparing three years before construction with three years after. While statistically significant, this change in risk is relatively small, especially considering that the result is an average over many projects, many of which led to a reduction in risk while others led to an increase in risk. Also, these projects led to a 20% in cyclist usage. True, they found a large increase in right hook collisions; but at the same time, there was also a large decrease in rear-end collisions, the collision type generally regarded as the most deadly. The two relative risk studies from Canada show significantly lower risk for streets with cycle tracks, and while all of those studies would have benefited from a larger sample of cycle tracks, their results are still valid, given the relatively small set of cycle tracks North America had available at the time for study. For the U.S., a study of relative risk between riding in the road and riding on sidewalks that were designated as bikeways was performed in Palo Alto, CA (Wachtel and Lewiston, 1994) found 80% greater risk for riding on the sidepath compared to the street. However, this study concerned itself only with crashes occurring at intersections. A reexamination of the same data by Lusk et. al. show (2011) that when crashes that occur *between* intersections are also accounted for, there was no difference in relative risk between the sidepaths and the road; furthermore, if the analysis is limited to cyclists riding in the same direction as nearby traffic, as would be the case with unidirectional cycle tracks as proposed for Beacon Street, the relative risk for the sidepaths was 50% compared to riding in the road.

5Agerholm et al. "Traffic safety on bicycle paths-results from a new large scale Danish study." http://vbn.aau.dk/files/14344951/agerholm_et_al._bicycle_paths.pdf
6 S. U. Jensen. Bicycle Tracks and Lanes: A Before and After Study. http://trafitec.dk/sites/default/files/publications/bicycle%20tracks%20and%20lanes.pdf

Modal Equity

The Design Exception Report dismisses one of the potential alternatives with the following statement: "The alternative does not provide an adequate balance of accommodations between cyclists and motor vehicles. With 11,000 to 13,000 vpd in addition to 500 cyclists per day, modal equity is critical." Separate documents released by the City of Somerville claim that bicyclists are 300 out of 1300 peak hour users, or 23%, and that they currently have 10 ft out of66ft of the right of way, or 15%, whereas under the cycle track proposal, they would have 15feet, or 23% of the space. Under a buffered bike lane proposal submitted by David Olmsted, they would have 24% of the space, according to the city's figures. This type of "modal equity" analysis is apparently a component of the city's decision-making process, but it is not one based on sound analysis for the following reasons:

- It has nothing to do with safety or mobility, since different modes have different operating and space requirements.
- Different modes can share the same space by using it at different times.
- Daily traffic counts would probably reveal that bicyclists account for no more than 10 or15% of total traffic and therefore "deserve" only that much of the space (under the logic of "modal equity").
- Bicyclists have the same right to use the entire roadway as motorists8, even if there is a bike lane, and thus the entire roadway is part of the bicycle "share".
- Bicyclists also have a right to use the sidewalk (if yielding to pedestrians and pausing at intersections), and thus the sidewalk should be part of the bicycle "share".
- Motorists need to use bike lanes to maneuver in and out of parallel parking and to prepare a right turn.9
- Motorists are expected to use the cycle track on the side with no parking for "emergency" parking according to the Design Exception Report.
- Pedestrians would have a right to use the cycle track, and thus the cycle track should be counted as part of the pedestrian "share"10.For all of these reasons, "modal equity" as described in the Design Exception Report is not a valid basis on which to make roadway design decisions.

Response: The main way that David Olmsted's buffered bike lane design finds space for buffered bike lanes is by removing it from the sidewalk. It is reasonable that the City should prefer an alternative that provides excellent accommodation for cyclists without reducing the space available to pedestrians over a design that, regardless of whether its impact on cyclists is

positive or negative, reduces the sidewalk width from 10 ft to 7 ft. The idea that the cycle track should count as pedestrian space is not a view that would be supported by most pedestrians.

7Teschke et al, Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study http://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2012.300762.8"Bicycles may be operated in general traffic or on sidewalks except as hereinafter proscribed." Section 13-4, Somerville Traffic Regulations.

Alternatives to the Cycle Track

In summary, according to applicable guidelines, there must be enough width on the roadway to accommodate bicycles in this type of an urban setting. Bike paths adjacent to a road are inappropriate for safety reasons in this type of setting (even if called "cycle tracks" by the proponents). There is a proven and approved alternative: provide bike lanes. Bike lanes can be widened (or newly added) by removing parking where it is not needed (e.g., adjacent to American Academy of Arts & Sciences) and by creating parking bays out of a portion of the existing utility strip on the sidewalk in order to reduce or eliminate the risk of "dooring" crashes. A bike lane to the left of a right-turn only lane could be used at high right-turn locations such as Park Street and Washington Street. The current AASHTO recommendations are that a bike lane should be 6 ft wide when next to a narrow (7 ft) parking lane in order to provide room to ride outside the door zone. Where there is room, a 3 ft buffer zone could be striped between the 7 ft parking lane and a 4 ft bike lane (which would not be adjacent to parked cars, and which therefore could be the minimum 4 ft width). In locations where it is not possible to provide a bike lane outside the door zone, shared lane markings could be placed in the travel lane, and the 3 ft buffer zone next to the parking lane could be maintained.

Bicyclists are legally permitted to ride on the sidewalk on Beacon Street, provided they yield to pedestrians and, following pedestrian rules, pause at every crossing to ensure that no one is about to turn across the crosswalk. This option is suitable for young children (with escorts) or others who wish to ride slowly and away from motor vehicles. It is not necessary to provide a "cycle track" to accommodate this need. Moreover, the current proposal would require bicyclists to move back and forth between bike lane and sidewalk, and thus would not really satisfy users who are afraid to ride on the roadway (and for those who it would satisfy, they would also be satisfied with bike lanes on the roadway, especially if they were outside the door zone).

As the guidelines point out, bicycle sidepaths (or "cycle tracks") are inappropriate in this type of urban section. Bike paths belong on certain types of independent corridors, or limited access roadway alignments, but not on city streets. If MassDOT approves the project without changes, it will potentially expose state and city agencies, and design contractors, to liability for failure to follow their own standards. Furthermore, it will create a precedent that may be used by other communities to design projects that remove bicyclists from the roadway onto sidewalk-like facilities. Although there may be lots of support for such efforts, they would reduce both bicyclist safety and mobility.

Response: We are pleased that the commenter supports bike lanes, a design proposed for part of the corridor. We disagree, however, that cycle tracks are inappropriate, and believe that they offer cyclists a better level of service and safety in the sections in which they are proposed.

"When turning to the right, an operator shall do so in the lane of traffic nearest to the right-hand side of the roadway and as close as practicable to the right-hand curb or edge of roadway." M.G.L. Ch. 90 Sec. 14.10"Pedestrians are prohibited from walking in bicycle lanes (except as necessary to cross said lanes in a properly marked crosswalk), but are permitted to use bicycle paths." Section 13-6, Somerville Traffic Regulations.

COMMENTS FROM JOHN ALLEN

Preference

There are far better solutions than the proposed cycle tracks. As a cyclist, my preference is to widen the traveled area of the street. I know two ways to do that:

- The one I most like was put forward by David Olmsted, and would narrow the sidewalks to 7 feet-still ample-in order to widen the roadway and allow bike lanes to be safely outside the door zone of parked cars. As Olmsted has suggested, bump-outs around utility poles would avoid the need to move most of them. This solution would entail little or no reduction in the on-street parking which is important to residents and businesses along Beacon Street. This option also would allow improvement east of Washington Street, where parking demand is high and the proposed design would make no improvement. I am pleased to hear that the design consultant considers Mr. Olmsted's option to be feasible.

- Another option would remove parking on one side of the street, as already proposed in the current plan, so a bike lane on the other side can be placed safely clear of parked vehicles.

As a bicyclist, I'd be happy with either of these options, or a combination of them. I understand that parking removal is not popular with residents, but on the other hand, it is already under discussion, and with bicyclists on the widened roadway rather than behind parked cars, safety is better than with the proposed cycle tracks. Far fewer parking spaces needs be removed, because blind conflicts would not occur between bicyclists and turning motorists at driveways. (I'll have more to say about that later).

Also attention needs to be paid to intersections so that cyclists have a clear line of travel through them, and so motorist are directed to merge across cyclists' line of travel when preparing right turns. This can be accomplished by removing a few parking spaces before major intersections, so as to create right-turn pockets.

Other desirable amenities would include bicycle parking, and speed tables at crosswalks so as to control motorists' speed. Traffic-law enforcement and signal timing also can help with this. An educational campaign would inform travelers as to how to use the corridor safely and efficiently. Parking management could lead to more efficient and convenient use of available parking resources, to the advantage of residents and businesses.

Response: The Olmsted design has been discussed earlier in this document. Please see the review of the design under comments from David Olmsted.

I also note that a bikeway in the unused width of the Fitchburg Line rail corridor has been proposed, and this would provide a nearby parallel route suitable for timid or child cyclist. This possibility has already been discussed by the City of Cambridge.

Response: To the best of our knowledge there are no imminent plans for a bike project in the Fitchburg Line rail corridor.

The Proposed Design

The proposed design would have a sidepath ("cycle track") behind parked cars over much of the southwest side of Beacon Street, and a bike lane behind a mountable curb (also called a "cycle track", though it would function as a bike lane) on much of the northeast side. In the section from Museum Street to Park Street, parking would be removed on the south side, and a sidewalk would be added there. This segment would have bike lanes on both sides, but due to the narrowing of the roadway, the one on the north side would be in the door zone of parked cars, as at present. East of Washington Street, there would be no change from the present configurations, with parking on both sides, and bike lanes in the door zone.

Technical Issues

A primary one is that the Beacon Street corridor is not wide enough to accommodate the sections with cycle tracks without very serious impairment of traffic flow. The reduction of on-street parking would inevitably result in a major increase in illegal parking and standing, as has been at least indirectly acknowledged by the Mayor of Somerville (In a letter to Beacon Street business owner Domenic Rocco):

Fuel deliveries will occur as they have always occurred - and at the same locations. Either the trucks will cross the mountable curb of the cycle track to enter the driveways they currently use or, as in the case of the photograph you sent in, they would park in front of the abutter. They would do this in the new design by mounting the cycle track and blocking it for the limited time needed to deliver the fuel.

In other words, fuel truck will do what they have always done: single-park or double-park in front of the delivery location and obstruct traffic flow (bicycle or auto) until the delivery is complete.

But it isn't the same, because, without parking, the fuel trucks and other delivery vehicles on the side without parking will have to stop in the cycle track rather than in the parking lane; and parking spaces on the other side will be more heavily occupied.

Response: The commenter cites operational problems on the northeast side of the street caused by fuel trucks and other vehicles mounting the curb and parking in the cycle track. The inconvenience that such obstruction causes, when necessary (e.g., for fuel delivery) are a necessary and tolerable aspect of urban life. The idea that a mountable curb may invite unnecessary, illegal parking than is necessary will be considered in further stages of design to see whether a vertical curb might be used to deter illegal parking while still being mountable by a fuel delivery truck. Additionally, the commenter cites there will a major increase in illegal parking and standing. The parking study shows that parking will be sufficient to support demand. To negate the potential for illegal parking and standing, parking was changed from the northeast side to the southeast side adjacent to the majority of businesses. Also the City is searching to acquire off street parking.

There are other technical issues:

- Most car-bicycle collisions occur due to crossing and turning movements. "Right hook" and "left cross" collisions are the most common types and the most common causes of fatalities to cyclists in urban areas. Beacon Street has dozens of residential and commercial driveways, and several street entrances and crossings. Cycle tracks behind parking trip bicyclists where they are hidden from crossing and turning motorist. Lacking parking setbacks as every intersection and driveway, cycle tracks force motorists to turn across the path of bicyclists they cannot see.

In that context, here is another quote, from Somerville Planning Director Hayes Morrison:

"Neither the AASHTO green book not the MUTCD have any parking restrictions at driveways. At these locations, parking restrictions will be consistent with the (Somerville) April 2011 Traffic Regulations, which state that parking is prohibited 'in front of any driveway, including 2 feet in either direction from the driveway'.

No current legal spaces at either side of driveways on the southbound/even side of the street will be eliminated."

Response: The commenter is concerned that there won't be adequate sight distance at driveway intersections. The narrow width of driveways ensures that drivers will turn into them at very low speeds, giving both the driver and an approaching cyclist (or pedestrian) time to react and avoid a collision. The obstruction such right-turning vehicles pose to through traffic is a minor and everyday part of urban traffic.

A 2-foot clear zone to parking either side of a driveway may be sufficient for safety of pedestrians on a sidewalk, but it by no means provides adequate sigh triangles between motorists entering driveways, and bicyclist traveling at speeds up to and beyond 20 miles per hour, concealed behind a line of parked motor vehicles. Furthermore, the AASHTO Green Book is not AASHTO's reference on bikeway design. That is the AASHTO Guide for the Development of Bicycle Facilities, which includes numerous warnings about the hazards of bikeways behind parking and which cross driveways.

- Motorists who are aware of the driveway crossing hazard will slow to a crawl, blocking traffic in the street. The motorists are supposed to yield to bicyclists, but because of the protruding hoods of their vehicles, they can't see the bicyclists, and the bicyclists will have to yield. Safe bicycle speed also, then, is very slow.

- A bikeway behind parking designated for one-way travel also promotes two-way travel, leading to greatly increased risks, because motorists and cyclists converge on each other from unexpected directions.

Response: The commenter claims that two-way cycling on the parking-protected cycle track will be common. Because the cycle track transitions to and from a bike lane at either end, its unidirectional nature will be self-enforcing; cyclists will have no more incentive to ride the wrong way on the cycle track than they would to ride the wrong way on a sidewalk in a solution with bike lanes.

- Dividing up the width of a road corridor reduces the usable width due to the increasing number of buffers required. Specifically, the proposed design trades a left-side door zone for a right-side door zone. And, then with the "reveal" (low curb) on the sidewalk side of the bikeway, only about 4 feet of its width will be clear of these hazards. Motorists will open their doors on the street side, no longer in conflict with bicyclist, but instead in conflict with motor traffic.

Response: The City, DCI and MassDOT have worked on at least a half dozen sections to eliminate increasing the number of buffers required. For instance the right side door zone as referenced above also provides a vertical transition for gaining elevation to access driveways. On the North side where parking is proposed to be prohibited the cycle track is not 4 ft, it is a minimum of 5ft. As for the last comment the MassDOT has required a 13ft lane to facilitate eliminating opening any door to traffic.

- The ability to overtake on cycle tracks is limited by their width, and as the one behind parking reaches capacity, all bicyclist will be limited to the speed of the slowest.

Response: The commenter says that the ability to pass other cyclists will be limited. The cycle tracks are wide enough that, with cooperation (e.g., using a bell), cyclists will be able to pass one another. Experience in Montreal with very busy but narrow cycle tracks indicate that they

operate very successfully (very well patronized) even when cyclists cannot pass one another at certain times of day. On Beacon Street, intersections will provide frequent wide areas that provide passing opportunities.

- Over the years, the traffic mix is going to change in unpredictable ways, with different types of vehicles of different widths, and which travel at different speeds. A single, wide roadway can adapt dynamically to different traffic mixes and can be restriped if needed. The unchangeable, literally cast-in-stone reconfiguration proposed for this street offers no such flexibility. Cycle track installations in other cities are typically implemented using striping, traffic islands and removable barriers, retaining flexibility for reconfiguration. Cambridge, and now Somerville, is unique in grasping the opportunity presented by full-depth reconstruction to narrow roadways irrevocably.

Response: The commenter suggests leaving broad areas of shared pavement in anticipation of new forms of transportation. Broad shared pavement areas do not adequately serve today's bicyclists, and the Boston region has many roads with broad paved areas should they be needed.

- Where would residents put out trash barrels? Answer: on the cycle track, if Concord Avenue in Cambridge offers any example.

Response: The area between the cycle track and walking path is "the furniture zone" is specifically for poles, trees, bike racks, benches and temporary uses such as trash and snow.

- Pedestrian-bicycle conflicts increase, and particularly at intersections and bus stops.

Response: Again we are proposing to relocate the bus stop away from the cycle tracks and the intersections are being designed as part of the 75% design to enhance site distance and limit vehicular speeds.

- Cycle tracks are difficult to keep clear of snow, ice and trash. That is particularly true of the proposed design. A snowplow truck would have to keep clear of the mountable curb on the northeast side, or risk damaging it. The gutter at the foot of the mountable curb is a conduit for stormwater, and at a time of melting and freezing, it becomes a sheet of ice. Keeping a cycle track between parking and a sidewalk clear of snow and ice so that it is rideable is very difficult. By way of contrast, a conventional, crowned street profile carries meltwater away to the curbs.

Response: As stated at all the public meetings the City of Somerville is prepared to maintain the cycle track and understands that the effort involved to do so is increased.

The Research Literature

Repeated claims of safety for cyclists have been made for the propose design, back up by erroneous and selective interpretation of research literature.

The Design Exception Report for the project cites a Montreal study which claims a 28% reduction in crashes on cycle tracks, compared with streets. That study lacks credibility, because it makes invalid comparisons, and also fails to count injuries to pedestrians. A careful analysis of that study is available here: http://john-s-allen.com/montreal-kary.html.

The Design Exception Report also cites the large and careful 2007 Copenhagen study. That report shows that the overall crash rate increased by 10% and the crash rate for cyclists, by 30%. The conclusion are unequivocal, see http://www.facebook.com/media/set/?set=a.1422969945625.54796.1574017310&1=6D6BAF5BF4. This is despite the much smaller number of driveways on the Copenhagen installations. The design of the Copenhagen installations is much more ample and forgiving than that of the proposed Somerville installation. The Design Exception Report has turned the Copenhagen report on its head, claiming that it actually shows a reduction in the crash rate.

European practice is often held up as a model for American to follow, but it should be noted that there has been much opposition to under designed bikeways in Europe, particularly in Germany. Here, for example, is a quote from Tilman Bracher of the German Cycling federation, commenting in 2007 about a study of bicycle crashes in Berlin conducted by that city's police department:

> The problems with sidepath placement leading to crashes at intersections and driveway are known to police an planners in Berlin, and the knowledge has spread…Bikeways are now, as a rule, planned as bike lanes on the roadway, or bicyclists ride in mixed traffic. Many sidepaths have been removed. We are on the way to make the new planning that started with the police study mainstream.

This quote and other documents illustrating the same point may be found linked at

http://www.bikeexprt.com/bikepol/faci/sidepath/index.htm

The example which I think is most relevant to the proposed design is from Davis, California, where on of three designs tried in the 1970s was bikeway behind parked vehicle, a design quickly abandoned due to hazards recognized by bicycling advocates of all shade of opinion, in a community with heavy bicycle use and a climate of strong support for bicycling. A summary of the Davis experience, with links to documentations, is here: http//john-s-allen.com/blog/?p=1927.

Response: With regard to safety research, the preponderance of evidence indicates that cycle tracks are safer than bike lanes. The basic mechanism upon which they are based – physically separating people from the danger of motor traffic – is simple and straightforward, and has been a basis of industrial safety in the United States for 50 years. Many European cities have been using cycle tracks for decades, with (literally) millions of users per day, including many more vulnerable users (children, seniors) than one commonly sees in the U.S., and on the whole, these countries have a far better cycling safety record than the United States. The American and

Canadian cities that have experience with cycle tracks – well publicized facilities used by thousands of people – has not led to any noticeable decrease in cyclist safety, and most of the cities that have installed them, including Montreal, Vancouver, New York, Washington, Portland, Chicago, and San Francisco, continue to develop additional cycle tracks.

Relative risk studies on the whole also support segregated bikeways. The only peer-reviewed study finding that cycle tracks increased risk is from Denmark, where they found a 17% increase in crashes involving a bicycle and a motor vehicle (MV) on roads converted from bike lanes to cycle tracks, comparing three years before construction with three years after. While statistically significant, this change in risk is relatively small, especially considering that the result is an average over many projects, many of which led to a reduction in risk while others led to an increase in risk. Also, these projects led to a 20% in cyclist usage. True, they found a large increase in right hook collisions; but at the same time, there was also a large decrease in rear-end collisions, the collision type generally regarded as the most deadly. The two relative risk studies from Canada show significantly lower risk for streets with cycle tracks, and while all of those studies would have benefited from a larger sample of cycle tracks, their results are still valid, given the relatively small set of cycle tracks North America had available at the time for study. For the U.S., a study of relative risk between riding in the road and riding on sidewalks that were designated as bikeways was performed in Palo Alto, CA (Wachtel and Lewiston, 1994) found 80% greater risk for riding on the sidepath compared to the street. However, this study concerned itself only with crashes occurring at intersections and driveway junctions. An analysis of the same dataset by Lusk et. al. show (2011) that when crashes that occur between intersections are also accounted for, there was no difference in relative risk between the sidepaths and the road; furthermore, if the analysis is limited to cyclists riding in the same direction as nearby traffic, as would be the case with unidirectional cycle tracks as proposed for Beacon Street, the relative risk for the sidepaths was 50% compared to riding in the road.

Anecdotes from Berlin and the 1970's in Davis, CA, can be countered many times over by accounts of cycle track development in Europe and in many American cities, including Davis. Davis's traditional bike lanes work fine on low-volume streets, but on several higher volume streets, they have cycle tracks.

Project Documentation, and what it shows:

Plans for all MassDot projects are supposed to be posted online at 25 percent design review, along with a basic project checklist that includes measures of pedestrian and bicycle accommodation.

Overhead views were hung on the walls and placed on tables at a January 28 public meeting so meeting attendees could write suggestions on them, and then these were withdrawn for review by the consultant. Plans were not online as of the February 4 public hearing. The only engineering drawings online were three cross-section drawing. The available documentation did not show anything, for example, about traffic signal timing, construction phases, or utility connections. The overhead views showed only the proposed treatment, without reference to existing

condition. The overhead views were not dimensioned. Similar drawings were posted at the February 4 meetings, and again, these did not qualify as engineering documents.

Response: The referenced drawings were presentation drawings to help the general public understand the improvements. Sets of the 25% design plans were available at the meeting, the Somerville DPW, Somerville Planning Department and at MassDOT district office and MassDot Boston office.

In reply to a request for the plans from a Somerville resident between the times of the two meeting, the City sent an e-mail with the same watercolor paintings of conceptual street views which where already available in the Design Exception Report. Just looking at them, it is obvious that they are inaccurate; for example, the cycle track on the side with the mountable curb is shown much wider than the 6 feet described in the cross-section.

Response: Please see response above.

Some highly unfortunate design elements also are shown. The mountable curb is of brick. Does anyone involved in the design of this project understand what it is like to ride a bicycle over a brick surface with a side slope? One of the paintings shows a series of traffic islands with plantings, which do not correspond to any of the described cross sections. These, and a traffic island in another drawing, force motorists to make wide right turns from the left of the island, with cyclists to its right, It's bad enough to require motorists to turn right from the left side of bicyclists, but thanks to the width of the island, bicyclist often will be outside the scope of the motorists' right-side rear view mirrors.

Response: These reference islands have been shown on the 25% design plans to increase visibility and help manage the intersection by enhancing pedestrian and bicycle awareness. Planting would be very low style of vegetation design to not reduce visibility. Planting and detail in these areas are expected at the 75% design.

All of the watercolors represent daytime lighting conditions, but they show astonishingly low levels of traffic of all kinds-bicycle, motor and pedestrian, a traffic volume which might be expected at 3 AM on a Sunday morning. One drawing shows a cyclist riding the wrong way on a cycle track. No directional markings are shown.

Response: Again a full 25% design is available at the locations identified above.

At the February 4 public hearing, the design consultant described a new design element: a 3-inch "reveal" between the cycle track and sidewalk. This is another name for a low curb, a longitudinal step. It would sweep the front wheel of a bicycle aside, preventing balancing the bicycle and resulting in a hard fall. It would also complicate snow clearance.

Response: The 3" reveal sloped curbing will be a 6:1, 1" vertical to 6" horizontal, it will be flat enough to negotiate on a bicycle without sweeping the front wheel, unlike a longitudinal step referenced above.

These issues do not promote confidence in the functionality of the design, or in the public process.

Summary

To summarize, I strongly advise that the Beacon Street reconstruction be configured to provide more travel width in the roadway, so that bicyclists and motorists can share it safely and amicably; that intersection design reflect best practices of traffic flow, and particularly, destination positioning so that drivers merge before turning rather than turning abruptly across the line of travel of cyclists; that motorist speed be controlled through speed tables, signal timing and traffic law enforcement; that education and parking management be part of the planning for the project; and that alternate, truly safe and separate routes be developed for cyclists who are uncomfortable with riding on an improved Beacon Street.

COMMENTS BY ASTRID DODD

I have lived on Wendell St., Cambridge, a block and half from Beacon Street for 40 years and have crossed Beacon Street on foot at least twice a week for that long, chiefly to reach the Star Market. I walk along Beacon Street to reach Port Sq. and the MBTA Red Line. Walking is the only way I experience Beacon Street, so I am keen student of cyclist, pedestrian, and motorist behavior on Beacon Street.

All of us who depend on Beacon Street welcome its long-overdue reconstruction. However, I object to adding a cycle track to the Beacon Street Project. The great safety this cycle track buys for cyclists is an illusion. The increased danger of cyclist-pedestrian conflict is real.

After I itemize the problems the cycle track will create, I will mention some crosswalk issues that I hope you will address, particularly Somerville's misguided plan to pave crosswalks in low-visibility pavers.

My Cambridge neighborhood lobbied more than a decade ago for two improvements now in the Beacon Street plan that I trust will stay there because they are crucial for pedestrians and benefit everyone:

Adding a sidewalk along the American Academy of Arts & Sciences property will finally provide for continuous pedestrian travel on the south side of Beacon.

Response: This is sidewalk is considered one of the primary safety improvements in the corridor. It is a top priority and has been included in the 25% design.

Reconfiguring the top of Oxford where it meets Beacon St so that Oxford becomes a distinct right turn off Beacon. Right now the top of Oxford is so wide that 90% of MV drivers do not signal their intent, leaving cyclists, pedestrians and other drivers playing a tough game of chicken.

Response: The improvements at this intersection are proposed to better channelize motor vehicles bicycles and shorten the pedestrian crossing length. The intersection is a top priority and is currently part of the 25% design.

The Proposed Cycle Track: Chief Problems for Pedestrians

1. Peds & Bikes at the same elevation invite Ped-bike conflict.

The absence of an effective physical barrier between the proposed cycle track and the sidewalk means there is no obstacle to cyclists "borrowing" sidewalk space just as cyclists now use curb cuts to access city sidewalks. On one side of Beacon there is no change in elevation, on the other just a 3" mountable curb. Cyclists will swerve onto the sidewalk when they encounter other cyclists, errant trash cans, or a mound of snow.

Response: Although the cycle track is at the same elevation at the sidewalk on the south side it clearly defined and not part of the sidewalk. The sidewalk width is at least 10 for the entire cycle track length. The cycle track width is 9 feet on the south side. The two spaces are clearly wide enough and are defined by pavement color contrast, signage, pavement markings and more importantly physical vertical elements. The physical elements included in this furniture zone are trees, utility poles, trash receptacles, Benches, bike racks, signs, meters and in winter potentially snow and on trash-day, trash cans. The widths, the demarcation and the physical constraints create two distinct facilities. Hence, "borrowing the sidewalk," if it occurs, will be deliberate act not an accident, just as cyclists today can ride on the sidewalk. However, unlike today, the proposed plan gives cyclists a safe space of their own, reducing the incentive to use the sidewalk.

2. Visual "Barriers" don't count & may cost

Cyclists who want to pass cyclist, small children and dogs, will not be deterred by a decorative, flat brick strip between the cycle track and the sidewalk, nor by trash cans or decorative light poles. Brick strips, tree wells and tress can be hazards for pedestrians with impaired vision or mobility.

Response: Again the sidewalks are wide and separate and the hazards in the future are anticipated to be no greater the present.

3. Trees: Amenity or peril?

What I see on the cycle track/sidewalk plan are long lines of street trees that:

- are too close together for tree health

- cast shadows at night making it hard to see trip hazards or cyclist
- need pruning to prevent ped and cyclist eye damage
- have metal tree grates that can be a slip or trip hazard for ped and cyclist alike
- have trunks that if run into are a hazard & will eventually have roots that upheaval the cycle track-sidewalk

Response: Trees are a vital component to a livable community and the city is committed to maintaining trees wherever feasible.

4. Who maintains the sidewalk and cycle track?

Must adjacent property owners clear snow and ice and leaves from the cycle track as well as the sidewalk? Where do the trash and recycling barrels go? If they block the cycle track on trash days, do cyclists detour to the sidewalk? Must DPW workers look both ways before claiming barrels from the cycle track?

Response: the City has acknowledge the additional maintenance required for the cycle track and has committed to maintaining the track in several public hearings

5. Problems for both peds and bikes when the cycle track ends or is interrupted.

At the 40+ driveways and 10+ side streets interrupting the Beacon St. cycle track, all effort to separate cyclist and pedestrian ends.

"Off-road ride-out" is a well-documented point of MV-bike collision that surely applies to cycle tracks. MV drivers are not in the habit of looking for cyclists riding off of sidewalks/cycle tracks into their path. Do MV drivers look both ways for cyclist twice - on the cycle track and in the road?

Response: It is incumbent upon the motor vehicle driver to be aware of the pedestrians and bicyclist alike. As stated elsewhere the project proposes to provide enhanced sight distances at the 6 intersections that are along the southern cycle track section. Also described elsewhere in this document is the conflict at the driveways where the cycle track rider are proposed to be in front of the parked cars for vehicles exiting the driveways which are often backing out. It is believed that this is indeed safer for the cyclist

At every driveway and cross street, bike-ped conflict rises. Cyclist will approach and leave the cycle track in the path of crossing pedestrians. Peds negotiating passage in front of MV's exiting a driveway or side street must simultaneously negotiate with approaching or passing cyclist.

Each end of the cycle track - at the RR bridge and at Washington-Kirkland-creates a temptation to cyclists to continue on the sidewalk rather than the road.

Response: the design clearly shows the cycle track coming to grade and transitioning to the roadway elevation not the sidewalk elevation. Additionally, at the 75% design signage will be developed to further guide the cyclist.

How eager will cyclist be to move into the roadway if there is a sidewalk nearby with an approachable curb cut? Most pedestrian object to sharing the sidewalk with cyclists. Businesses should object to sidewalk cycling unless they think it's ok that customers have to look both ways as they leave store.

Response: It will be clearly signed and demarcated separating pedestrian and bikes. And just as most pedestrians prefer being separate from bikes, most cyclists prefer being separate from pedestrians. The desire to find the "fastest path" will create a strong incentive for cyclists to transition to the bike lane, not to transition to the sidewalk.

Many people believe that municipalities are permitted by state law to prohibit sidewalk cycling only in "business districts". This is not the case. Cities and town can ban sidewalk cycling anywhere and should.

Unless Somerville intends to use the Beacon St. cycle track as a foot in the door to city-wide sidewalk cycling, it should act now to ban sidewalk cycling in all but designated (and posted) sidewalks.

Response: The City will consider this comment.

Hearing proponents of the Beacon cycle tack dwell on the need to build this 1.1 mile (interrupted) cycle track so that young families with children will try cycling, I fear the cycling community already covets public sidewalks and this cycle track is the proverbial foot-in-the-door. The new AAAS sidewalk will be a test, yes?

Response: If it somehow were the desire of the cycling community to ride on the sidewalks, they would be riding there already, since it's allowed under current regulations. At the American Academy of Science, the City will provide both a new sidewalk and a cycle track, evidence of its commitment to providing pedestrians with a safe place to walk.

6. Seeing invisible cyclists: Will Beacon St. Pedestrians get any help with this hazard?

The single greatest challenge Beacon St. pedestrians face now is how to cross Beacon at dusk or after dark - or even on a rainy day - without walking out in front of an invisible cyclist. Beacon St cyclists are, on average, better at being visible, including observing the state law requiring cyclists to have a white light in front visible from 500' from dusk to dawn. My job is to avoid the 1 in 3 who right now do nothing to help me stay out of their way at the present unsignalized Sacramento crosswalk. The danger to peds of un-lit cyclists will only increase with a cycle track. Traffic signals are no protection from unlit cyclists because more than half of Cambridge and

Somerville cyclists ignore red lights. Unlit cyclists on the Beacon cycle track will be a constant hazard to pedestrians, all the more so for being silent and nearby at all times.

If Somerville and MassDOT intend to encourage walking as much as cycling, it should be easy to figure out a way to induce cyclist compliance with this state law - at least on Beacon St.

Response: The designer will investigate the need for additional street lighting. Also, a pedestrian signal has been added to the Sacramento Street intersection.

7. 25% of Americans have Disabilities

25% of Americans have a disability of some kind, not always obvious and not limited to the elderly. How can pedestrians with disabilities - including limited vision, mobility, hearing or cognitive processing skills (and that last includes young children) - mange to safely co-exist with fast-moving bicycles on a cycle track that looks like a sidewalk? Walking is one of the few forms of exercise easily available to older Americans of limited means; MassDOT and Somerville need to consider whether their mission is to facilitate the opportunity for walking as exercise for all residents young and old, especially older residents of limited income who can't afford a health club or even the car to drive to a mall.

Response: As part of this project, new crosswalks and sidewalks will be added, existing sidewalks, crosswalks and pedestrian signals will be enhanced and most importantly non-compliant pedestrian ramps will be upgraded to meet current accessibility regulations. In the spirit of complete streets the pedestrian is not left out.

8. Bike-Ped Collisions are not a Figment of Pedestrian Imagination

Bike-ped conflict exists; it damages bodies and alter lives. Two Hunter College researchers (Tuckel & Milczarski, 2009) analyzed data from 100 hospitals emergency rooms across the US and found evidence of at least 1,000 bike-ped collisions each year in the US between 1980 and 2009 that resulted in hospital emergency room treatment for a pedestrian victim. Their later, 2011 study of ped-bike collisions found 1,000 pedestrians per year sought emergency room treatment in New York State alone. There may have been injured cyclists, but the hospital coding system they used applied only to injured pedestrians. Tuckel & Milczarski didn't attempt to allocate blame for collision, only to document the existence of bike-ped conflict that results in pedestrian injury and death. They did this because the extent, incidence, and severity of bike-ped conflict has been an anecdotal matter until now easily dismissed by the cycling community and, apparently, by transportation planners at all levels.

It should not be beyond cyclists' imagination that the qualities that make bicycles environmentally friendly are the very qualities which make them a hazard to pedestrians; small, fast and quiet. Cars may be bigger, noisier, and faster than bicycles, but pedestrians have a much better chance of seeing and hearing them in time to protect themselves.

Response: Having cyclists behave in a predictable manner is one important way to reduce the incidence of bike-pedestrian conflict. The proposed cycle track will give cyclists a path that is reliably clear and safe from moving and parked cars, and should therefore contribute to making cyclists' movements more predictable.

9. Cycle track questions about which I have not Found Any Answers

How many times will the elevation change underfoot in Beacon Street crosswalks that intersect the cycle track/sidewalk?

Response: At present the sidewalk and roadway are proposed to be at the same elevation as they are today, hence the change in elevation will occur at the side streets only.

Whose job is it to clear snow and ice from the access to crosswalks, including opening up plow ridges?

Response: Although the maintenance along the cycle track will be enhanced, the city will review the entire operation as it relates to crosswalk and pedestrian ramps.

Are cycle tracks defined as one way only in the direction of MV traffic on that side of the road? If the answer is yes, how is that message conveyed to cyclists and/or enforced? If not, how do cyclists going in two directions on a cycle track avoid each other?

Response: Yes the cycle track is one way. It will be conveyed by pavement marking signage and geometrics.

Are cyclists obligated to use a cycle track if there is one, or is it optional?

Response: The cyclist always has the option of riding in the street, for example, if the cycle track is blocked by a fuel truck or if preparing to make a left turn.

If cyclist can/will still ride in the road, does that mean that, as a pedestrian crossing the road, I must watch for lit and un-lit cyclist in four places - in the road on both sides and in the cycle track on both sides?

Response: Yes, in essence one would look at the cycle track and then at the travel lane for any vehicle including: bikes, scooters, motorcycles, cars and trucks.

Does Somerville have a plan to require Beacon Street cyclists to comply with the state law requiring a white light in front visible from 500'? Whether the cycle track is built or not, why is it not a condition of MassDOT highway funds that MA cities and towns develop programs to increase cyclist compliance with state law?

Response: This is not a design issue; it is an enforcement or policy issue that is better addressed through other channels.

BUS NO. 83 DISRUPTION - Two #83 bus stops on Beacon near Park St. are in the way of the cycle track and slated to be moved to Park St. Ironically, this move returns the inbound bus stop to a location on Park that was tried and found severely wanting. Riders waiting on the narrow Park St. sidewalk for bus 83 must fasten their gaze on the top of a very high, sharp Park St. hill over which the 83 bus comes, fast, hoping to make the green light for a left turn onto Beacon. Since there is no clue to the bus' approach until it appears at the top of the hill about 50 feet away, the bus patron has to be ready to signal the MBTA driver instantly or risk missing the bus. Now the same will be true of bus 83 outbound riders: if the stop is moved to Park, busses approaching on Beacon will be out of sight. As a solution to cycle track-bus conflict, this move demonstrates disregard for the comfort and well being of MBTA bus patrons. Also disregard for T bus drivers, who probably disliked the Park St. bus stop as much as the bus patrons did. Moving these two Bus 83 stops to notoriously inhospitable Park St. locations continues the decades-long saga of chipping away at public transportation on Beacon St. In about 1975, Bus 83 ran the entire length of Beacon, but had to detour "temporarily" to Somerville Ave. because the Beacon St. RR bridge was too weak. In 1980, the MBTA gave residents a letter promising that bus 83 would return to upper Beacon when the bridge was rebuilt. In 1993, the MBTA and Somerville jointly decided to renege on that promise.

Response: The city will continue to work with the MBTA to provide an appropriate and safe environment for the MBTA patrons. The stop locations will be carefully reviewed with respect to appropriate space to accommodate ADA accessibility regulations and promote safe boarding's and alighting's that occur at the stops. Boarding and alighting numbers are available for the existing stops by the MBTA.

CROSSING BEACON STREET ON FOOT: EIGHT PROBLEMS TO FIX

For Beacon Street to be "a complete street", it has to work as well for pedestrians as it does for everyone else. Pedestrians do care about the quality of the sidewalks along the roadway, but they care equally about crossing the road.

1. Paving Crosswalks in Reddish Brown Paver Edged in Granite Does Not meet Currently Accepted Standards for a Pedestrian Traffic Control-Safety Device.

   This aspect of the Beacon St. plan should be scrapped:

   To be visible at night, crosswalks need to be marked in bright, white, bold reflective stripes that are slip-and trip-resistant. This color and pattern is the symbol for "pedestrians crossing" most easily recognized by fast-moving cyclists and distracted drivers. It is the pattern that best illuminates pedestrian presence in the crosswalk, especially at night and in bad weather. Granite edging of crosswalks is a slip hazard. Crosswalks are technically a "safety device" and should not be camouflaged or decorated in the name of street beautification.

Response: The Brick crosswalks would be lined with a single white thermoplastic 8" crosswalk line to reinforce the crossing making the crossing retro-reflective and MUTCD compliant.

2. Add a Crosswalk on Upper Beacon At Prentiss or Forest Street

   It is a half-mile walk from the RR bridge crosswalk to the Sacramento crosswalk, a preposterously long distance that surely doe not reflect MassDOT guidelines for pedestrian facilities in urban areas. A crosswalk should be added at Forest or Prentiss, unsignalized if necessary.

Response: Added

3. Leave the Sacramento Crosswalk Where it is Now

   The present crosswalk at Sacramento from O'Sullivans to Star Market reflects four decades old pedestrian desire lines for reaching the Star Market/Shaws. At certain times of the day and week, a steady stream of pedestrians crosses Beacon in the present crosswalk in order to grocery shop. It has been upgraded over the years to the point that it works well for an unsignalized crosswalk. It links the Cambridge-Somerville neighborhood south of Beacon St. to Beacon Street's largest business, Star Market, depositing pedestrian at a break in the Star parking lot fence which is the shortest walk to the store's front door.

Response: Currently in 25% revised plans

4. Advertise the RR Track Underpass to Somerville Ave with Murals, Signs, Painted Line on the Road on Both Ends - Not a Crosswalk that put Peds in Conflict with Supermarket Delivery Trucks.

   Installing a new crosswalk to line up closer to the RR track underpass is neither necessary nor safe. A crosswalk ending at the NW corner of the Star parking lot puts pedestrians in conflict with MV traffic turning into and out of both the Star parking lot, some of it 16 wheelers accessing the Star loading dock. As a frequent user of the underpass to reach Bus 87 or 83 on Somerville Ave., I find the present Sacramento crosswalk convenient, safe and direct.

Response: Although this issue is not part of this linear project the City of Somerville has agreed to review analysis this important pedestrian connection. Once improvements have been determined the city will prioritize them and determine a construction schedule.

5. The Museum Street Crosswalk should not be Eliminated

   It reflects decades-long pedestrian desire lines. Yes, pedestrians can walk up to Sacramento or down to Scott St. on the new AAAS sidewalk, but should they have to? During the academic year, it is a vital route on foot to access Harvard.

Response: The Museum crosswalk is currently retained in the 25% design.

6. No Signalized Intersection should Require Pedestrians to Wait More than 90 Seconds

   This applies to signals that have an automatic WALK and those that do not. Cambridge has applied this standard with great success.

Response: The designer will take that under advisement while evaluating all modes of transportation and creating modal equity.

7. All Signalized Beacon Intersections should have an Automatic Walk Cycle.

   Pedestrians should not have to wait every time they want to cross the street. Eliminating push button treats pedestrians as motorists and cyclists are treated: sometimes you luck out and sometimes you don't. It tells pedestrians that they are not at the end of the transportation food chain. The intersection at Park-Scott and Washington-Kirkland must have high enough pedestrian volumes to justify automatically recurring WALK signals.

Response: Please see the response to item 6 above.

8. Beware Raised Crosswalks

   Several people have promoted "raised crosswalk". If they are paved with reddish brown pavers, they are not visible enough and are not as likely to be recognized by drivers as a pedestrian crossing zone. If raised crosswalks must be shared with cyclist riding across side streets from one cycle track section to the next, the raised crosswalks will not be wide enough. Raised crosswalks at side street entrances to Beacon St. will make it difficult for MV drivers to pull out cautiously and navigate around peds and bikes in order to enter Beacon St. safely.

Response: the city is considering the potential for raised crosswalks. If they are developed further than specific attention will be given to separating the modes of travel by surface color texture and signage.

SUMMARY

The frequently changing conditions of a cycle track that share a sidewalk with pedestrians will present a challenge to both cyclists and pedestrians. Even a cycle track at a slightly lower elevation than the sidewalk creates problems.

It would be better to narrow the sidewalks and give more roadway space to cyclists than to force pedestrians to share sidewalk-cycle tracks with cyclist. Adequate bike lanes in the newly paved roadway plus a program to induce Beacon St. cyclists to have the legally mandated white light in front visible from 500' - plus some highly visible clothing - would do far more for cyclist safety and cyclist-pedestrian coexistence than the proposed cycle track.

Cyclists lobbied 40 years ago for bicycles to have the legal status in MA of VEHICLES, not toys. And they won. Vehicles, motorized and non-motorized, belong in the roadway, a roadway made safer for all users, vehicles as well as people who need to cross the road from time to time.

The phrase "mountable curbs" is as meaningless as the phrase "one size fits all". A curb that is "mountable" does not function as a curb worthy of the name - not for keeping storm water in the roadway, not for keeping cars and trucks and bicycles off the sidewalk, and certainly not for keeping frequently unlit, always silent, sometimes fast cyclists from surprising - and thus threatening - pedestrians at any point along their journey.

Walking is a desirable way to get around - for environmental, financial and health reasons. Communities as dense as Somerville and Cambridge should re-engineer the streets to encourage legal, visible cycling and should not demand that pedestrians to share their off-road space with fast, inaudible, often invisible wheeled vehicles called bicycles.

It would be a great pity if the Beacon Street project, in the DOT pipeline for over a decade, were postponed yet again, this time due to the cycle track controversy. Please find another route on which to experiment with a cycle track, and please help Somerville design a Beacon St. upgrade that respects and supports the needs of all Beacon users.