

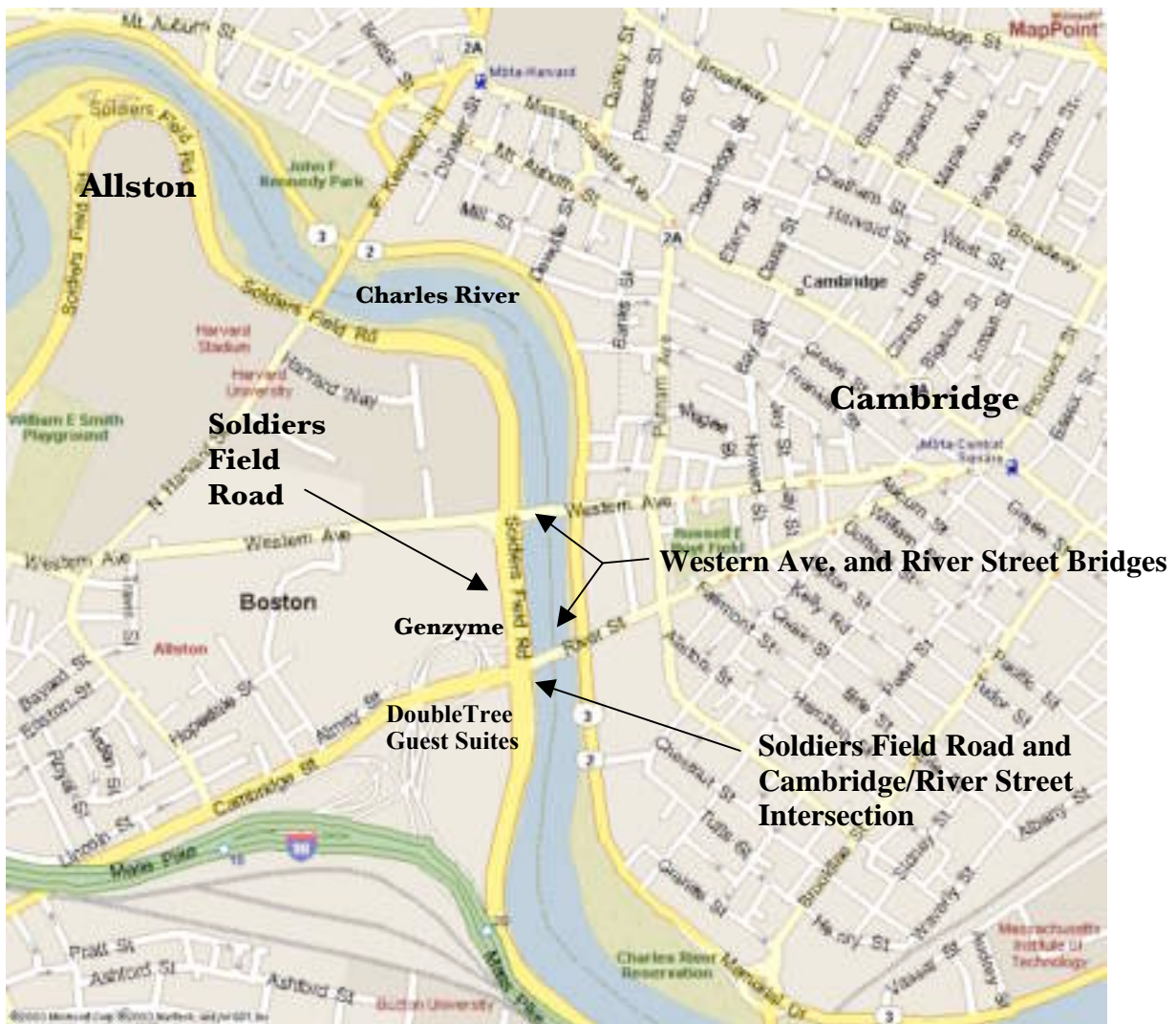
Dudley White Pathway Project
An analysis and redesign of the
Dr. Paul Dudley White Pathway and the
Soldiers Field Road/ River Street intersection.



By Kol Peterson. 12/03.

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This study deals with the intersection shown here between the DoubleTree Guest Suites and the Genzyme building. The through roadway is called Cambridge Street, which turns into River Street as it crosses the Charles River to Cambridge.

Acknowledgements

These findings are based upon surveys and reports done by the Department of Conservation and Recreation (a.k.a. DCR, formerly known as the Metropolitan District Commission, or MDC) and the Master Plan for the Charles River Basin (MPCRB), the Charles River Conservancy (CRC), MIT, and the Allston-Brighton Community Development Corporation (ABCDC), and Stephen H. Kaiser, PhD.



Crossing this unprotected intersection is high risk, not an act of leisure as intended.

I) Problem Statement

River Street provides a connection from Allston to Cambridgeport and Central Square.¹ On the south side of the bridge, there is a complex intersection where River Street meets Soldiers Field Road. The intersection collects traffic from Cambridge Street, Soldiers Field Road, and for Exits 18 and 20 of Interstate I-90, and funnels most of it into Cambridge, since River Street is one-way. Unfortunately, the only type of traffic flow that has been facilitated at this complex intersection is car traffic. The non-vehicular traffic users (i.e. walkers, joggers, bicyclists, and skaters) are squeezed onto too narrow a space and have no safe way to cross the street.

The River St./Soldier Field Road intersection lacks any safe pedestrian crossings in any direction. Though there are crosswalks, there are no pedestrian signals nor any *pedestrian signal phases* (designated, safe times to cross the road). The 1965-vintage traffic signals have no “walk” signal of any sort. All intersections involve sharing the right of way. What is needed here is a sharing of the road that gives a fair shake to

¹ River Street is called Cambridge Street on the Allston (south) side of the river.

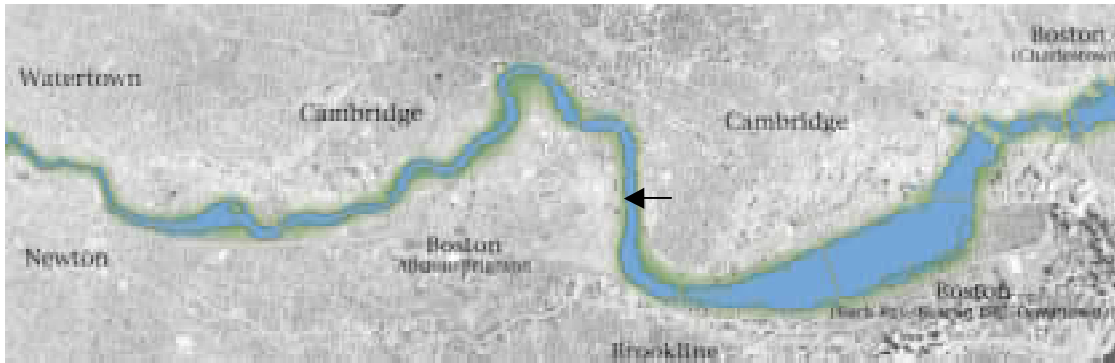
pedestrians and cyclists, in-line skaters, and joggers. With the expected increase in pedestrian use (due to the Harvard/ Allston development project), this intersection poses as a serious liability for the Department of Conservation and Recreation (DCR). Of particular concern is the crossing at the River Street Bridge. As the weakest link in the Dudley White Pathway, it is affecting the strength of the path as a whole. This study looks at both short and long term improvements, from relatively inexpensive to costly solutions.

II) Background of Dudley White Pathway

Who uses the Pathway?

The original Dudley White Pathway is a bike path elegantly situated in the Parklands alongside the Charles River for approximately seventeen miles, stretching from the Science Museum to the Watertown Dam. The bike path is named after Dr. Paul Dudley White, President Eisenhower's cardiologist. Dr. White promoted cardiovascular health exercises, and worked with the MDC in the 1970's to build bike paths along the Charles River. The pathway has since become a vital part of the physical landscape for residents in the municipalities of Boston, Watertown, Cambridge, Allston, and Brighton. As one of the few paths through open space in a dense, urbanized area, it serves as a unique central corridor to a wide range of residents and other users. A pathway user can travel from River Street to Leverett Circle without crossing any traffic, creating one of the best, uninterrupted pathways in the city.

From leisure, recreation, and exercise, to commuting or public gatherings, the Charles River Parklands and pathway are a boon to the quality of life for nearby residents and visitors. The original bike path has now become a multi-use path and already goes beyond the Watertown Dam and soon will also connect to the Boston Harbor. As a corridor, the Parklands provide an alternative, regional, connection route for commuters. As a non-motorized vehicle pathway, it is one of the few car-free zones for commuting cyclists. It is also a premier open space for recreation, exercise and leisure for residents near the river. The user surveys indicated that the pathway was a valued asset to local and Greater Boston residents.



The Dudley White Pathway runs along the banks of the Charles River, creating a seventeen-mile loop. Once the Kennedy Greenway is completed, the Parklands will total 500 acres.

When the CRC conducted a survey of Dudley White Pathways users, received 149 responses. The survey found that 66% used the pathway for recreation and 29% commuted on the pathway. Respondents made very good use of the pathway. 80% of the respondents used the pathway at least once a week. 40% of the respondents used it daily².

A 1997 **500-person MDC telephone survey** assessed residents' attitudes towards the parklands.³

90% feel that Boston “*would be much less appealing place to live*”, without the parklands.

86% feel that “*most of the park areas and paths are usually well maintained.*”

73% feel that “*there are great places for kids to play along the river.*”

72% feel that the roadways “*are attractive and efficient places to drive.*”

All these numbers indicate a generally positive perspective of the parklands. While the general feeling towards the Parklands is positive, 54% responded that “*traffic on the parkways near the Charles often spoils our enjoyment of the river.*”⁴ There are clearly specific measures that could be taken to increase the usability of the Parklands and pathways as recommended by the Master Plan for the Charles River Basin.

On either side of Cambridge Street at the Soldiers Field Road/River Street intersection, every bit of space is currently serving as a transportation corridor, so little

² Appendix C, p.1

³ Memorandum Report. Davidson-Peterson Associates, Inc. Telephone Survey for Charles River Basin Project. 1997.

⁴ Ibid.

attention is given to the aesthetics of the Parklands. While the pathway along Memorial Drive (the Cambridge side of the river) at River Street had an average of 202 users/hour, the average number of users per hour along Soldiers Field Road at River Street was only 122 users/hour.⁵ This discrepancy can be attributed to the perceived threat that intersection imposes on pathway users.

Other tough crossings along the river exist at the Larz Anderson Bridge and the Arsenal Street/ North Beacon Street Bridge. However, these involve tighter intersections with lower speed traffic and fewer trucks. The most difficult intersection is the Turnpike exit at River Street. While there are gaps in the traffic for pathway users, it is not clear when and where they are, so many users lose their best times to cross because they cannot figure out the complex traffic moves from the Turnpike. Regardless of the actual record of accidents, the crossing is one that is easily perceived as hazardous for pedestrian, bicyclists, and drivers. No intersection should either be, or so easily seem, dangerous.



Aerial view of Soldiers Field Road (left), Memorial Drive (right), River Street Bridge (foreground) and Western Avenue Bridge (above). The shadow of the DoubleTree Guest Suites fall on the intersection (lower left). The parklands in this stretch are non-existent.

⁵ Appendix D

III) Design

Equity and Connectivity

Connectivity between various elements of the Metropolitan Parks System was integral to its founding. In its conception in the 1890s, Charles Eliot envisioned the Charles River parklands as the “central court of honor” to a series of landscaped parks in and around Boston.⁶ These open spaces included the Emerald Necklace along the Muddy River, Fresh Pond and Alewife, as well as parkways and parks along the Mystic and Neponset River. With the completion of the Central Artery Tunnel Project, the Parklands along the Charles are also being extended to Boston Harbor. And with the Kennedy Greenway addition of forty acres of park space, there will be 500 acres of riverside parklands up to the Watertown Dam.

Eliot and Olmstead both believed that parks should be designed as spaces in which people of various social classes could mingle freely. Eliot described his vision of the Charles River parklands as hallways lined with shade trees where crowds could congregate and mix easily as well as places that could be sought out for purposes of solitude.⁷

The Charles River Parklands and Dudley White Pathway are geographically situated between many densely urbanized neighborhoods, yet they remain inaccessible to several of those neighborhoods. The Massachusetts Turnpike, Soldier’s Field Road, truck yards and rail lines separate the transient and less affluent communities of Allston and Brighton from the Charles River corridor. The impermeable transportation corridors create an almost insurmountable obstacle to the populations in Allston/Brighton.

⁶ MPCR B, p. 5

⁷ MPCR B, p. 23



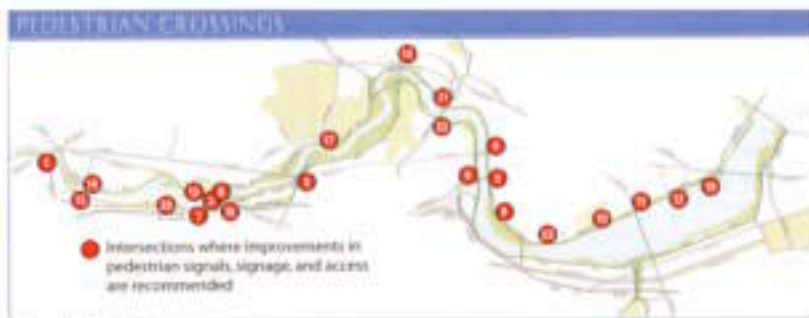
Orthophoto of Allston, Cambridge, and the Charles River. Pedestrians in Allston neighborhoods are separated from river access by I-90 and Soldiers Field Road.

Allston and Brighton are composed of populations that the EOE has defined as deserving of the environmental justice program. This program identifies areas where over 25% of the residents are minority, foreign born, lack English language proficiency, or the household income is at or below 65% of the statewide median income for Massachusetts.⁸ According to census data, 40-60% of the population along the river on the south side from the BU Bridge to the Anderson Bridge is low-income. Meanwhile, on the north side of the river, where river access is much better, 0-40% of the population is low-income. Allston/Brighton are areas with a relatively dense, non-white population as shown below.

⁸ Maps compiled from: <http://www.state.ma.us/envir/ej/environmentaljustice.htm>

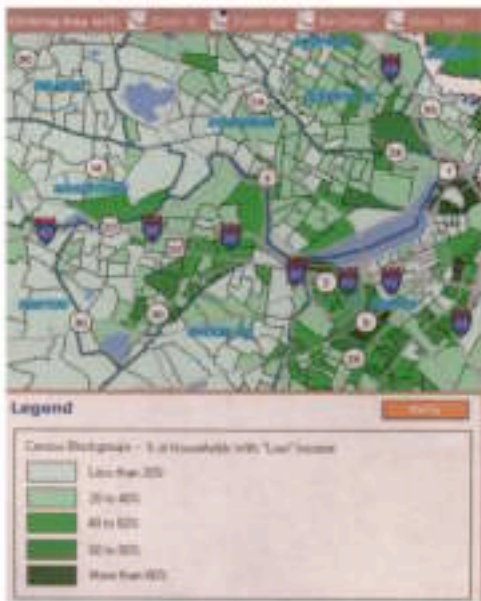
Notice any patterns?

There is a correlation between the areas without adequate pedestrian infrastructure and the areas with large low income or minority populations



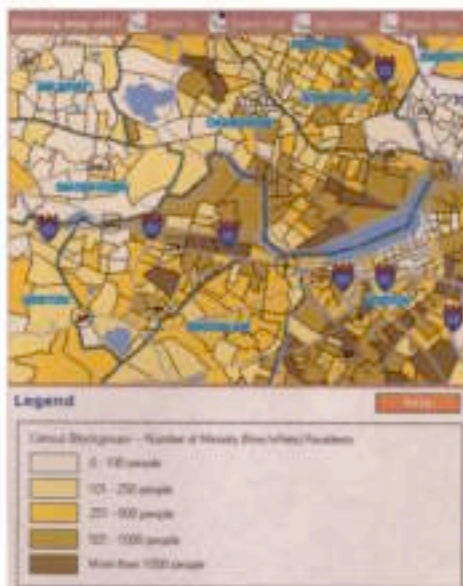
(Source: MBCTP, p. 70)

A map of Boston indicating areas of low income



(Source: Mass.gov)

A map of Boston indicating population density of non-white residents



(Source: Mass.gov)

There is a correlation between poverty, race, and insufficient pedestrian infrastructure in Allston and Cambridgeport.

The Master Plan for the Charles River Basin conducted a study of the intersections that were in need of pedestrian signals along the Charles River corridor. The study found twenty-three intersections that lacked pedestrian signals. By examining a map of low-income residents and non-white residents, it is immediately apparent that a geographic correlation exists between the lack of pedestrian crossing infrastructure and low-income and non-white resident population density.

No particular agency or person is to blame for this inequitable accessibility problem shown here, but it is important to give these underprivileged communities better and safer access to the Charles River corridor and its pathways. Opening up transportation alternatives to these less affluent communities is an important step in restoring and revitalizing the pathway. The pathway system is a regional system open to all, rich and poor, and everything in between. The least costly and most feasible fix to the intersection's pedestrian problem is the addition of pedestrian signals and better crosswalk that provide an interval for pedestrian crossing.

90% of the pathway users reached the parklands by modes other than a vehicle.⁹ If there is not adequate infrastructure in place to access to the river, then it is unlikely that it will be used. As an extreme example, a comparison to the Lower Mystic River basin can be made. There, the lack of parklands and pedestrian access severely limits its use, even though the river is immediately bordered by a dense, urban population.

IV) Redesigning the Intersection and Pathway

The River Street Bridge is heavily used. Major flows of traffic cross the bridge all day long, making it is nearly impossible to find a safe crossing time. The problem is exacerbated during rush hour backups. Though there are crosswalks, which supposedly provide pedestrians a right-of-way, a safe street crossing is nearly impossible for pathway

⁹ Appendix C, p. 2

users. Because of the lack of pedestrian signals and adequate crosswalks, pathway users listed their top Parklands improvement priority as “safer crossing of cross streets”.¹⁰

Basic Action)

The rounding of the curb at N corner has an extremely wide radius, creating an additional 8ft of crosswalk unnecessarily. The sidewalk here could be expanded by 8ft, shortening the crosswalk by 8ft and necessary cross time by 2 seconds. Similarly, the opposite corner (NE) could be squared off, creating a tighter radius and shortening the crosswalk by 4ft and cross time by 1 second (see photos below). While the curbs are being extended, proper curbcuts and handicap ramps can be installed. Currently, they are hardly accessible to the non-handicapped users...they are not certainly not handicap friendly.



The rounded corners of the River Street make the crosswalk 12ft longer than necessary. By extending the sidewalks 8ft and 4ft respectively, the pedestrian interval cross time could be decreased by three seconds. The black sections show where these extensions should be.



¹⁰ Appendix C, p. 2



The crosswalk does not match up with the ramp, making crossing even more difficult.

The traffic on the Soldiers Field Road westbound off-ramp is generally queued. Extending the corner, as described above, would not decrease flow since the intersection queue prevents taking the corner at high speeds anyway. Also, when there is no queue, a tighter corner would prevent high-speed turns, allowing for safer concurrent pedestrian crossing (see Option II). The N corner radius could be tightened to a five foot radius and the NE corner from a 40ft radius to a 20ft radius. These two geometric alterations would decrease necessary pedestrian cross distance by 12-15ft.

Signal Phasing

The average *crossing delay* (the time that a pedestrian must wait for a safe street crossing) for a pedestrian is greater than 45 seconds, also known as a Level Of Service (LOS) F. According to the Highway Capacity Manual, this type of crossing causes “very high likelihood of risk taking behavior”.¹¹ Because pedestrians are forced to wait so long to cross safely, they are likely to cross at inappropriate times. Though this intersection is complex, there are several design possibilities to change the dynamic.

¹¹ Highway Capacity Manual 2000. p.18-15.



The lack of pedestrian signals makes crossing into an activity of car dodging.

In its current signal phase cycle, the DoubleTree Guest Suites, upon a queue, has its own 15-second interval for vehicles to exit. There is very limited use of this phase: on the order of 100 vehicles per hour. Immediately to the right of this turn is another traffic signal at Soldiers Field Road, which is also green during this phase. Then, at the end of this 15-second phase, there is a 30-second phase for exiting I-90 traffic.¹²

Signal Option I) Giving pedestrians the green during the Doubletree phase

During the Double Tree green phase, the signal could be red at the main intersection at Soldiers Field Road. During this time, all six crosswalks could have green pedestrian signals. The phase would have to be a minimum of approximately 22 seconds to accommodate 4ft/second walk time and 7 seconds for the pedestrian clearance interval for the 60ft¹³ crosswalk across the bridge.¹⁴ After the DoubleTree and pedestrian phase is completed, the I-90 off-ramp signal and Cambridge Street traffic would get a 30 second

¹² Signal Phasing Chart for River St/Soldiers Field Road (Appendix B-II). Note: This cycle varies somewhat depending upon the time of day, but the timed ratios stay relatively similar.

¹³ See Appendix B-I



Double Tree Guest Suites has a 15 second signal onto Cambridge Street. Usually, this phase is underutilized. If there were pedestrian signals to alert them, pedestrians could be crossing the hazardous intersection during this time.

green phase as they do now. This simple change would delay the intersection for traffic for seven seconds, but would improve the situation considerably. By not seizing and advertising this underused traffic phase for pedestrian use, it is wasted time for car traffic and pedestrians alike.

Option II) Concurrent crossings

The second option is to create a concurrent pedestrian green phase with the westbound Soldiers Field Road off-ramp signal. *Concurrent phasing*¹⁵ is another option. In concurrent phasing, right-turning cars from the outbound off-ramp would “yield to pedestrians (*and cyclists*) in crosswalk”. The advantage of this technique is that it does not

¹⁴ Pedestrian Crossing guidelines in the Highway Capacity Manual 2000. p.18-8.

¹⁵ Pedestrian crossing with simultaneous parallel traffic movement. Pedestrian has right of way

alter the signal cycle at all. The disadvantage is that pedestrians must visually communicate with drivers to ensure their safety before crossing. For cyclists, visual communication can be difficult when moving fast or balancing on their bicycle. Better still, *Basic Action*, *Option I*, and *Option II* could be combined, to maximize pedestrian crossing time.

These two options present various ways to create a pedestrian cross phase at each of the six crosswalks. It is likely that there are other alternatives solutions as well. It would not take much to improve the situation for pedestrians and it is time to remedy the situation. Any alteration of this intersection would likely be an improvement from its current design. At minimum, pedestrian signals need be installed and the sidewalks need to be extended. The 12-15ft crosswalk shortening described above in *Basic Action* translates into a 3 second decrease in walk time, making a shorter, 19 second pedestrian phase possible. This cycle would only add a 4 second delay for automobile, while completely opening up the intersection to pedestrians.

Reconfiguring Pathway Width

The large amount of high-speed traffic has created an unpleasant intrusion on the Parklands. Between River Street and Western Avenue there are about 10 lanes of traffic unrelieved by any greenery- all within the Charles River Parkland. Meanwhile, the pathway on either side of River Street is inadequate for users. The stretch of pathway between Western Avenue to 100ft downstream of River Street is only 5ft wide, making it one of the narrowest, loudest, and least safe stretches in the whole network of paths. Out of the 38% of respondents who have either seen or been in an accident on the pathway, the most common reason was listed as a collision due to a cyclist or in-line skater shifting lanes to avoid a runner due to narrow paths.¹⁶ If the pathway were broader, the physical conflict between runners, cyclists, and skaters would be reduced.

¹⁶ Appendix C, p.3



Some sections of the Dudley White Pathway are too narrow to support their users. This section near the Longfellow Bridge is only 5ft wide, creating frequent user conflicts.

The Recommended Minimum Sidewalk Width is 8ft, as determined by the Highway Capacity Manual 2000. That width is determined for pedestrian use, and does not include other users such as high-speed cyclists and in-line skaters. As recommended by the MPCRБ, the pathway should be at least 10ft wide to accommodate the users.¹⁷ Between River Street and Western Avenue, the guardrail is situated between the pathway and the river rather than between the pathway and Soldier’s Field Road. This exacerbates the safety problem on the already collision-prone 6ft-wide pathway.

Meanwhile, the adjacent, two-lane service road between River Street and Western Avenue, just beside Soldiers Field Road, is underutilized. These two lanes are for traffic waiting to turn left onto Western Avenue. Ironically, these lanes are underutilized and unnecessary. In December of 2003 into the beginning of 2004, one lane of the access road was shut down during MWRA water main construction. During this time, the one open lane could handle the traffic volume at morning and evening rush hour. As recommended in the Master Plan, one lane of this road should be closed to widen the

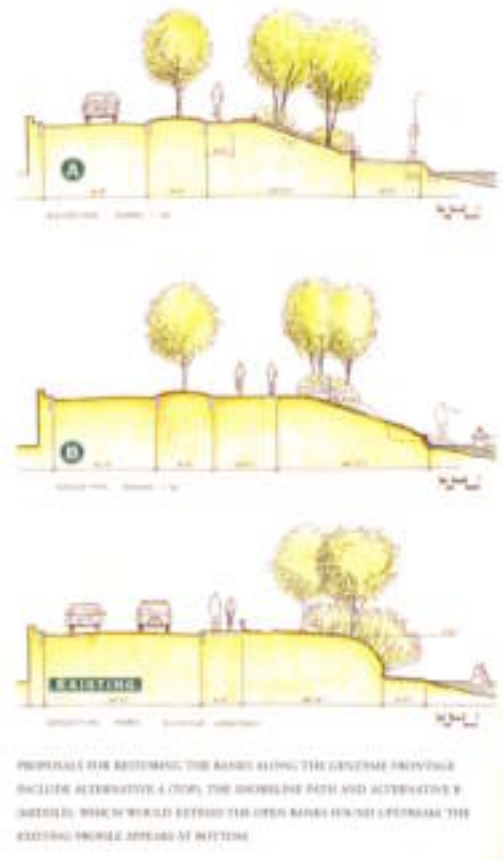
¹⁷ MPCRБ., p.126

pathway and open up the shoreline along the riverbank. The low traffic volume would not prohibit this and it would enhance the pathway substantially. This section could be spacious and green, rather than cramped and gray. A newly widened shoulder would also enhance the attractiveness of this section by providing an additional buffer between the pathway and Soldiers Field Road. In order to facilitate this narrowing, the left turn signal phase onto Western from the westbound access road should be lengthened accordingly to allow all stacked traffic to turn onto Western Avenue without a backup.

The Master Plan offers four alternatives to the pathway design.¹⁸ Of the four options, Alternative B (see diagram below) involves the least alteration and is therefore, likely to be the least expensive and the most feasible design. It recommends narrowing the two-lane, 24ft service road to a one-lane, 16ft road. This alternative would give the parkland an additional 8ft of green space as well as a road shoulder, dramatically affecting the feel of the parklands corridor between Cambridge/River St. and Western Avenue.

These three redesign options offer alternatives to the existing conditions along Soldiers Field Road between River Street and Western Avenue.¹⁹

If the access road is narrowed by one lane, the Dudley White Pathway can be widened to a safer width of 10ft. Option B is likely the least expensive and most feasible design option.



¹⁸ Ibid.

¹⁹ These drawings come from the MPCRB, p. 126.

V) Bold New Vision for the Pathway

As stated in the Master Plan, the most important goal for this stretch of parklands should be improving safety for non-vehicular pathway users. This could be accomplished most effectively by widening the pathway. Since the current conditions of the parklands in the section are an unsightly, short, steep bank to the river, envisioning alternative designs to this section is appropriate. Changing traffic patterns is an inexpensive and feasible way to ameliorate a bad situation, but what if we had the opportunity to redesign this whole stretch of parklands? In this case, there are several alternatives to consider.

Alternative 1) Small Dig

Soldiers Field Road could be depressed underground. Like the Central Artery Tunnel Project, by putting Soldiers Field Road underground, we could greatly expand the existing green space. This alteration would create a new ambience along the Charles River. It would not only result in a dramatic shift of landscape but would provide a set of much needed connections between Allston and Cambridge, increasing property values in Cambridge substantially and in Allston exponentially. The cost of this solution is unlikely to come out of the state budget at a time when the cost and disruption of the Big Dig is still being felt by the city.

Alternative 2) Uninterrupted Pathway

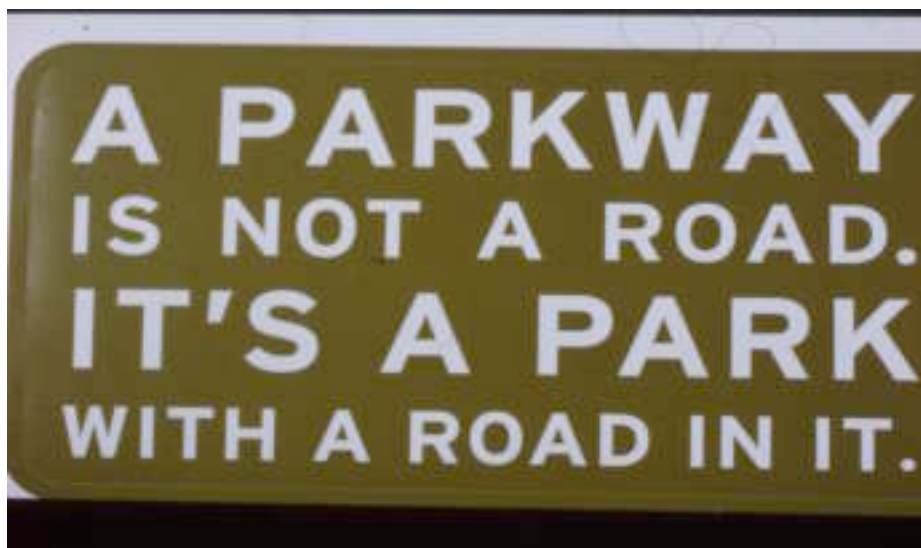
A boardwalk could be constructed on the bank that would overhang the river in those spots where there is not enough width, like downriver from the River Street Bridge. Along with this alteration, the River and Western Bridges could be altered by constructing a pedestrian tunnel like the one at the Elliot Bridge. This boardwalk and pedestrian tunnel would separate vehicle traffic from pedestrians and cyclists.



An example of a boardwalk is found near the Watertown Dam. This type of boardwalk could be installed in sections of the pathway downstream of River Street

Alternative 3) Slowing Traffic

Soldiers Field Road could be changed into a slower, more local-use road, to match its original plan as a Parklands road. In its conception, Charles Elliot conceived of Soldiers Field Road not as a high-speed arterial highway, but a low speed parkway for carriages. It was supposed to be a road that allowed for admiration of the parklands. This is certainly not the case now. Now, drivers generally reach speeds of 50-60 mph and pay closer attention to traffic than they do to the river or Parklands. A new Soldiers Field Parkway would be a significantly slower road, comparable to Memorial Drive.



In its conception, Soldiers Field Road was supposed to be a low-speed parkway

This could be accomplished by directing more traffic to I-90. And eastbound toll reduction could influence this shift. With the increased capacity of I-90 because of the Central Artery Tunnel Project, the traffic generated by this shift could be handled by the Mass Pike. Towns along Soldiers Field Road such as Allston, Brighton, Cambridge, and Watertown, would be served better if regional traffic were directed to I-90.

Financing

DCR is the owner of this parklands property, and is responsible for upgrades and maintenance. For the reasons stated earlier, it should be a priority to upgrade this section of the pathway and the intersection. The current intersection design poses a safety threat to pedestrians and pathway users. The costs of improving the intersection are worth it if they will spare a life.

Local businesses such as Genzyme and DoubleTree Guest Suites have a vested interest in the accessibility for their employees and guests who would likely enjoy an occasional river walk. Their interest could be manifest by participating, perhaps with others, in a public-private partnership to upgrade the intersection and pathway.

Harvard's shift into Allston/Brighton certainly presents a major opportunity for development and revitalization along the river. The campus expansion should rightfully take its pedestrian and bicycle-oriented student body into consideration when funding public works projects to revitalize their new 100-acre Allston/Brighton acquisition. The pathway is going to be used much more heavily as student river crossings become increasingly common since the campus will be equally on both sides of the Charles. By necessity, Harvard now should have more enlightened self-interest in the revitalization of the Parklands and pathways.



Harvard's campus is moving across the Charles River in the coming years. It is in their best interest to invest in major pathway improvements from the River Street Bridge to the Lars Anderson Bridge in Allston and Cambridge.²⁰

There are also several possible public sources of funding available for the intersection and pathways projects. Along with (or as part of) a public-private partnership, T-21 highway funding, transportation enhancement funds, or Congestion Mitigation and Air Quality funding are potential funding sources that should be considered. The real responsibility of this project lies in the hands of DCR, however. It is their responsibility to maintain and upgrade their property to ensure safety and promote community.

VI) Conclusion

There are some important elements in the pathway and intersection dynamic that need to be reexamined. Neighborhood, economic class, and racial divisions can be clearly correlated to pathway accessibility. Designing changes to the pathway can help facilitate equality and access to a central urban corridor that is currently underutilized by a marginalized population.

The easiest and least expensive way to alter the constructed bias and facilitate pathway use is to upgrade the intersection by adding pedestrian signals and extending the curb to narrow the crosswalk distance. Pedestrian signals are a first step to creating a safe

²⁰ Cartoon from Harvard Magazine. Nov-Dec 2003, p. 64

route for pedestrians traveling to and from Allston and Cambridge and to increase mobility along the pathway corridor.

The second phase of this project should consider an alteration of the pathway width by narrowing the underutilized access lanes along the river between River and Western. It would increase parkland aesthetics and facilitate safe pedestrian pathway use.

Envisioning future alternatives for the Parklands is a good exercise to draw out what our city could work towards for the future. Though these redesigns are costly, the benefits may be worth the expenses incurred and should be studied as part of the bridge renovations that are due.

The Charles River Parklands are a valuable asset for the urban community of Boston, Cambridge and surrounding municipalities. To let these assets sit in a dysfunctional state is a wasteful and inappropriate in an era of urban regeneration. The pathway also can play a key role in increased recreational offerings in a time when obesity is becoming a national plague. With the Rose Kennedy Freeway and the New Basin Parklands near completion, there is a new sense of the Boston Metropolitan area as a vibrant pedestrian center. As Allston/Brighton undergo dramatic changes through the Harvard University campus shift in the coming decade, there are possibilities to make the parklands not only more conducive to pedestrian use but as attractive a centerpiece in Boston as it was originally conceived to be.

The Charles River Conservancy takes as its mission the stewardship and renewal of the Charles River Parklands and their surroundings, particularly parks, parkways and bridges. The Conservancy is a not-for-profit advocacy group founded in 2000 to facilitate to public-private partnerships vital to renewing the Parklands. It works with community organizations, as well as government, corporate, and institutional partners and private citizens. The Conservancy engages in numerous Parklands restoration and improvement initiatives, including access and safety, education and outreach, and planning and stewardship programs. Its goal is to bring increased resources and attention to the task of inventing anew the Charles River Parklands as the centerpiece of Greater Boston's metropolitan park system.