

Rails-to-Trails Conservancy  
Local Government Commission  
California Bicycle Coalition

# Memo

September, 2011

**To:** City of Chula Vista  
**From:** Healthy Transportation Network  
**Re:** Accommodating Bicycles on Broadway

## Feasibility of Bicycle Lanes on Broadway

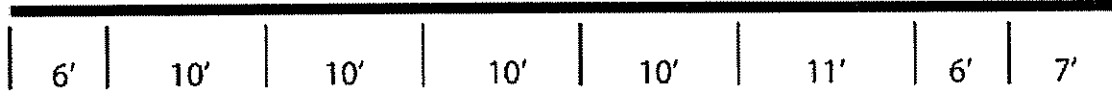
Based on the field visit we conducted on August 9, 2011 and the discussions we held with City transportation staff during that visit, we believe that the City of Chula Vista will improve traffic safety and neighborhood livability by accommodating bicycling on Broadway. We recommend the installation of class 2 bicycle lanes from C Street to Main Street. This conclusion is based on the following observations:

- Bicyclists are already traveling along Broadway, both for the purpose of through travel as the parallel routes are not continuous, and to access the services and businesses that are located on Broadway;
- Traffic volumes and vehicle speeds are too high on Broadway for bicyclists to share the lane with motorists, and no bike lanes exist to provide a safer space for bicycling;
- Therefore, bicyclists most often ride on the sidewalks which presents serious hazards at intersections and degrades the pedestrian environment;

The good news is that there is enough space on Broadway to accommodate Class 2 bicycle lanes without the added cost of shifting curbs or purchasing right-of-way. Blocks on the northern section of Broadway, from C Street to F Street, typically have 70 feet, curb-to-curb; blocks on the southern section of Broadway, from F Street to Main Street typically have 80 feet, curb-to-curb. We believe that a customized plan that takes into account the available space, curb-to-curb, as well as the varying need for parking and/or two-way left-turn lanes along different sections of Broadway can be developed to provide a continuous Class 2 bicycle lane in each direction Broadway.

On the sections of Broadway that currently have 70 feet curb-to-curb, the bicycle lanes will only fit if parking on one side of the street or the two-way left-turn lane is dropped. The City will need to evaluate the tradeoffs between these two strategies. Although it is often desirable to provide on-street parking to support local businesses, the Broadway corridor appears to have sufficient off-street parking that eliminating it on some blocks should be possible without negative impacts. If parking is eliminated on one side of the street the lane widths would be as follows:

- One 6-foot bicycle lane (adjacent to curb), two 10-foot travel lanes, one 10-foot two-way, left turn lane, one 10-foot lane, one 11-foot travel lane, one 6-foot bicycle lane and one 7-foot parking lane as shown below.



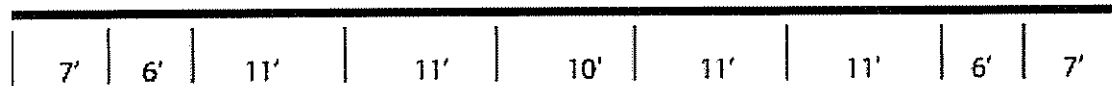
If the two-way left turn lane is eliminated, the lane widths would be as follows:

- Two 7-foot parking lanes, two 6-foot bicycle lanes, four 11-foot travel lanes as shown below.



On the sections of Broadway that currently have 80 feet curb-to-curb, bicycle lanes will fit without changing the lane configuration except for narrowing the lanes, as follows:

- Two 7-foot parking lanes, two 6-foot bicycle lanes, four 11-foot travel lanes, one 10-foot two-way left turn lane as shown below.



On sections of Broadway that have more than 80 feet curb-to-curb, efforts should be made to add a raised median with turning pockets instead of a continuous two-way left turn lane to make it easier for pedestrians crossing the street and to better channelize turning movements. This is especially the case in sections of Broadway where the blocks are long and pedestrians are crossing midblock. On the section of Broadway between H Street and I Street, due to particularly high volume of through and turning traffic, it might make sense to eliminate the on-street parking adjacent to the Chula Vista Center mall and to provide a raised median with turning pockets where needed. Studies have found that raised medians can reduce pedestrian crashes by up to 40 percent. (See Zegeer, C., Stewart, J., and Huang, H., *Safety Effects of Marked versus Unmarked Crosswalks at Uncontrolled Locations: Executive Summary and Recommended Guidelines*, Report No. FHWA-RD-01-075, Federal Highway Administration, Washington, DC, March 2002.)

In the sections south of L Street that include a raised median with turning pockets, the City may need to eliminate on-street parking in some sections in order to fit in the bicycle lanes. When bicycle lanes are placed next to parked vehicles, a minimum of 13 feet should be provided for the parking lane and the bicycle lane. To encourage motorists to park close to the curb, the parking lane (or T markings) should be placed 7-feet from the curb, with a 6-foot bicycle lane. (Alternatively the parking lane can be set at 8 feet with a 5-foot bicycle lane.) All parking lanes should be marked with a continuous line or with "T"s that designate the individual parking spaces. If T markings are used, a perpendicular line extending into the bicycle lane four feet should be included (as shown in Appendix A, Slide #19 of the powerpoint presentation) to indicate to bicyclists where to ride to stay out of the door zone.

Bicycle lanes at any intersections along Broadway that include a dedicated right-turn lane should shift to the left of the lane as per the California MUTCD, Chapter 9, so cyclists can travel straight and avoid “right-hook” crashes.

As we discussed with staff during our visit, 10-foot lanes on urban arterials with speeds below 45 mph have not been found to reduce safety or capacity. A study on lane width safety by Potts, Harwood and Richard presented at the Transportation Research Board in 2007 stated that: “The research found no general indication that the use of lanes narrower than 3.6 m (12 ft) on urban and suburban arterials increases crash frequencies. This finding suggests that geometric design policies should provide substantial flexibility for use of lane widths narrower than 3.6 m (12 ft).” (“Relationship of Lane Width to Safety for Urban and Suburban Arterials,” Ingrid B. Potts Principal Traffic Engineer Midwest Research Institute, Douglas W. Harwood Transportation Research Center Manager Midwest Research, Karen R. Richard Staff Analyst Midwest Research Institute, TRB 2007 Annual Meeting, Transportation Research Record 2023.)

Additional support for narrower lanes is included in the following studies:

- Safe Streets, Livable Streets: A Positive Approach to Urban Roadside Design, A Dissertation Presented to The Academic Faculty by Eric Dumbaugh, In Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the School of Civil and Environmental Engineering, Georgia Institute of Technology December, 2005
- Traffic Fatalities and Injuries: Are Reductions the Result of “Improvements” in Highway Design Standards? Robert B. Noland Centre for Transport Studies Dept. of Civil and Environmental Engineering Imperial College of Science, Technology and Medicine London, SW7 2BU Phone: 011-44-207-594-6036 Fax: 011-44-207-594-6102 Email: r.noland@ic.ac.uk <http://cts.cv.ic.ac.uk> (TRB Presentation 2000)
- The Effects of Transportation Corridors' Roadside Design Features on User Behavior and Safety, and Their Contributions to Health, Environmental Quality, and Community Economic Vitality: a Literature Review, Elizabeth Macdonald, Rebecca Sanders, Paul Supawanich, University of California, Berkeley, University of California Transportation Center UCTC Research Paper No. 878
- The Influence of Lane Widths on Safety and Capacity: A Summary of the Latest Findings Theodore Petritsch, P.E. PTOE Director of Transportation Services Sprinkle Consulting, Sprinkle Consulting

Examples of cities that have accommodated bicycle lanes on multi-lane streets by narrowing down the vehicle travel lanes to 10 feet are included in Appendix B, “Accommodating Bike Lanes in Constrained Rights of Way” assembled by the Association of Pedestrian and Bicycle Professionals.

Photographs of cities that have similar streets to Broadway with bicycle lanes are included in the presentation enclosed as Appendix A.

## **Case Studies and Reports Showing Economic Benefits of Bicycling Infrastructure Investments on Local Business**

1. How Bike Lanes Can Boost the Economy: Recognizing the economic role of bikes: a study in Sydney, Australia  
<http://sustainablecitiescollective.com/big-city/24250/how-bike-lanes-can-boost-economy>

Research in 2007 by Alison Lee sought to identify the economic value of replacing car parking with bike parking in shopping strips. The case study in Lygon Street Carlton in Melbourne showed that cycling generates 3.6 times more expenditure. Even though a car user spends more per hour on average compared to a bike rider, the small area of public space required for bike parking suggests that each square metre allocated to bike parking generates \$31 per hour, compared to \$6 generated for each square metre used for a car parking space, with food/drink and clothing retailers benefiting the most from bike riders.

2. Bike Lanes, On-Street Parking and Business: A Study of Bloor Street in Toronto's Annex Neighbourhood  
[www.cleanairpartnership.org/pdf/bike-lanes-parking.pdf](http://www.cleanairpartnership.org/pdf/bike-lanes-parking.pdf)

From Conclusions/Recommendations section: This study set out to analyze the constraints and opportunities, including the economic impact of removing one lane of on-street parking, for installing a bike lane on Bloor Street through the Annex neighbourhood. Based on the data, analysis and discussion, the evidence makes a strong case that Toronto should be looking to install a bike lane on this section of Bloor Street. The spending habits of cyclists, their relatively high mode share, and the minimal impact on parking all demonstrate that merchants in this area are unlikely to be negatively affected by reallocating on-street parking space to a bike lane. On the contrary, this change will likely increase commercial activity.

3. Bloor Street Follow-up Study - Bike Lanes, On-Street Parking and Business: Year 2 Report  
[http://torontocat.ca/main/sites/all/files/BikeLanes\\_Parking\\_Business\\_BloorWestVillage.pdf](http://torontocat.ca/main/sites/all/files/BikeLanes_Parking_Business_BloorWestVillage.pdf)

From Conclusions and Recommendations section: The data presented in this report indicate that in the Bloor West Village neighborhood there is both visitor/resident and merchant support for changes in street use allocation to support active transportation such as installing a bike lane or widening sidewalks, and that the removal of half of the on-street parking to accommodate such changes would be unlikely to negatively impact commercial activity.

From Conclusions and Recommendations section: The results of this study, combined with the results of the previous study in the Bloor Annex neighborhood, suggest that the assumption that reducing on-street parking to accommodate active transportation is "bad for business" may not be true for at least two different neighborhoods along the Bloor-Danforth corridor.

#### 4. Bike Corrals: Local Business Impacts, Benefits, and Attitudes

From Bicyclists as Customers section: A concern of businesses, specifically regarding the loss of valuable on-street auto parking, is that they will lose customers who drive without gaining customers who travel by other modes. Despite this commonly held logic, 40 percent of all businesses estimate that they have seen an increase or strong increase in customers who are bicyclists. Furthermore, businesses in this study, on average, perceive that one out of every four (24.8 percent) of their customers are bicyclists.

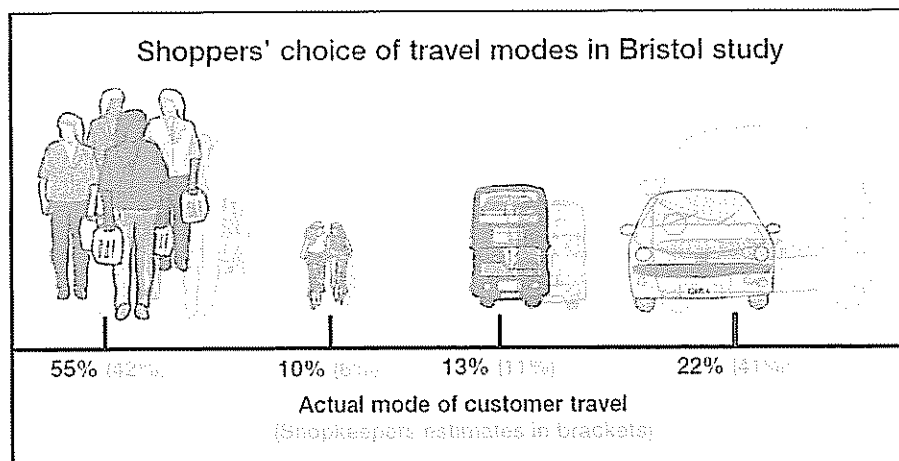
From Demand for Parking section: The bike corrals increase the parking capacity of the street by 400 to 800 percent, per corral, by removing 1 to 2 auto parking spaces and replacing them with room for 10 to 20 bicycles. With average persons per vehicle steadily declining, reaching a low of 1.08 in 2000, the bike corrals are often meeting the same or similar demand as the auto parking it replaced. This is true even when current existing conditions at some corrals average just one or two parked bikes at a time. The 400 to 800 percent increase in parking capacity benefits business by allowing more potential customers to park adjacent to their establishment.

\\Western\rtc\_files\HTN\Technical Assistance Workshops 2011\City of Chula Vista\Chula Vista TA Post-Mtg docs\PDX Bike Corral Study.pdf

#### 5. Shoppers and How They Travel

<http://www.sustrans.org.uk/assets/files/liveable%20neighbourhoods/Shoppers%20info%20sheet%20-%20LN02.pdf>

This study by Sustrans (United Kingdom) focused on the City of Bristol to determine how customers traveled to shop. The study found that retailers overestimate the importance of the car, overestimate how far their customers travel, and underestimate how many shops each customer visits. These findings have real significance for business planning – as well as land use and transport. Typically, retailers advocate for more car access and parking, and tend to resist measures to promote walking, cycling and public transport use, yet this study suggests that the opposite would be more beneficial to businesses.



## **Education for Motorists and Bicyclists - Share the Road Campaigns**

As you proceed with implementing changes on Broadway, it will be important to educate the community – motorists, pedestrians and bicyclists – about how to safely and legally share the road. Below are some good Share the Road program descriptions as well as some promising statistics on the impact of these programs in tandem with bicycle infrastructure improvements.

### **1. Marin County Bike Coalition (MCBC)**

The MCBC operates a fairly extensive Share the Road campaign, and has extensively documented their efforts on their webpage: [Share the Road page](#). The purpose of their campaign is “educating bicyclists and motorists to share the road courteously and safely.”

Their page includes data about the success of their program, including this: “a positive piece of data from the California Highway Patrol's Statewide Integrated Traffic Records System (SWTRS) shows that Marin County bike and car crashes declined by 34% over the past 10 years, while bicycle commuting has simultaneously increased by 66%. “

The Marin County Bicycle Coalition's efforts continue to help make the road safer, and your financial support and volunteerism through attending public meetings, makes a big difference. Through our collaborative efforts with law enforcement and public works departments we have raised awareness and changed the physical environment to make our roads safer for bicycle riding. Each time we secure new bike lanes, Complete Streets policies, fiscal support for non-motorized transportation projects, etc. we are helping to make the roads safer for bicycle commuters and recreational riders in Marin County.

MCBC's current program consists of three main components: [Checkpoints](#), [Basic Street Skills](#) classes and [Riding with Youth](#) workshops. As of December 2008 funding for these programs is provided by the [Non-motorized Transportation Pilot Program](#), administered by [WalkBikeMarin](#). Additional partners for this program are Marin General Hospital and Marin County Law Enforcement.

CHECKPOINT program: Local law enforcement agencies and MCBC team up for the Checkpoints to show their united support of reducing road rage and increasing traffic safety for motorists and cyclists. Uniformed officers and MCBC volunteers provide Share the Road flyers to motorists and cyclists that pass through each Checkpoint. The flyers contain California Vehicle Code information, Codes of Conduct for bicyclists and motorists to insure their safety and foster respect for each other and additional safety tips to prevent road rage.

<http://www.marinbike.org/Campaigns/ShareTheRoad/Index.shtml>

### **2. Pedestrian and Bicycle Information Center**

This webpage contains case studies of Bike/Ped Safety Campaigns from around the country. For example, “[Share the Road for a Healthy Maine](#)” details their Share the Road Campaign materials developed for TV ads, radio spots, etc. Although surveys to glean the results were inconclusive, anecdotal evidence suggests positive impacts.

<http://www.bicyclinginfo.org/education/case-studies.cfm>

## RESPONSES TO QUESTIONS SUBMITTED AFTER OUR FIELD VISIT

**QUESTION #1: How is the pavement maintained under bike corrals? (The pavement will probably be subject to less stress since vehicles will not be using it, but we would probably want to include this pavement in an overlay or seal of the street.)**

We don't have this information, but you could find out by contacting someone in the Portland program. The contact person listed on the website is: Sarah Figliozzi, City of Portland Bureau of Transportation; sarah.figliozzi at portlandoregon.gov

You'll find a lot of information about the Portland Bicycle Corral Program here:  
<http://www.portlandonline.com/transportation/index.cfm?a=250076&c=34813>

**QUESTION #2: Where would be the best locations to use colored bike lanes?**

There is no standard yet for how and where to use colored bike lanes. A good place to start is in conflict zones: places where the lanes cross a lane of traffic where you want to give motorists an extra reminder to look out for bikes. This issue is addressed in the NACTO Urban Bikeway Design Guide (more on NACTO in the response to question #3 below):

<http://nacto.org/cities-for-cycling/design-guide/bikeway-signing-marking/colored-bike-lanes/>

**QUESTION #3: How do municipalities deal with liability issues for innovative treatments, since they have not yet been accepted into the MUTCD?**

Our understanding is that if the treatment is done with approval from FHWA as an experimental treatment, the liability is no different than any other transportation facility; you should confirm this with FHWA. In our interviews with several communities using experimental treatments, they indicated the process to get FHWA approval was fairly straightforward and not onerous. Here's a web page with more info: <http://mutcd.fhwa.dot.gov/condexper.htm>

This chart on the status of various FHWA experiments might also be helpful:  
[http://www.fhwa.dot.gov/environment/bikeped/mutcd\\_bike.htm](http://www.fhwa.dot.gov/environment/bikeped/mutcd_bike.htm)

A good resource for cities that are trying new approaches to bicycling is the National Association of City Transportation Officials (NACTO), which recently produced an Urban Bikeway Design Guide, "a collection of 21 innovative bikeway treatments designed to provide practitioners with a larger set of design solutions that go well beyond existing design guides and manuals to help promote safe bicycling." You can view the Guide here: <http://nacto.org/cities-for-cycling/design-guide/>

The following language from the NACTO Urban Bikeway Design Guide is instructive:

"It is important to note that many urban situations are complex; treatments must be tailored to the individual situation. Good engineering judgment based on deep knowledge of bicycle transportation should be a part of bikeway design. Decisions should be thoroughly documented. To assist with this, the NACTO Urban Bikeway Design Guide links to companion reference material and studies."

There is a chapter on liability in the ITE's "Traffic Calming State of the Practice" Guide, which makes it clear how cities can protect themselves against liability. The Guide indicates that fears of litigation are often overblown:

<http://www.ite.org/traffic/tcsop/Chapter6.pdf>

## **CONCLUSION**

We appreciate the opportunity to meet all of you and applaud your interest in making your city more bicycle-friendly. We hope that the Healthy Transportation Network's Technical Assistance Grant was useful to you. We would appreciate your feedback, which will help us continue to improve our program. If you can take a few minutes to respond to the following questions, we'd really appreciate it. You can email your response to Laura Cohen at Rails-to-Trails Conservancy,

1. Overall, was the Technical Assistance consultation helpful? Please rate on a scale of 1-5 with 5 = extremely helpful; 1 = not helpful at all
2. What was most helpful to you?
3. Do you have any suggestions for improving our program?
4. Would you recommend this resource to others?
5. Do you anticipate that the Technical Assistance consultation will enable you to move forward with some element of your bicycle or pedestrian plans? If so, please specify.

If you should need further technical assistance from the Healthy Transportation Network, we would be happy to talk to you about a fee-for-service arrangement. Please contact any one of us.

Good luck, and thank you for hosting the Healthy Transportation Network staff.

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Dave Snyder, Executive Director, California Bicycle Coalition  
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## **APPENDICES:**

A – Pdf of powerpoint presentation given by HTN staff for Chula Vista field visit, August 10, 2011 (includes slides from "Economic Effects of Traffic Calming on Urban Small Businesses" by Emily Drennen)

B – Pdf of "Accommodating Bike Lanes in Constrained Rights-of-Way" prepared by Association of Pedestrian and Bicycle Professionals (APBP)