



CITY OF CAMBRIDGE
COMMUNITY DEVELOPMENT DEPARTMENT

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To: Robert W. Healy, City Manager *Σ*
From: Susan Clippinger, Director, Department of Traffic, Parking and
Transportation *BR*
Beth Rubenstein, Acting Assistant City Manager, Community
Development Department
Date: November 18, 1998
Re: Council Order #032 date 11/2/98 Re: Report on the City's Official Policy
on the Implementation of Bike Lanes and Whether Bike Lanes are a
Condition of any Federal or State Funding

With respect to the above-referenced council order, we report the following.

Summary

Bicycle lanes are created on city streets to promote cycling and increase safety for bicyclists and other roadway users. Federal and state funding requires accommodation for bicyclists. While bicycle facility types are not generally specified in funding requirements, both federal and state design guidelines prescribe bicycle lanes for urban arterials.

Implementation of bike lanes

The City policy on the implementation of bicycle lanes is derived from the policies and ordinances of the City Council, the Growth Policy Document, and the work of the Bicycle Committee. The policy is supported by federal, state and local policies, directives and ordinances together with national guidelines and best engineering practices. Attachment 1 provides additional detail on these key policies.

In 1992, the Cambridge City Council enacted the Vehicle Trip Reduction Ordinance for the development of a more livable city through the reduction of automobile use and the promotion of non-polluting forms of transportation. The ordinance establishes the Bicycle and Pedestrian Mobility Program, which, among other things, is required to "design and implement a program to encourage greater use of bicycles as alternatives to single-occupancy vehicles within the city."

The overall goals of the bicycle program are to promote cycling and to enhance safety.

Promoting cycling

National and international evidence to date has demonstrated that the most important way to promote bicycle transportation is to provide bicycle facilities – safe and clear places where people can ride, including bicycle lanes. A major study sponsored by the Federal Highway Administration, for example, demonstrated that bicycle usage in urban areas is directly proportional to the

percentage of arterial streets with bike lanes. US cities with high bicycling populations have 70% more bike facilities per roadway mile and six times more bike lanes per arterial than those with low bicycling populations.

Enhancing safety

Bicycle lanes have significantly improved safety, in terms of both the number and the severity of crashes in cities throughout the US and internationally. Bike lanes have reduced crash rates for all users – bicyclists, pedestrians and motorists. Bicycle lanes also have been associated with safer bicyclist behavior – less wrong-way and sidewalk riding and more obedience to traffic controls (e.g., stop signs). For example, a recent national study comparing streets with bike lanes to those without found that 15% of cyclists on streets without bike lanes rode on the sidewalks, vs. 3% on the streets with bike lanes. In addition, on streets with bike lanes, 81% of cyclists obeyed stop signs, vs. 55% on streets without. Attachment 2 provides detailed information on relevant studies.

Bike lanes are also beneficial to other roadway users. They more clearly demarcate the space assigned to various users and organize traffic. Bike lanes help define travel space, provide bicyclists with a path free of obstructions, decrease the stress level of bicyclists riding in traffic, encourage bicyclists to ride in the correct roadway position, and signal motorists that cyclists have a right to the road. Bike lanes are intended to promote an orderly flow of traffic by establishing specific lines of demarcation between areas reserved for bicycles and areas occupied by motor vehicles. This effect is supported by bike lane signs and pavement markings. Bike lane stripes reduce the chance that motorists will stray into cyclists' path of travel. Likewise, with more certainty as to where bicyclists will be, passing motorists are less apt to swerve toward opposing traffic to avoid hitting bicyclists.

Where bike lanes are created in Cambridge

The premise of bicycle transportation planning is that all roads are bikeways (except limited access highways), but the kind of facility or designation will vary depending on the street type, use (e.g., amount and type of motor vehicle traffic) and existing conditions. Bicyclists, like automobile drivers, want to get to their destinations by the most direct route available. Therefore, all the major arterials in the city are places where safe bicycling should be encouraged. This is important also because many destinations - stores, restaurants, transit stations, schools, etc. - are located along arterials.

On most streets, particularly on urban arterial and major collector streets, the appropriate facilities for bicyclists are bike lanes. Bike lanes are also appropriate on minor collector or local streets, especially if traffic speeds and/or volumes are higher than normally encountered. Bike lanes may also be important on minor streets to connect existing bike lanes or to extend bike lanes to desirable destination points.

Where it is not feasible to provide bike lanes on arterial or major collector streets because of physical constraints or other priorities (e.g., space allocated to motor vehicle travel or parking), wide outside lanes with guide lines should be provided. Wide outside lanes do not provide the

same demonstrated safety benefits, nor the same element of encouragement as bike lanes. However, they do organize traffic better than wide lanes with no marking and can help to limit speeds.

When bike lanes are created in Cambridge

Bicycle facilities are considered at the inception of all transportation projects and become incorporated into the design of each project. In addition, the city will initiate projects to connect bicycle facilities when possible to create a network of facilities serving the city, such as using Fresh Pond Parkway as a link in connecting the Minuteman Bikeway to the Charles River. City departments coordinate their work to address the needs of bicycle transportation and to ensure that all anticipated construction is reviewed during the design phase of every project. Often improvements can be made at a low cost, which benefits cyclists, motorists, and pedestrians alike.

Federal and state funding

Bicycle projects are broadly eligible for funding from most of the major federal-aid highway, transit, safety and other programs. ISTEA, the primary federal aid source for transportation, was reauthorized in 1998 as the Transportation Equity Act and is now known as "TEA21." To be funded, bicycle projects must be "principally for transportation, rather than recreation, purposes." Special provisions protect cyclists and other non-motorized users: for example, projects funded under ISTEA may not have an "adverse impact" on the safety of non-motorized transportation.

In Cambridge, all the projects that have been funded through ISTEA/TEA21 include bicycle and pedestrian facilities, e.g., the Fresh Pond Parkway Enhancement and Cambridgeport Roadways projects. Bicycle accommodations are required for street reconstruction projects receiving federal or state funds. While bicycle lanes are not specifically mandated, in both federal and Massachusetts state guidelines the prescribed facility for bicycles on urban arterials is a bicycle lane. Failure to provide for cyclists may be judged as having an "adverse impact" on the safety of cycling and thus jeopardize funding.

ATTACHMENT 1: CAMBRIDGE POLICIES, STATE POLICIES, AND FEDERAL POLICIES

A. CAMBRIDGE POLICIES

1. Cambridge Vehicle Trip Reduction Ordinance

In 1992, Cambridge enacted an ordinance for the development of a more livable city through the reduction of automobile use and the promotion of non-polluting forms of transportation. The ordinance establishes the Bicycle and Pedestrian Mobility Program, which, among other things, is required to "design and implement a program to encourage greater use of bicycles as alternatives to single-occupancy vehicles within the city."

2. Cambridge Growth Policy Document

In 1993, the City of Cambridge created its Growth Policy Document, *Toward a Sustainable Future*. Policy 23 states: "Encourage all reasonable forms of non automobile travel including, for example, making improvements to the city's infrastructure which would promote bicycling and walking."

3. Guidelines for Developing Bicycle Facilities

- It is the policy of the City of Cambridge to promote bicycling as a form of transportation.
- Facilities will be built to encourage primarily transportation and utilitarian cycling and secondarily recreational cycling.
- The City of Cambridge will develop and support programs promoting safety, education and traffic law enforcement for bicycle users.
- Facilities will be built to encourage more cyclists to ride, in addition to accommodating current levels of cycling more effectively.
- Improvements for cycling shall be considered in all roadway projects undertaken in the city.
- Bicycle facilities shall be built to support safe traveling.
- Bicycle circulation should be managed so that conflicts with other modes of travel are minimized, and safety improved for all.

B. STATE POLICIES

- The *Massachusetts Statewide Bicycle Transportation Plan* (1998) states:

The vision of the Statewide Bicycle Transportation Plan is recognition of the bicycle as a viable means of transportation and reasonable accommodation of the needs of bicyclists in policies, programs and projects. Greater recognition and accommodation of the needs of bicyclists will lead to a more balanced transportation system with greater modal choice and improvements in bicycle safety. Such actions will enhance the environment and quality of life in the Commonwealth, and improve personal mobility.

- In 1996, "An Act Relative To Bicycle and Pedestrian Access in Construction of Public Ways" was passed by the Massachusetts state legislature and signed by Governor William F. Weld. It amends Chapter 90E of the General Laws to insert after section 2, as appearing in the 1994 Official Edition, the following section:

Section 2A. The commissioner [of the Massachusetts Highway Department] shall make all reasonable provisions for the accommodation of bicycle and pedestrian traffic in the planning, design, and construction, reconstruction or maintenance of any project undertaken by the department. Such provisions that are unreasonable shall include, but not be limited to, those which the commissioner, after appropriate review by the bicycle program coordinator, determine would be contrary to acceptable standards of public safety, degrade environmental quality or conflict with existing rights of way.

C. FEDERAL POLICIES

Through its several branches and agencies, the federal government has clearly articulated the mandate to promote bicycling in the United States.

- "It is Federal Transportation Policy to promote increased use of bicycling and encourage planners and engineers to accommodate bicycle and pedestrian needs into designing transportation facilities for urban and suburban areas" (*Moving America*, US. Department of Transportation, 1990).
- "The National Transportation Policy (NTP) states that it is federal transportation policy to promote increased use of bicycling [and] to accommodate bicycle needs in designing transportation facilities for urban areas" (*Policy on Bicycle and Pedestrian Projects*, US Department of Transportation Federal Highway Administration, 1991).
- Under the 1991 US Department of Transportation Appropriations Act, enacted by Congress, the Secretary of Transportation was directed to conduct a national study (*The National Bicycling and Walking Study*) that included "a plan for the increased use and enhanced safety of [bicycling]." The report presents a plan of action for activities at the federal, state and local levels for meeting the goals of doubling the current percentage of trips made by bicycle and by walking and reducing the injuries and deaths to bicyclists and pedestrians by 10 %.

- The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) affirmed the value of bicycling in the transportation system. Among other things, it requires 10 % of federal transportation funds be used for “enhancement activities,” which include bicycle and pedestrian facilities.

The reauthorization of this legislation, the Transportation Equity Act (TEA21) was passed in 1998. It is even stronger in its support and encouragement of bicycling in the transportation system. Bicycle projects are broadly eligible for funding from most of the major federal-aid highway, transit, safety and other programs. Bicycle projects must be “principally for transportation, rather than recreation, purposes.” Special provisions also protect cyclists and other non-motorized users; for example, projects may not have an adverse impact on the safety of non-motorized transportation.

ATTACHMENT 2: SAFETY BENEFITS OF BIKE LANES

Bike lanes help define road space, provide bicyclists with a path free of obstructions, decrease the stress level of bicyclists riding in traffic, encourage bicyclists to ride in the correct roadway position, and signal motorists that cyclists have a right to the road. Bike lanes are intended to promote an orderly flow of traffic by establishing specific lines of demarcation between areas reserved for bicycles and areas occupied by motor vehicles. This effect is supported by bike lane signs and pavement markings. Bike lane stripes reduce the chance that motorists will stray into cyclists' path of travel.¹ Likewise, with more certainty as to where bicyclists will be, passing motorists are less apt to swerve toward opposing traffic to avoid hitting bicyclists.

The presence of a bicycle lane does not preclude bicyclists from riding in the regular vehicle travel lane if the situation warrants, e.g., in passing another cyclist or going around a double-parked vehicle. As is the case when a motorist changes lanes, it is the bicyclist's responsibility to look for traffic and signal clearly when entering another travel lane.

In summary, bike lanes do the following:

- indicate the correct position and direction of travel of bicyclists on the roadway
- promote an orderly flow of traffic
- allow bicyclists to pass queued motor vehicles stopped at a stop sign or traffic signal allowing cyclists to move to the head of the queue (bicyclists should proceed slowly to the stop line and stop for the sign or wait for the signal)
- send a message to motorists that bicyclists have a right to the roadway
- remind motorists to look for bicyclists on the road
- give bicyclists a clear place to be so they are not tempted to ride on the sidewalk

Well-designed facilities encourage proper behavior and decrease the likelihood of crashes. Several studies have shown that **bicycle lanes influence positive behavior and improve safety.**²

- Corvallis and Eugene, Oregon, cities with good bikeway networks, have the highest number of riders and rider behavior is the best: **wrong-way riding is minimal, fewer ride on the sidewalk** than in other Oregon cities and helmet use is above the statewide average. The cities in Oregon with fewer facilities experience lower ridership numbers and poor rider behavior: more ride against traffic or on the sidewalks, and helmet use is often lower than the statewide average.³

¹ David L. Harkey and J. Richard Stewart, "Evaluation of Shared-Use Facilities for Bicycles and Motor Vehicles in Florida," *ProBike ProWalk 96 Resource Book*, p. 103.

² Federal Highway Administration, *Safety Effectiveness of Highway Design Features, Volume VI, Pedestrians and Bicyclists*, FHWA-RD-91-049, 1991.

³ *Oregon Bicycle and Pedestrian Plan*, 1995.

- In looking at comparable streets with and without bicycle lanes in Davis and Santa Barbara, California, the number of cyclists riding on the wrong side of the street was **one third as much on streets with bicycle lanes**.
- The addition of bicycle lanes in Davis, California **reduced crashes by 31 percent**.
- In Santa Barbara, California a study concluded that bicycle lanes would have **prevented approximately 14 percent of crashes**.⁴
- Bicycle lanes on a major avenue in Eugene, Oregon resulted in an increase in bicycle use and a substantial reduction in the bicycle accident rate. The **crash rate** per 100,000 bike miles **fell by almost half** and the **motor vehicle crash rate also fell significantly**.⁵
- In Denmark, bicycle lanes **reduced the number of bicycle crashes by 35 percent**.⁶ Some of the bike lanes reached risk reductions of **70 to 80 percent**.⁷
- Major improvements to the bikeway network in Delft, the Netherlands, resulted in **fewer accidents and injuries** among cyclists.⁸
- With the redesign of roadways to establish an integrated bike lane network, recorded traffic injuries in Deventer, the Netherlands, **fell by 30 percent overall** over a 7 year period, with an even greater fall in injuries to cyclists.⁹
- On high speed (40 to 45 miles/hour) multilane urban highways with high traffic volumes (15,000 to 25,000 per day), even the minimal four foot wide marked bicycle lanes contiguous to the roadway were found to have multiple benefits relative to traffic flow, bicyclist comfort, and passing distance.¹⁰
- A comparison of crash rates of all types in major cities has shown that **cities with higher bicycle use have lower traffic accidents of all types** than cities with lower bicycle use.¹¹

⁴ Federal Highway Administration, *Bicycle Safety-Related Research Synthesis*, 1995.

⁵ *Ibid.*

⁶ Danish Road Directorate, *Safety of Cyclists in Urban Areas*, 1994.

⁷ Jan Grubb Laursen, *Nordic Experience with the Safety of Bicycling*, 1993.

⁸ Ministry of Transport, Public Works and Water Management, *Cities Make Room for Cyclists*, Delft, 1995.

⁹ *Ibid.* Exact percent for decline in cyclist accidents not cited in publication.

¹⁰ Federal Highway Administration, *Safety Effectiveness of Highway Design Features, Volume VI, Pedestrians and Bicyclists*, FHWA-RD-91-049, 1991.

¹¹ Peter Newman, Lecture presented at the Conservation Law Foundation, Boston, MA, January 9, 1997.

Differences in bicyclist behavior relative to street facility

9

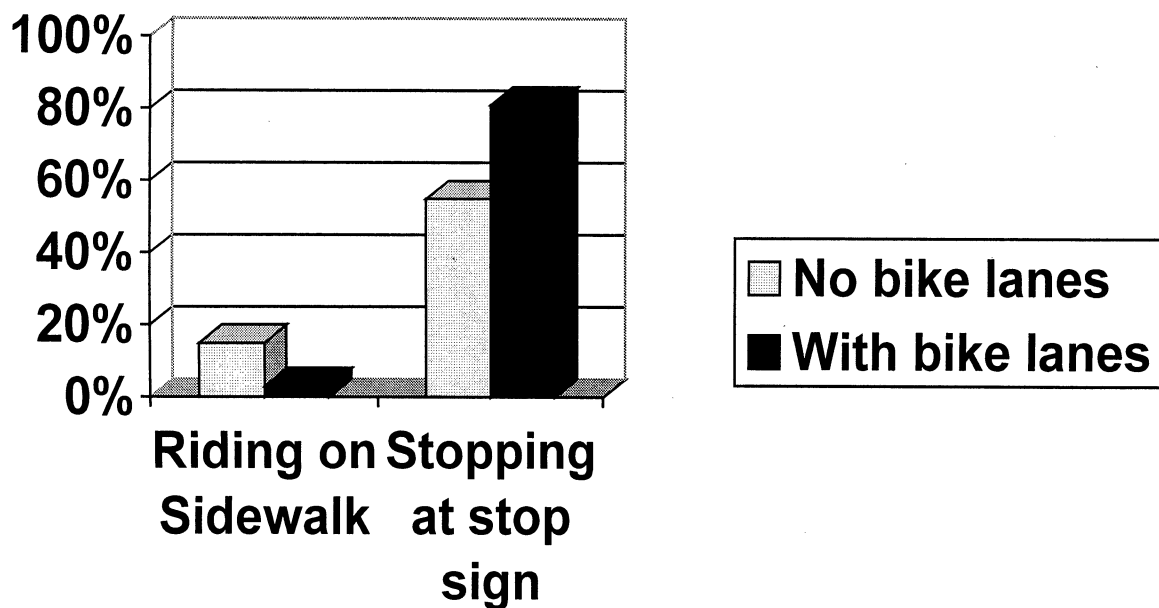


Figure 1: Differences in bicyclist behavior when bike lanes are present

- In a national study comparing streets with bike lanes and those without, several important observations were made:¹²
 - **Wrong-way riding was significantly lower on the streets with bike lanes.**
 - In approaching intersections, **15% of cyclists on streets without bike lanes rode on the sidewalks, vs. 3% on the streets with bike lanes.**
 - **On streets with bike lanes, 81% of cyclists obeyed stop signs, vs. 55% on streets without.**
- Recent studies in several locales have provided compelling evidence that **marking bicycle lanes through intersections decreases the number and severity of crashes that occur at intersections.**
 - In a major study in Denmark, marking bicycle lanes in blue across intersections resulted in a **38 percent decrease in bicycle crashes** and a **71 percent decrease in fatalities and serious injuries.**¹³
 - A Swedish study found the use of red **increased safety per bicyclist by 20 percent.**¹⁴

¹² Federal Highway Administration, *Bicycle Lanes versus Wide Curb Lanes: Operational and Safety Findings*, May 1998.

¹³ Søren Underlien Jensen, Karina Vestergaard Andersen and Erling Dan Nielsen, "Junctions and cyclists," paper presented at Velo-City '97.

- In Oxford, England, the introduction of cycle lane markings (with no color) across intersections successfully **reduced the number of crashes** occurring at the test locations.

¹⁵

- In Montreal, Quebec, the use of blue at five intersections resulted in a **decrease in the number of conflicts, markedly improving the behavior of bicyclists and pedestrians** and increasing the visibility of the right-of-ways. ¹⁶

¹⁴ Lars Leden, "Has the City of Gothenburg found the concept to encourage bicycling by improving safety for bicyclists?," *Proceedings, 10th International Bicycle Planning Conference*, 1997.

¹⁵ Nigel Coates, "The Safety Benefits of Cycle Lanes," Oxford City Council, UK, 1996.

¹⁶ Jean-François Pronovost and Marc Lusignan, "Behaviour of Road Users Following the Application of a Special Bikeway Crossing Marking," *ProBike ProWalk 96 Resource Book*, p. 48, 1996.



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4.

EXECUTIVE DEPARTMENT
ROBERT W. HEALY
City Manager

RICHARD C. ROSSI
Deputy City Manager

November 23, 1998

To The Honorable, The City Council:

In response to Awaiting Report Item No. 29, regarding a report on the City's official policy on the implementation of bike lanes and whether bike lanes are a condition of any federal or state funding, received from Acting Assistant City Manager for Community Development Beth Rubenstein.

Very truly yours,

Robert W. Healy
City Manager

RWH/mec
Attachment

Consent Agenda #4

7505

Relative to AR. #29, regarding a
report on the City's official policy
on the implementation of bike lanes
and whether bike lanes are a
condition of any federal of state
funding.

In City Council November 23, 1998

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