EVALUATION OF SOLID GREEN BICYCLE LANES

TO INCREASE COMPLIANCE AND BICYCLE SAFETY

A REQUEST TO EXPERIMENT

Submitted to:

Federal Highway Administration
Office of Traffic Operations

Submitted by:

City of New York
Department of Transportation

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NATURE OF THE PROBLEM

When motorists encroach upon bicycle lanes, bicyclists feel at risk. This can result in reduced bicycle usage. City Transportation staff have observed motorist usage of designated bicycle lanes at several locations in the city bike route system, often parking on top of curbside lanes. Overall, insufficient motorist awareness of the likely presence of bicyclist and insufficient horizontal clearance from the bicyclist's likely travel path can result in intimidating circumstances for a bicyclist.

By emphasizing the portion of the roadway adjacent to the curb reserved for the exclusive or preferential use by bicyclists, bicycle usage can be encouraged. Correct lane positioning is important for bicyclists at intersection approaches – especially for the "right turn trap" type crash. By defining the correct lane position bicyclists may be more prominent in the cone of vision for both overtaking right turning motorists and oncoming left turning motorists. According to the Institute for Highway Safety/Highway Loss Data Institute website 35% of bicycle deaths in 2000 occurred at intersections. According to the FHWA's Transportation Air Quality – Selected Facts and Figures publication FHWA- PD-99-015, commuter trips by bicycle have declined by 20% from 1980 to 1990, while urban traffic congestion levels from 1982 – 1996 have had increases typically in the range of 20% - 30% (or more).

These developments are contrary to the goals of the National Bicycling and Walking Study FHWA-PD-94-023 which are:

1) To double the current percentage of total trips made by bicycling and walking, and;
2) To simultaneously reduce by ten percent the number of bicyclists and pedestrians killed or injured in traffic crashes.

According to Kenneth R. Wykle, former Federal Highway Administrator, in his Pedaling into the 21st Century article *"People shouldn't have to use a gallon of gasoline to get a quart of milk. Increased use of bicycling as a means of transportation also will help protect the environment, reduce traffic congestion, and develop more livable communities."*

DESCRIPTION OF PROPOSED EXPERIMENTAL DEVICES

The City New York proposes initially to evaluate the use of typical white bicycle lane pavement markings, installed at the study locations noted below. After this baseline condition is evaluated we will then provide and evaluate solid green pavement marking between the bicycle lane striping. It is anticipated that the use of the solid green marking will prompt motorists to respect the bicycle lane (reducing encroachments) as well as be aware of bicyclists along the roadway. In addition the solid green pavement marking will prompt greater bicycle use by providing a well-defined area for the bicyclist in the roadway.

As a result of coordination between the Bicycle Technical Committee (BTC) and the Pavement Markings Technical Committee (PMTC) of the National Committee on Uniform Traffic Control Devices (NCUTCD), the color green was identified as the most likely color for this experiment. (While the use of blue pavement markings for handicapped parking is not defined in the MUTCD, there is a common perception that blue is reserved for that purpose.)

RELATED FINDINGS

Annual bicycle fatalities in the U.S. in 2000 held steady at nearly 700 per year. Many more bicyclists sustain various levels of injuries. Conflicts with motorists cause many of these crashes.

The City of Portland, Oregon has experimented with colored markings at bicycle-motor vehicle crossings. The results of their experiments are contained in the Document "Portland's Blue Bike Lanes – Improved Safety through Enhanced Visibility", City of Portland Office of Transportation July 1, 1999. The conclusions included in this report indicated, among other results, statistically significant increases in motorists yielding to cyclists and an increase in motorists slowing or stopping when approaching conflict areas.1

RESEARCH PLAN

The research will employ a multiple baseline across sites design. The plan includes an initial base line study of the effectiveness of standard bike lane markings. This will be followed with an evaluation of the solid green bike lanes. Each location will be observed for at least one two hour peak period (i.e., 7am-9am or 4pm-6pm). The City of New York will measure:

1. The percent wrong way bicycling (scored from videotapes from a number of pre-selected sites along the route).
2. Percent of bicyclists riding in the bicycle lane vs. in the vehicle lane or on the sidewalk.
3. Number of motor vehicles, stopped or driving, in the bicycle lane.
4. Lateral distance between motor vehicles and the bicycle lane.
5. The number of conflicts between bicycles and motor vehicles that require evasive action such as sudden braking or direction changes to avoid a crash.
6. Motor vehicle speed.
7. Directional and total motor vehicle volume.
8. Directional and total bicycle volume.
9. Weather conditions, date, and time.
10. Durability of the green bicycle lane treatment.
11. Visibility, which may need to be measured at times other than the collection of the ten pieces of information above, since it will be checked at night and when wet.

Following the collection of baseline data the solid green bicycle lane treatment will begin. The green bicycle lanes will be observed, and data collected, three months, six months, and nine months after installation.

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1 City of Portland Office of Transportation, "Portland's Blue Bike Lanes – Improved Safety through Enhanced Visibility", July 1, 1999 p. 20.

EXPERIMENTAL SITES

The bicycle lanes that will be used in this experiment, along with their limits, length, and the borough in which they are located, are anticipated to be as follows. (Note: There are no curbside bike lanes in the Bronx.)

Brooklyn:

Adams Street	(Tillary St. to Willoughby Ave.)	0.5 miles, (0.25 miles each way)
Henry Street	(Clark St. to Amity St.)	0.6 miles, southbound only

Manhattan:

Centre Street	(Reade St. to Worth St.)	0.12 miles, northbound
Centre Street	(Chambers St. to Park Row)	0.14 miles, southbound

Queens:

Underhill Avenue	(Utopia Pkwy to 196th St.)	0.7 miles, eastbound only
Cypress Hill Street	(Cypress Ave. to Cooper Ave.)	1.2 miles, (0.6 miles each way)

Staten Island:

Richmond Terrace	(York Ave. to Tysen Ave.)	0.57 miles, westbound
Richmond Terrace	(Lafayette Ave. to York Ave.)	0.37 miles, eastbound

AGREEMENT TO RESTORE

COMPLIANCE WITH MUTCD

At the end of the project, we will assess the effectiveness of the experimental markings. If the experimental markings are effective, we will request a change in the MUTCD that would allow the use of these markings. If the experimental markings prove to be ineffective, we will remove the markings and return the roadway to compliance with the MUTCD. The City of New York will terminate the experiment if at any time it determines significant safety hazards are directly or indirectly attributable to the experimentation.

AGREEMENT FOR SEMIANNUAL REPORTS

PROGRESS REPORTS

Throughout the project, we will provide to FHWA semi-annual reports and intermediate findings on the project's status. At the conclusion of the project, a final report summarizing our findings will be provided to FHWA. This report will be completed within six months of the collection of

follow-up data.

Green Lanes Permissionto to Experiment 4-22-05A