



July 1, 2014

Mr. Jeffrey A. Lindley
Associate Administrator for Operations
U.S. Department of Transportation
Federal Highway Administration
Office of Operations (HOP)
Mail Stop: E86-205
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Request for Experimental use of Bike Boxes with Advanced Stop Lines for Motor Vehicles and Two-Stage Left Turn Queue Boxes at Uses Other Than For Jughandle Turn at T-Intersection

Dear Mr. Lindley:

The City of Charlotte, Department of Transportation (CDOT) formally requests to experiment with the use of bike boxes with advanced stop lines for motor vehicles and two-stage left turn queue boxes at uses other than for jughandle turn at T-intersection. These bike boxes might also use green colored pavement such as described in Interim Approval 14, which the City of Charlotte has prior approval (reference IA-14.23).

Our request will comply with Paragraph 11 of Section 1A.10, which states that all requests should include:

1. Statement of the nature of the problem, including data that justifies the need for a new device or application.

With the increasing number of cyclists in the Charlotte area and bicycle commuters, the need for better bicycle pavement markings and improved bicycle operating conditions are paramount. In 2008, the Charlotte City Council adopted the Charlotte Bicycle Master Plan. Policy Strategy 4.3 states, "The City will conduct field tests of various emerging design treatments to improve bicycling conditions in the City." Bike boxes are one of the design treatments the City believes will improve bicycling conditions. The use of this treatment will be at locations where left-turning cyclists may conflict with through-movement vehicles, as well as locations of heavy bicycle ridership in areas where the City desires to promote bicycle commuting.

2. A description of the proposed change, how it was developed, and how it deviates from the current MUTCD.

The City would like to install bike boxes in the manner that was developed by the National Association of City Transportation Officials (NACTO) in their published "Urban Bikeway Design Guide." Similar treatment has been in experimental use by Portland OR, New York NY, Austin TX,

and San Francisco CA. The current MUTCD does not have provision for getting cyclists in front of vehicles at intersections.

Bike Boxes with Advanced Stop Lines for Motor Vehicles

The device includes white pavement markings delineating the area of the bike box and a white bicycle symbol inside the box. The box starts at the closest crosswalk line and extends toward the vehicle lane at least ten feet to a 24" vehicle stop bar. Immediately beyond the stop bar are the words "WAIT HERE," indicating to vehicles to not encroach into the box. In some locations, the City will install green markings inside the bike box and extend along a portion of the adjacent bike lane (if applicable). Also in some locations, the City will install bike detection and include the bike detection symbol in white to identify the location for the bike to send a call to the signal.

The main deviation from MUTCD is extending bike lanes across the vehicle lane perpendicularly to create a space for the cyclist to be in front of vehicles. In this manner, the vehicle will have to yield to the bike through the intersection.

Two-Stage Left Turn Queue Boxes at Uses Other Than For Jughandle Turn at T-Intersection

The device includes white pavement marking delineating the area of the bike box and a white bicycle symbol inside the box as well as a left-turn arrow. The box is parallel with the through movement of the street the cyclist is turning from and between the crosswalk and extended edgeline of that through movement. In some locations, the City will install green markings inside the bike box. Also in some locations, the City will install bike detection and include the bike detection symbol in white to identify the location for the bike to send a call to the signal.

The main deviation from MUTCD is placing the cyclist beyond the crosswalk of the cross-street to create a space for the cyclist wait for the signal. In this manner, the vehicle will have to yield to the bike through the intersection.

3. Any illustration(s) that enhances understanding of the device or its use.

Bike Boxes with Advanced Stop Lines for Motor Vehicles

Figures 1 and 2 show photographs of the device being used. The bike lane extends to the crosswalk line and across the entire vehicle through lane. Motorists see a stop bar, the words "WAIT HERE," and a bicycle legend so they are given a clear message that the space in front of them is for cyclists.

Figure 1: In-line view of green bike box



Figure 2: Motorist and cyclist compliance of bike box treatment



Two-Stage Left Turn Queue Boxes at Uses Other Than For Jughandle Turn at T-Intersection

Figures 3 and 4 show the device being used. In order to make a left turn from a four-lane, two-way roadway with no left turn lanes, the cyclist rides with traffic in the curb lane. On the green signal, the cyclist advances to the bike box next to the crosswalk, turns to face with the flow of traffic on the side street, and stops. On the green signal for the side street, the cyclist advances through the intersection in the curb lane of the side street (or bike lane if applicable).

Figure 3: Two-stage left turn box from cyclist's view to turn left onto side street.



The vehicle driver on the side street is stopped at the stop bar, which is four feet from the crosswalk. The bike box is beyond the crosswalk to avoid conflict with pedestrians who are crossing with the main street green signal. This device is used in locations where there is sufficient distance between the extended curb of the main street and the crosswalk to install the device.

Figure 4: Two-stage left turn box; vehicle driver's view from side street.



4. Supporting data that explains how the experimental device was developed, if it has been tried, the adequacy of its performance, and the process by which the device was chosen or applied.

CDOT's main reference guide for bike box design is the NACTO Urban Bike Design Guide. NACTO is a nationally-recognized organization for urban design guidance, including guidance for bicycle facilities. Several municipalities such as San Francisco and New York have installed bike boxes and found them to be successful with vehicular compliance to the bicycle space.

CDOT has a team of engineers and planners on all roadway construction projects in the City. The CDOT Bicycle Planner leads the discussion on bicycle facilities. In the case of bike boxes, this treatment is chosen because of the vehicular lane configuration. The team of engineers and planners discussed in detail all of the bicycle and vehicular movements through the intersection. At the intersections where bike boxes with advance stop lines for motor vehicles will be installed, the right-turning vehicles are separated from through and left-turning vehicles, or right turns are restricted. If a bike lane is present, the bike lane is between the through/left and right lanes, as shown in the pictures under item (3). The bike box then serves to provide left-turning bicycles the ability to get in front of through-movement vehicles to avoid a conflict. At the intersections where two-stage left turn queue boxes are installed, there will typically be a high volume of vehicular and bicycle traffic on a multi-lane roadway and a lack of left turn lanes for cyclists to wait for oncoming vehicular traffic to clear. The bike box then serves as a location for cyclists riding in the curb lane to wait out of the way of through traffic to make a left turn onto the side street.

Bike box installation will be deliberate, by the process described above, where a team of engineers and planners discuss all bicycle and vehicular movements at an intersection.

5. A legally binding statement certifying that the concept of the traffic control device is not protected by a patent or copyright (see MUTCD Section 1A.10 for additional details.)

Bike boxes are not a patented device. Bike boxes can be constructed by any transportation agency using pavement markings from any number of qualified manufacturers.

6. The proposed time period and location(s) of the experiment.

CDOT would like to evaluate and experiment with bike boxes for a period of 5 years. This time frame allows adequate time to secure funding, evaluate the “before” conditions and collect crash data for a complete 3-year “after” period. Crash reports typically lag 6 months to a year behind the current date. Locations in Charlotte which bike boxes would be installed on city-maintained streets are:

ROAD_NAME	@ INTERSECT	FACILITY
CARSON	SOUTH BLVD	Bike Box
S. TRYON	CARSON	Two Stage Left Turn Queue Box
ELIZABETH	TORRENCE	Two Stage Left Turn Queue Box

7. A detailed research or evaluation plan providing for close monitoring of the experimentation, especially in the early stages of field implementation. The evaluation plan should include before and after studies as well as quantitative data enabling a scientifically sound evaluation of the performance of the device.

CDOT will maintain a list of locations where bike boxes are installed. If the intersection currently exists as a four-way intersection, field observation will be conducted prior to installation of the bike box to gather data on driver and cyclist behavior, specific to turning movements and number of bicycles and vehicles through the intersection. After the bike box installation, evaluations will be done, at a minimum, of one month and six months after installation to collect the same data.

8. An agreement to restore the experimental site to a condition that complies with the provisions of the MUTCD within 3 months following completion of the experiment. The agreement must also provide that the sponsoring agency will terminate the experiment at any time if it determines that the experiment directly or indirectly causes significant safety hazards. If the experiment demonstrates an improvement, the device or application may remain in place until an official rulemaking action occurs.

The City will maintain a list of locations where bike boxes are used. The City acknowledges the right of the FHWA to terminate the approval of the experiment at any time should a safety reason problem arise. The City agrees to remove the experimental treatments if within three months of the completion of the study if the FHWA reaches a decision that bike boxes are not warranted to be covered in the MUTCD. The City agrees to remove the treatments should we find the experiment directly or indirectly causes a substantial safety risk.

9. An agreement to provide semi-annual progress reports for the duration of the experimentation and a copy of the final results to the FHWA's Office of Transportation Operations within three months of the conclusion of the experiment.

CDOT agrees to provide annual progress reports during the course of the experiment and will provide a final report following the conclusion of the experiment.

If further information is needed, please contact Susan Habina Woolard of our office at 980-285-7118 or shwoolard@charlottenc.gov. Thank you for considering this request. We look forward to your response.

Sincerely,



Liz Babson, P.E.
Deputy Director
Charlotte Department of Transportation

EB/shw

C: Kevin Dunn, P.E. via email
Debbie R. Smith, P.E., CDOT
Scott L. Putnam, P.E., CDOT