CITY OF DAVIS
UNIVERSITY OF CALIFORNIA

BICYCLE CIRCULATION AND SAFETY STUDY

DE LEUW, CATHER & COMPANY · ENGINEERS AND PLANNERS

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August 31, 1972

The Honorable Mayor and City Council
City of Davis, California
and
The Office of Architects and Engineers
University of California - Davis

Gentlemen:

Enclosed herewith is the final report of the Davis Bicycle Circulation and Safety Study. This report, along with the companion report of the Davis Traffic Circulation and Safety Study, outlines findings and conclusions of the Study and details alternative improvement programs responding to current and future bike circulation and safety needs.

The City and University have excellent bike safety records and, considering the level of bike travel in the community and the existing system of special bike facilities, is a model for other U. S. cities contemplating bikeway systems. However, at a number of individual locations, physical facilities provided are a contributing factor to poor bike safety records. Long term European experience with facilities for utility-oriented cycling and Traffic Engineering fundamentals are basic resources for physical design solutions to these problems. European experience also provides invaluable background for development of bikeway location and design criteria.

The City and University bikeway system is an impressive network. However, several additions to the network are needed to achieve the objective of providing community-wide bike access equal to or better than that afforded the automobile. Well designed bikeway extensions into new development areas are essential for future bike safety as well as to maintain and emphasize the bicycle's role in community transportation.

We appreciate this opportunity to serve the City and University and wish to express our special thanks to the Ad Hoc Circulation and Safety Committee, to Mr. Lou Weiss, UC Davis Principal Engineer, and to Mr. Dave Pelz, City of Davis Director of Public Works, for their large contributions to the successful completion of this project. We also wish to acknowledge the cooperation and assistance of the City and University Police Departments.

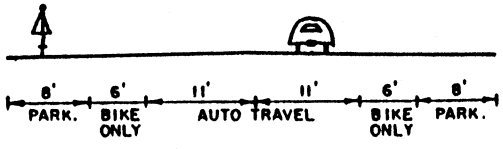
Sincerely,

DE LEUW, CATHER & COMPANY

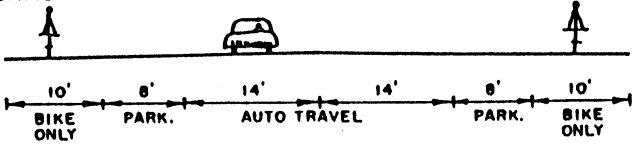
H. E. Lloyd
Senior Vice President

Daniel T. Smith Jr., P.E. 21,913
Project Manager

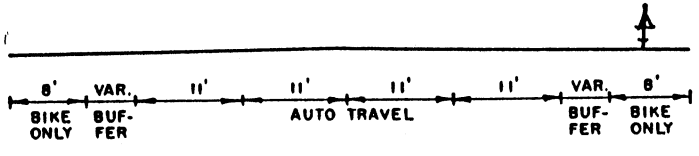
BIKE LANE
(DAVIS TYPE A)



PROTECTED LANE
PHYSICAL SEPARATION
(DAVIS TYPE B)



PROTECTED LANE
SPATIAL SEPARATION



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TYPICAL BIKE FACILITY TREATMENTS

Bike Lanes

With proper education as to their use, bike lanes have proven effective in separating flows of motor vehicle and bike traffic and in reducing midblock car-bike accidents. The defined space eliminates the tendency for cyclists to distribute themselves over the roadway cross-section and gives the cyclist a sense of security. Furthermore, presence of the bike lane itself serves as a reminder to the cyclist of his responsibilities to observe traffic regulations. For the motorist, the bike lanes provide a predictability and sense of security and the removal of the slower bikes from the motor vehicle lanes results in improved operations and capacity. However, the lanes do not physically prevent motor vehicles or bikes from encroaching on the territory of the other and encroachment, some deliberate, some inadvertent, does occur. Inadvertent encroachments are relatively rare ... the car which strays from its normal lane, loses control or makes a panic maneuver in an emergency situation, the cycle which veers out of the bike lane to avoid a parking or de-parking car or to avoid the open door of a parked car all are examples. Deliberate encroachments are more common...the right turning car which makes its approach to the intersection in the bike lane, the car which enters the bike lane to avoid another car which is blocking the motor vehicle lane while awaiting the opportunity to execute a left turn to a driveway at midblock or to a cross street, the bike which suddenly

leaves the lane and crosses the street at midblock to reach a destination on the other side or the cycle which leaves the lane approaching an intersection in order to execute an unauthorized form of left turn which will allow it to maintain momentum...are some of the common forms of deliberate encroachments. Encroachments are partially an element of the intersection problem which is discussed subsequently. However, encroachments tend to increase with increased motor vehicle volumes (particularly as capacity is approached) and speeds, thus on high speed-high volume streets more positive physical separation is desirable.

Protected Lanes

Protected lanes in varying degrees provide elements of positive physical separation between cycles and motor vehicles. Lanes protected by visually delineated buffer areas are very similar in operation to unprotected on-street lanes with the exception that the width of the buffer area tends to reduce the level of encroachment and frictional effects of traffic. Lanes protected by raised buffers more completely reduce encroachments and frictional effects. Protected lanes located between the parking shoulder and curb line have most positive separation. However, the parked cars create sight distance problems at driveways and intersections. Inability for cyclists to cross streets at midblock in this type of treatment results in two-way usage which, in turn, leads to intersection problems described subsequently. Protected lane treatments are most appropriate for very specialized situations; typically in cases where parking turnover produces high frictional effect in the bike lanes, on rural secondary highways where high speed traffic makes protection desirable, where wide pavement and shoulder width is available but parallel pathways are unfeasible, and in very specialized circumstances when a buffer between motor vehicle traffic and abutting land uses is desirable.

Sidewalk and Independent Paths

Sidewalk pathways eliminate midblock bike-motor vehicle friction. However, frictional interference of pedestrians may discourage usage of these facilities as does frequent interruption by cross streets and driveways or meandering of the path. An additional problem is establishment of a visual relationship between motor vehicles and cycles on the sidewalk path on approaches to intersections. Sidewalk paths are most effective on long stretches uninterrupted by cross streets where there is no frontage development or where frontage development is oriented to internal streets. Independent paths provide the most desirable environment for cycling. However, care must be taken to avoid compromising the primary objective of serving origins and destinations without necessitating significant out of direction travel. Additionally, independent paths tend to intersect roadways

of Orchard Park Drive which severely restricts sight distance to Russell Boulevard and makes motorists emerging from Orchard Park Drive all the more anxious to look to their left, neglecting bike traffic coming from their right along the pathway.

An improvement plan for this intersection is indicated on Figure 30. Because the electrical equipment installation cannot be readily moved, the bike path is bowed to the south, crossing Orchard Park Drive away from the intersection with Russell Boulevard consistent with the European 'offset crossing' practice as discussed in Chapter 2. Traffic on the short segment of Orchard Park should be slow moving and the bike crossing would be well demarcated and sufficiently visible for safe operations.

SYCAMORE LANE

The Davis "Type B" protected lane treatment (bike lanes placed between parked cars and the curb) appears to create some problems in its application on Sycamore Lane. Removal of parking for 100 feet on intersection approaches has eliminated the initial problem of poor sight distance at these locations. However, sight distance problems remain at driveways as evidenced by one auto-bike collision at the entrance to University Mall. Another problem is that the width of the lanes (10 feet) and the barrier to street crossings posed by parked cars tend to encourage two-way travel, reducing the predictability which one-way lanes would otherwise provide. In the case of the actual installation, most cyclists' origins and destinations are in the apartment area on the west side of Sycamore in the first block north of Russell. Because this two-way bike traffic does not cross driveways or other intersections, the net result of two-way usage is probably beneficial. The lighter two-way traffic on the lane on the east side of Sycamore does cross intersections and driveways, posing more of a problem.

In the future, it appears advisable to construct Davis "Type B" protected lanes only in areas in which high parking turnover or other special conditions would interfere with operations of normal on-street lanes.

RICHARDS BOULEVARD GRADE SEPARATION

Three alternatives for improvement of the Richards Boulevard-Southern Pacific Railroad grade separation have been detailed in the companion TRAFFIC CIRCULATION AND SAFETY STUDY. In the existing underpass, only 24 feet wide with no shoulders, bikes and pedestrians must share the 12 foot travel lanes with heavy motor vehicle traffic volumes. Each improvement plan includes bike-pedestrian pathways which provide substantial improvement over the existing inadequate structure.

However, there are significant differences in quality of