THE LOS ANGELES
SPRING STREET CONTRAFLOW BUS LANE:
A HISTORICAL ANALYSIS AND EVALUATION

Prepared for

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

May 1982

UNIVERSITY OF CALIFORNIA

Los Angeles

The Los Angeles Spring Street Contraflow Bus Lane: A Historical Analysis and Evaluation

A comprehensive project submitted in partial satisfaction of the requirements for the degree Master of Arts in Architecture and Urban Planning (U).

by

Tonia Botte Bates

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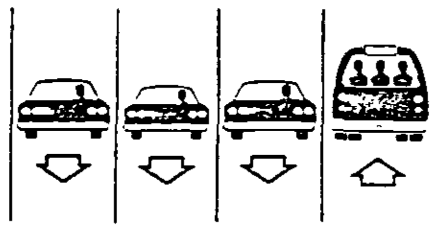
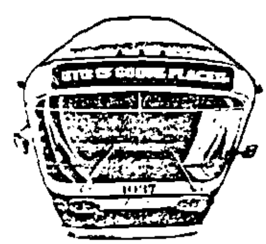
RTD

INTRODUCES



SPRING ST.

CONTRAFLOW SERVICE



SOUTHERN CALIFORNIA
RAPID TRANSIT DISTRICT

Effective Sunday, May 19, and until further notice, bus stops for certain outbound RTD lines will be relocated to the East (curbside) lane of Spring Street for passengers leaving downtown Los Angeles and bound for those northern and eastern suburban destinations listed on these pages.

The northbound Contraflow lane moves against the normal flow of one-way southbound traffic on Spring Street, between Olympic Blvd. and Macy Street.

The Contraflow plan, made possible through the cooperation of the City of Los Angeles and supported by Mayor Tom Bradley, is planned as a long-range experiment, currently scheduled for at least one year.

In addition to the double yellow lines which have been painted along the length of the route, a series of red and yellow cones will temporarily provide additional definition of the Contraflow lane.

Destination signs have been placed at the new bus stops to indicate lines served and approximate frequency of service.

SOURCE: Southern California Rapid Transit District
May 1974 brochure.

ACKNOWLEDGEMENTS

I wish to thank all those who have helped me with this project. First, I thank Marty Wachs for initially sparking my interest in transportation planning and encouraging my continued development in the field. Additionally, as my comprehensive project chair, Marty provided invaluable comments and guidance at each step of the project's production and encouraged me through its most frustrating moments. I also thank Don Shoup for his pertinent comments and suggestions as a member of my comprehensive project committee.

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INTRODUCTION

The Spring Street Contraflow Bus Lane in downtown Los Angeles developed from a long and complex sequence of events. It is the local result of the recent national emphasis on more efficient transportation facilities. But, local circumstances and controversy influenced the lane's characteristics.

This study follows the history of the Spring Street Contraflow Bus Lane in downtown Los Angeles from the first indication of its inception through its current form and characteristics. The first three chapters are a description of the events leading to the contraflow lane's installation on Spring Street and its performance through its first five years. They describe the attitudes and political decisions that resulted in the installation of the Spring Street Contraflow Bus Lane in 1974. The first chapter discusses the national political mood that set the scene for local action. The second chapter elaborates on the contraflow bus lane concept in general. The third chapter describes in detail the local decisions and controversy that revolved around the Spring Street Contraflow Bus Lane. The remainder of the report is a quantitative and qualitative evaluation of the contraflow lane's impacts and performance as they appear today.

CHAPTER I

The Development of Transportation Systems Management

The demand for automobiles and roads skyrocketed after World War II. The Federal government responded by spending vast amounts of money on highway construction, especially after the creation of the National System of Interstate and Defense Highways program was created in 1956. Public and private transportation priorities focused on the automobile. A "balanced" transportation plan meant keeping what transit facilities existed while expanding the highway system.[1]

At the same time, the unprofitable financial status of the existing transit facilities displaced them from private ownership to public control. As a result of pressure from financially troubled local governments, in 1964 Congress created the Urban Mass Transportation Administration (UMTA), within the Department of Housing and Urban Development, to deal with these new local public transit agencies. The Federal Highway Administration (FHWA) still dominated the transportation arena both financially and as a public priority, and a sharp division existed between the FHWA and UMTA. Often their transportation policies and priorities conflicted even though the 1962 Federal Highway Act called for a coordinated regional planning process.[2]

But by the late 1960's, vocal concerns about social disruption caused by massive highway construction began to change the goals and processes of the FHWA. By 1970, amendments to the Federal Highway Act required a major review of the regional transportation plan every five years. This regulatory element commenced the new trend toward shorter range regional transportation planning and led the way toward the 1975 UMTA and FHWA mandate for Transportation Systems Management (TSM).[3] The goals of TSM, a regional Transportation Improvement Plan, include finding more cost-effective means to expand transportation capacity on existing facilities.[4]

Environmental concerns that affected transportation planning also surfaced in the late 1960's. In 1970, the Clean Air Act Amendments were passed, and the National Enviromental Quality Act created the Environmental Protection Agency (EPA). The EPA had the power to impose transportation plans on metropolitan areas to enforce their ambient air quality standards. In Los Angeles, EPA promulgated an air quality improvement plan for the South Coast Air Quality Control Region. The plan included policies which strictly limited the use of automobiles and promoted more efficient transportation through the use of preferential lanes on streets and highways for high occupancy vehicles.[5] Although the plan was never adopted in full, it focused attention on low cost and easy to implement transportation policies.

These events brought to the forefront the need for alternatives to automobile facilities. Throughout the 1970's, sentiment and emphasis steadily shifted from highways to public transit at all levels of government.[6] Transit advocates and politicians cited more efficient use of existing facilities as the way to reduce social disruption, air pollution and large capital expenditures. The states caught the Federal mood, and California followed suit with environmental laws (CEQA) and other policies that affected transportation management.

In 1973, the governor of California approved Senate Bill 1221 authorizing the Southern California Rapid Transit District (SCRTD) to examine the potential for preferential transportation facilities within the County of Los Angeles. The Bill, authored by Los Angeles Senator Anthony Beilenson and supported by local political officials, appropriated $50,000.00 for the study. The Legislature chose SCRTD to conduct the study because it wanted to guard against the possibility that the "institutional attitudes" of those in control of the streets and highways might dictate conventional solutions.[7] The legislators realized SCRTD had a different vested interest in the use of streets and highways and, therefore, might develop innovative alternatives to their existing use. However, other interested local and regional agencies were not to be excluded from contributing to the study. SCRTD hired a consultant and held joint meetings with CalTrans, the City of Los Angeles Traffic Department, the Los Angeles County Road Department, and the Southern California Association of Governments (which was developing its own Short-Range Transportation Plan) during the course of the study. In March, 1974, RTD presented its preferential treatment plan for transit in Los Angeles County to the State Legislature.

The plan included such proposals as signal timing and preemption for buses, exclusive bus streets, with-flow bus lanes and contraflow bus lanes. Most of the methods studies could be implemented on existing streets and highways with only minor capital improvements. All were intended to improve bus travel and speeds, and provide greater capacity for the movement of people than currently existed. The plan's recommendations didn't include the Spring Street

Contraflow Bus Lane, as they tended to be more general in area and application. And, although most of these general recommendations were never implemented, low cost, short range transportation planning had arrived in Los Angeles. Awareness of the need for more efficient use of existing transportation facilities resulted in the recognition of contraflow bus lanes and their potential in Los Angeles.

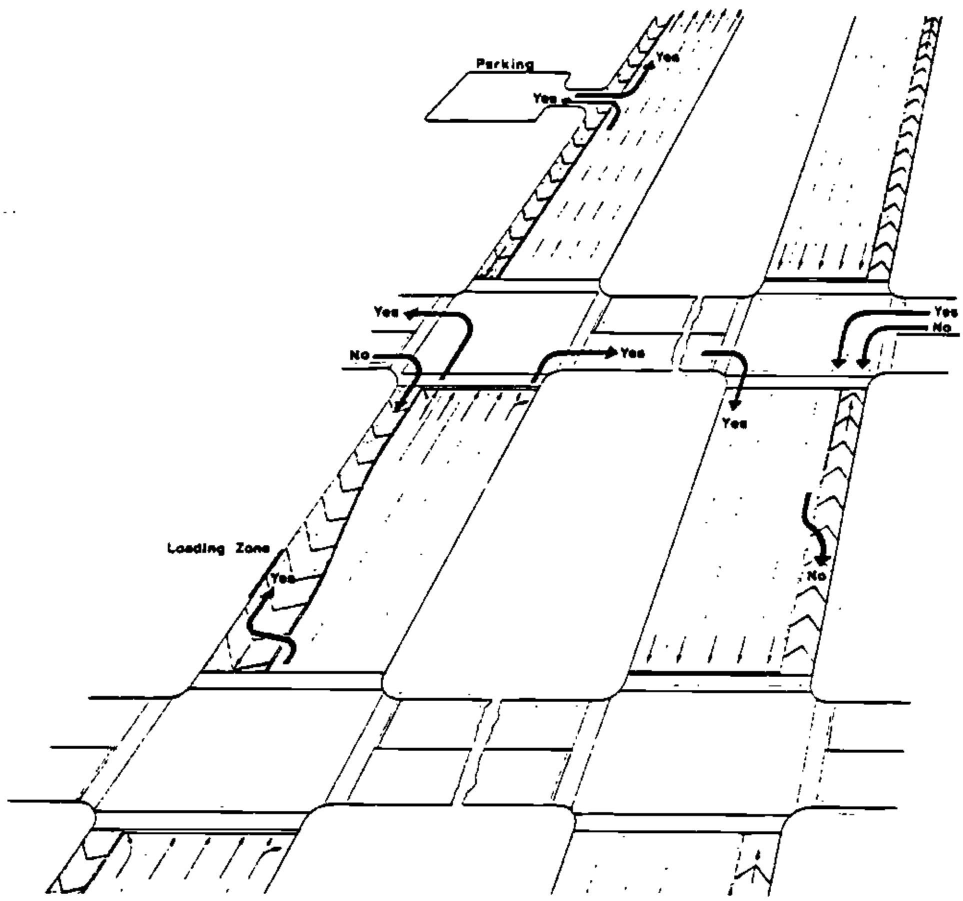
CHAPTER II

Contraflow Bus Lanes

In accordance with TSM principles, the contraflow lane aims to improve the efficiency of existing streets and highways by increasing potential passenger capacity. It is intended to accomplish this by increasing the number of people per vehicle and/or increasing vehicle speeds. Contraflow lanes carry traffic in the opposite direction of normal traffic flow. For this reason, they usually exist on freeways where the two directional flows are separated, or on one-way street couplets. The arterial or downtown contraflow lane often exists in connection with freeway bus lanes.[8] Since the Spring Street Contraflow Bus Lane falls into this category, the following discussion will concentrate on contraflow lanes on city streets. (See Figure 2.1)

Special treatment lanes are usually distinguished for use in two ways: they are either exclusive lanes or preferential lanes. The preferential lanes allow all high occupancy vehicles (buses, carpools, vanpools, etc.) to traverse the lane. The multi-vehicle lanes are termed "preferential" lanes because they allow use to all vehicles that meet the

FIGURE 2.1



OPERATIONAL CHARACTERISTICS, CONTRA-FLOW LANES

Wilbur Smith & Associates FIGURE 15

Source: Downtown Distribution Plan: San Bernardino Freeway Express Busway, Wilbur Smith and Associates, March, 1973.

preferred occupancy standards. Exclusive lanes exclude all vehicles but buses regardless of the number of people per vehicle.

Both contraflow and with-flow (the same direction as regular traffic flow) lanes can provide either preferential or exclusive use. Carpools and buses more easily share with-flow lanes because normal traffic patterns do not change and access to and from the lane cause no unusual problems. Contraflow lanes, however, disturb existing traffic patterns and access is more complicated. Therefore, contraflow lane proponents advocate exclusive use for buses to eliminate the problems confused carpool drivers may create.

In fact, only one contraflow lane in the United States allows vehicles other than buses to use the lane, and this provision developed after a particular incident occurred on that lane. In 1966, Madison, Wisconsin established a 2.2 mile contraflow lane on University Avenue when the street became one half of a one-way couple. The contraflow lane allowed buses (and taxis) to provide closer access to the University of Wisconsin than would be possible if they followed regular traffic patterns on the other half of the one-way pair (see Appendix I). In 1967, a pedestrian accident occurred on the lane that resulted in the pedestrian losing a leg. A law suit followed and previous public support for the lane diminished. The Wisconsin Supreme Court upheld the trial court's ruling that the bus lane was "illegal because it discriminated against the right of access to street by all vehicles". The courts determined that "'free use of all highways' meant accessible to everyone" and the Supreme Court Chief Justice stated "we cannot find the right to discriminate against the general public's use of a one-way lane on a street for the benefit of buses and taxicabs". "As a result of the court decision, the city converted the bus lane into a 'limited use' lane." Under this concession, all vehicles, regardless of the number of people in each, can use the lane, but they "must enter the lane at its beginning and traverse its entire length to the terminus."[9] It seems likely that such a procedure would still discourage significant automobile use because automobile travel is hindered by the route restrictions and the frequent bus stop delays of buses.

Many preferential and exclusive lanes operate only during peak periods. The extra street carrying capacity that these lanes provide is needed most during peak periods because traffic congestion is heaviest at these times. Time savings result from bypassing congestion on regular lanes. During off-peak hours, excess capacity often exists on regular traffic lanes and the preferential or exclusive lanes provide little or no time saving benefits.

However, the contraflow operation lends itself better to a 24-hour operation even if no quantitative advantages occur during the off-peak hours. First, it is more expensive to establish and maintain a peak period only contraflow lane because access and signage must accommodate traffic flows in both directions. But more importantly, an around-the-clock operation reduces confusion for those motorists who are prohibited from using the lane. The potential for automobile drivers to be unaware or forgetful of the contraflow lane increases if the operation is not always visible. These drivers may unintentionally use the lane during its hours of operation and disrupt the reverse-flow procedures and/or cause head-on collisions. Such reverse consequences do not exist on with-flow lanes. Therefore, many more with-flow preferential and exclusive lanes operate only during peak periods.

Nevertheless, officials in Louisville, Kentucky installed two contraflow lanes in 1971 that operate during peak periods only. The inbound lane operates for two hours in the morning and the outbound lane operates for two hours in the evening. However, during off-peak hours, the lane is used for parking.[10] This reduces some confusion because the lane is never available to regular traffic. But it may also cause excessive delay and expense if the city or transit agency must routinely tow away "over-due" parked cars. As of 1971, a peak period only contraflow lane also existed in Chicago. Each of the twelve other contraflow lanes in the United States are enforced on a 24-hour basis.[11] (See Appendix II)

Preferential with-flow lanes are more common in the United States than exclusive contraflow lanes, probably because they more closely resemble existing traffic patterns and they accommodate more types of people (carpoolers and bus patrons).[12] Since exclusive contraflow lanes serve a very select group (bus operators and riders) the following unofficial warrants exist for their installation:

1) traffic congestion prior to the contraflow lane's installation should be severe enough to hinder normal traffic flow,
2) the contraflow lane should carry at least as many passengers as the adjacent lane,
3) bus ridership should increase after the lane's installation,

4) the contraflow lane should carry about 60 buses per peak hour, and

5) the street containing the contraflow lane should have at least two remaining lanes.

The warrants affect and influence one another and therefore, will be considered in aggregate.

Pre-contraflow traffic congestion severe enough to hinder normal traffic flow will make the contraflow lane attractive to existing and potential bus riders. William H. Crowell, in a report for UMTA, projected potential time savings for contraflow lanes of at least 1.5 minutes per mile.[13] These savings should occur even on streets without much traffic congestion just from moving buses to their own lanes. The time savings result because turning cars don't slow buses and moving cars in curbside lanes don't hiner buses pulling out from bus stops. Increased bus schedule reliability also results from the separation of buses from traffic congestion. The heavier the congestion on the regular lanes, the greater the time savings and schedule adherence will be on the contraflow lane. One-way street pairs with heavy peak directional flow are the best candidates for the contraflow lane concept because heavy traffic in one direction of the pair encourages use of the opposite direction's unused capacity through a contraflow lane.[14]

Time savings and faster speeds result in greater vehicle capacity on the lane. But, more importantly, they can also lead to increased passenger volumes on the contraflow lane, especially if automobile drivers are attracted to the faster contraflow lane buses. Generally, traffic managers can expect a contraflow lane to increase capacity by 25-50%.[15] But only when travel times on the contraflow lane are substantially lower than those on normal traffic lanes do people have the incentive to use a contraflow lane bus. As R.H. Pratt and Associates state, "Unless time savings are shown as a result of bypassing congestion, little or no mode switching behavior will be observed.[16]

Inducing mode swtiching is especially important if passenger volumes prior to the contraflow lane are not large enough to warrant the lane. A contraflow lane usually takes away one street lane from regular traffic. Therefore, many traffic managers agree that the contraflow lane should carry at least as many passengers as the adjacent lane to warrant implementation.[17] (Baltimore officials advocate an average of all other lanes on the street.[18]) If this does not occur, the contraflow lane fails to provide more efficient use of existing facilities and poses some political problems. Officials may find an "under used" lane hard to justify as a service to the community. But if the contraflow lane can attract new bus riders, the situation will improve.

Additionally, a street containing a contraflow lane should have at least two (preferably three) remaining lanes.[19] Otherwise, the increased congestion on the remaining lanes caused by the removal of one lane for the contraflow operation strikes at the "rights" of automobile drivers. When a contraflow lane doesn't remove a lane from regular traffic, it eliminates curb parking. Therefore, vehicular volumes should be large enough to warrant either the lane loss or the parking loss for automobile drivers.

There are differing views on the actual number of vehicles per hour needed to justify a contraflow lane, but most literature seems to agree with the Institute of Traffic Engineers' guidelines for reserved bus lanes on city streets which state that 60 transit vehicles per peak hour can warrant the lane.[20] However, some experts in the field maintain that as few as 20 vehicles per hour can justify a bus lane. According to these varying guidelines, a contraflow lane should carry between 800 and 2400 passengers per hour.[21] But the maximum vehicle capacity of a contraflow lane could possibly even rise above 100 buses per hour.[22] In fact, the peak direction of the eleven mile contraflow pair in San Juan, Puerto Rico carries up to 70 buses during the morning peak hour, and 1800 to 2000 buses a day use the pair.[23] But the capacity of a single lane primarily depends on the loading characteristics of the bus lines on that particular contraflow lane. Non-peak vehicular volumes are usually relaxed due to both the reduced congestion on regular traffic lanes and the desirability of a 24-hour operation.

Traditionally, streets with the highest bus volumes were the first locations considered for preferential or exclusive bus lanes. However, the desire to improve transit operations in certain locations and provide a visible statement of transit policy and identity has recently influenced many bus lane locations.[24] Although the warrants discussed in this paper depict conclusions from well studied applications, they should act as guidelines only. Officials often have other goals in mind in addition to increased capacities and speed. Since contraflow lanes don't represent capital intensive investments, their warrants can be relaxed (or tightened) to fit local situations.[25] Local agencies may desire the increased transit visibility, improved passenger loading zones, or better schedule reliability that a contraflow lane can offer. The attainment of one or more of these latter goals may override their failure to significantly increase volumes or speeds.

Contraflow lanes on one-way streets can also often serve to provide more direct routing where it was previously prohibited.[26] As discussed earlier, officials in Madison used this "warrant" to provide better service to the University. Exclusive lane use and decreased route distance can combine for significant time savings. In 1961, officials in London also discovered such an advantage when they proposed a contraflow lane on Piccadilly. The change of two streets into a one-way pair forced westbound buses on one street to move to the corresponding mate of the one-way couple. This move greatly increased these buses' travel distance. A contraflow lane on the eastbound mate could bring them back to their original route and eliminate the excess route length.[27] However, decision-makers must use caution against installing a contraflow lane on a one-way street just because the facility exists. In Louisville, Kentucky, the outbound direction of the contraflow pair created a much longer bus route than had previously existed when buses flowed on the regular outbound one-way street.

Travel time actually increased on the route due to the increased distance, and the longer route was farther from existing and potential bus patrons. As a result, ridership on the outbound route was less than half that of the inbound route.[28]

The improved transit identity a contraflow lane can provide may also warrant the installatiuon of the lane. In cities or regions where little public awareness of transit services exists, a contraflow lane serves as a continual public reminder of alternatives to the automobile. The growth in public awareness resulting from improved transit visibility may lead to increased ridership, not only on contraflow lane bus lines, but on lines throughout the transit system.

Some or all of these goals and warrants could be met by expanding automobile facilities or building a rail or alternative rapid transit system. But the contraflow lane offers a way to meet these goals quickly and for a fraction of the cost. Its attractiveness stems from the small capital investment needed and its "overnight" installation characteristics. In 1978, estimates to install a contraflow lane ranged from $4000 to $100,000 per mile.[29] The largest costs associated with a contraflow lane are signs, stripping and signals.[30] In some cases, agencies may choose to construct a concrete barrier between the contraflow lane and the adjacent lane. In these cases, costs will rise significantly, but will still constitute a small capital investment for a "rapid transit" system. Such low cost alternatives are especially sensible and efficient when areas need improvements to meet only peak period demands.[31]

Contraflow lanes create no extraordinary operating costs.[32] Their self-enforcing characteristics partially contribute to this feature.[33] Motorists driving in the opposite direction are not likely to illegally use the contraflow lane, considering the consequences of coming into contact with an approaching bus. Again, vehicle volumes are important. The more buses that use the lane, the less likely it will be abused by motorists. The difficulty of getting onto a contraflow lane in the right direction also hinders automobile drivers from purposely or accidentally using the lane. Therefore, extra police or traffic officers aren't needed to ensure uninterrupted contraflow operation. Neither of these self-enforcing features exists on with-flow bus lanes.

There may be time and/or congestion "costs" associated with the contraflow lane for the motorists prohibited from using the lane. In addition, the contraflow lane may cause problems for motorists making left turns at intersections or into driveways. However, such conflicts exist on normal two-way streets and the contraflow lane just re-introduces a two-way system. A 1977 FHWA report even claims that changes to one-way streets generally produce more adverse public reaction than contraflow lanes because contraflow lanes come closer to the norm.[34] Nevertheless, objections to contraflow lanes from motorists, taxi drivers and especially the business community have occurred in many cities.[35]

Operating costs for the transit agency should decrease on the contraflow lane as speeds and patronage increase. But contraflow lanes (or any bus lane) have little impact in isolation. A successful contraflow lane should be part of an interconnected bus lane system. Only then can bus speeds increase enough to attract more riders and produce operating economies.[36]

Opponents of contraflow lanes often contend that decreased safety will result from the unconventional operation. However, most contraflow lanes have proven the opposite. For example, the Louisville traffic engineering department initially resisted their contraflow lanes due to safety concerns. But they finally admitted that safety had improved with the lanes.[37] Only four accidents occurred on the Louisville contraflow lanes from their opening in October, 1971 to February, 1973. Two of the four accidents occurred in the first two weeks of operation and a third occurred before January, 1972. From January 1972 to February 1973, the accident rate on the Louisville contraflow lanes dropped to 67 accidents per one million vehicle miles (67/MVM). "This compares favorably with the overall accident rate (71.83/MVM for 1970 and 62.11/MVM for 1971) for the Louisville Transit Company for the category of 'collision with other vehicles'."[38]

In Indianapolis, a 2.7 mile contraflow lane was installed on College Avenue in September, 1968. "Total accidents (on College Avenue) fell from 216 in 1968 to 105 in 1970."[39]

The bus accident rate on the eleven mile contraflow lane in San Juan, Puerto Rico rose significantly after the lane's installation. For the six month period immediately preceding the bus lane, there were .88 accidents/MVM on the eleven mile stretch. During the six months immediately following the lane's opening, 3.15 bus accidents/MVM occurred. However, the 177 bus accidents that occurred on the lane during the first six months after it opened dropped to just 91 bus accidents during the second six month period after opening. Also, the accident rates for all vehicles travelling the eleven mile distance went from 16.10 accidents/MVM before the contraflow lane opened to 15.48/MVM after it opened.[40]

It appears that the self-enforcing and "bus only" characteristics of the contraflow lane reduce and eliminate many conflicts that occur even on normal two-way streets. Buses don't need to pull away from curbs into traffic flows. And automobile drivers aren't tempted to use the lane for passing or turning. The accident potential does increase for motorists turning left across the contraflow lane. And pedestrians may forget to look both ways before crossing the street and step into the path of an oncoming bus. But again, both of these situations exist on a normal two-way street.

James A. Bautz, in his 1975 report to UMTA titled "Accident Experience for Contraflow Bus Operations" concluded from the above examples that, "There does not appear to be an excessively large number of accidents (on contraflow lanes)". But he also noted that "When a contraflow lane is installed on an arterial, the accident rate will probably jump at first and then fall as the public gets used to the lane".[41] And even though more accidents occur on arterial

CHAPTER III

The Spring Street Contraflow Bus Lane: Description

The Spring Street Contraflow Bus Lane extends between Ninth and Macy Streets on the east side of Spring Street in downtown Los Angeles. (See Figures 3.1 and 3.2) The 24-hour contraflow operation runs northbound along the east side of Spring Street while normal traffic moves southbound in the west side lanes. Between Ninth and First Streets the contraflow lane uses one street lane and southbound traffic uses four. North of First Street, the contraflow lane uses two street lanes, normal traffic uses four with a fifth left turn lane at intersections. Only SCRTD buses are permitted to travel in the contraflow lane and they enter the lane at a fork in the road at the intersection of Ninth, Main and Spring Streets. A double yellow stripe painted on the asphalt separates the contraflow lane from regular traffic lanes. Overhead signs identify the lane for "buses only" and signs prohibiting turns onto the contraflow lane stand on the cross streets. Bus stops are spaced approximately one block apart. Due to circumstances described in the next section, Main Street, the corresponding northbound mate of the Spring/Main one-way pair, does not contain a southbound contraflow lane. (See Figures 3.5 and 3.6)

FIGURE 3.2

STUDY AREA

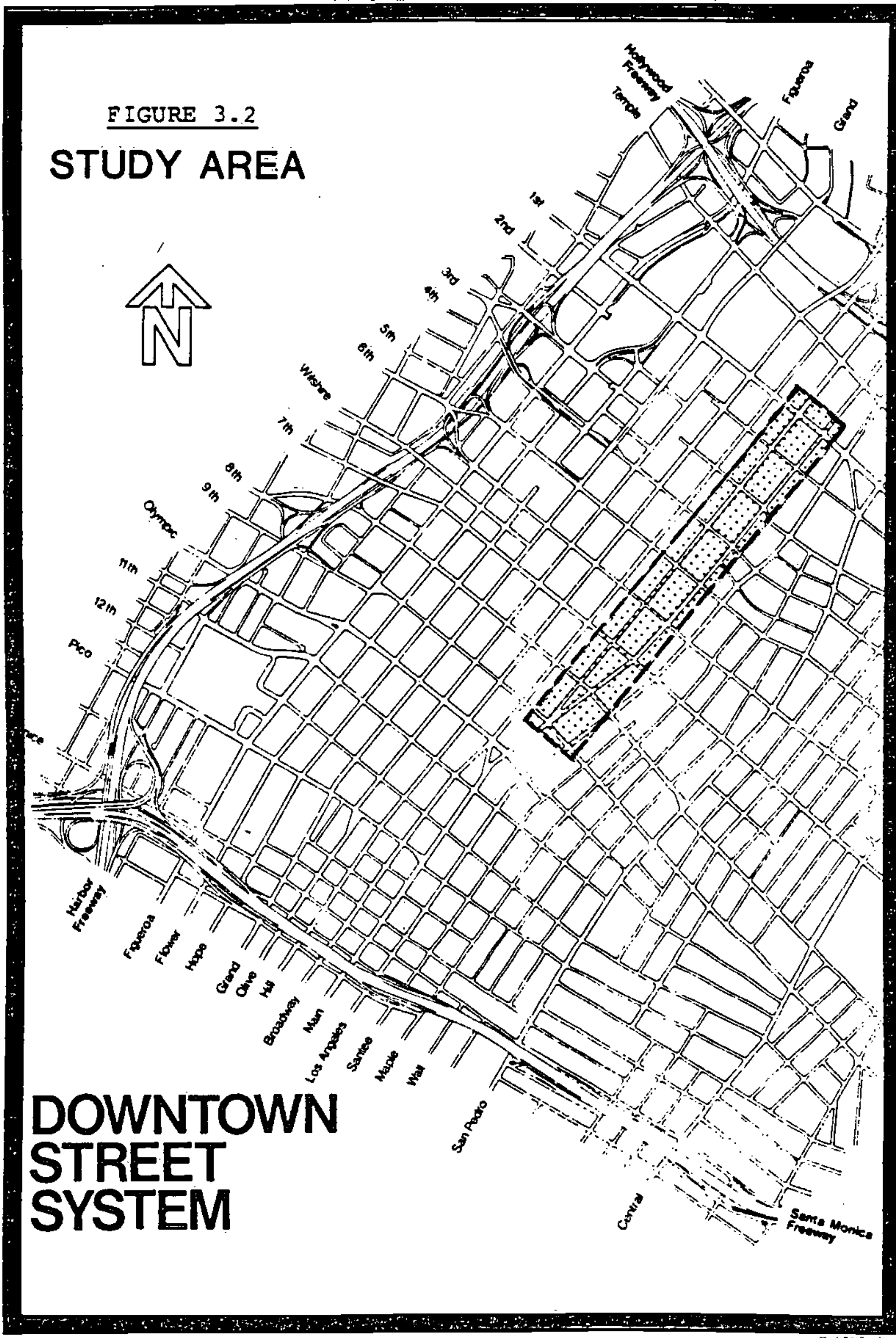
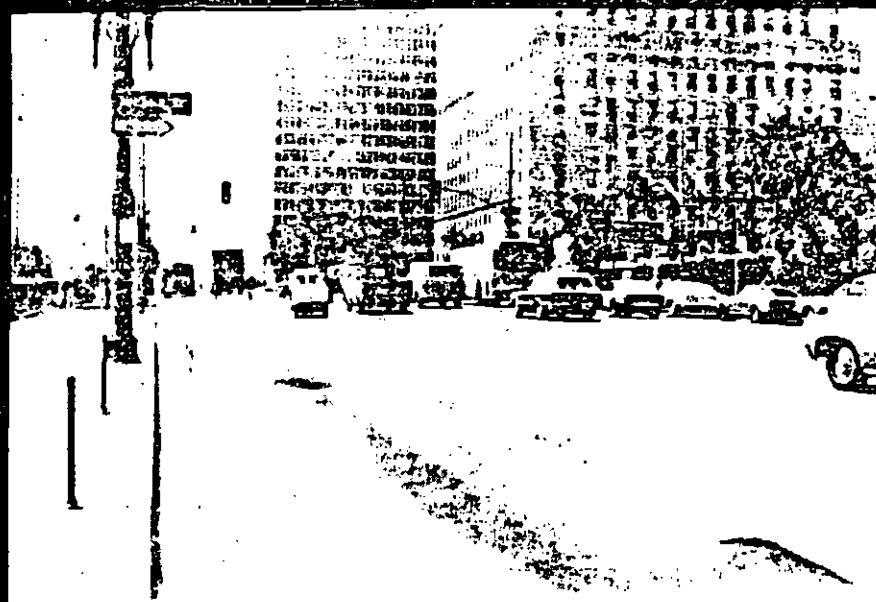
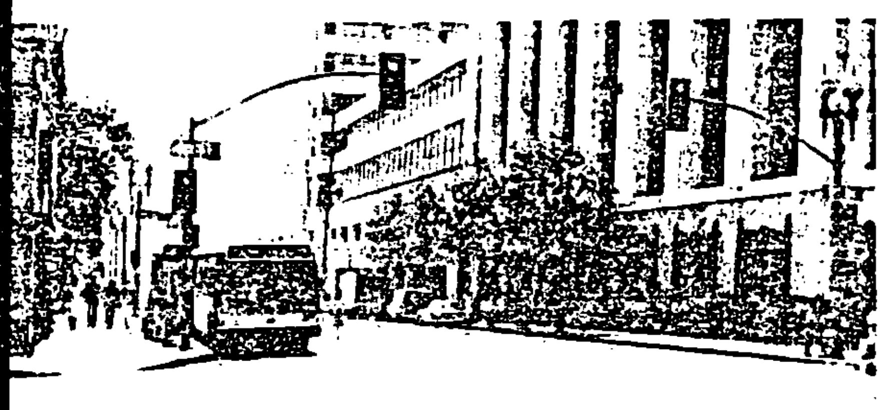


FIGURE 3.3



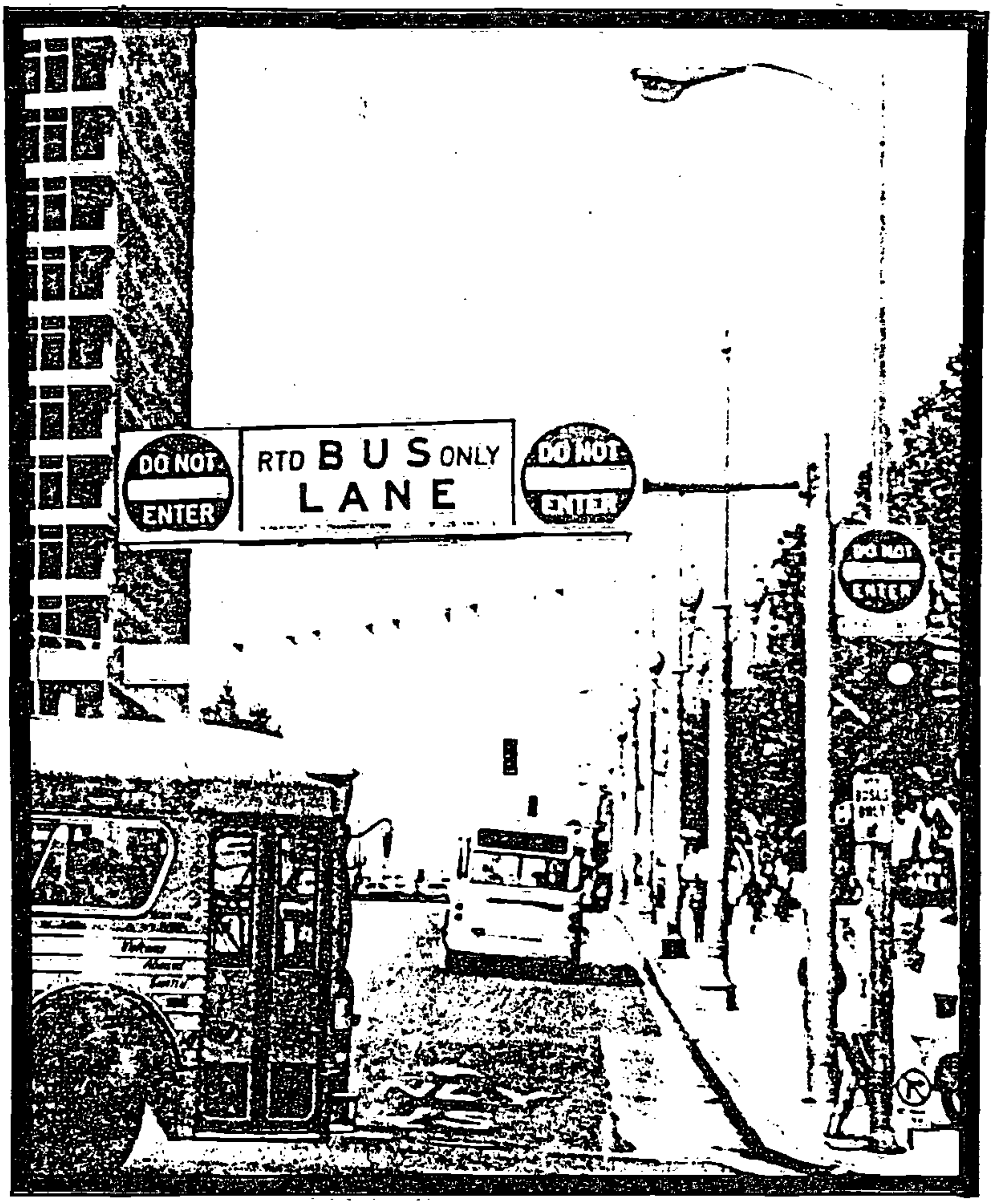
LOOKING SOUTH FROM NORTH OF ARCADIA ST.



LOOKING SOUTH FROM NORTH OF FIRST ST.

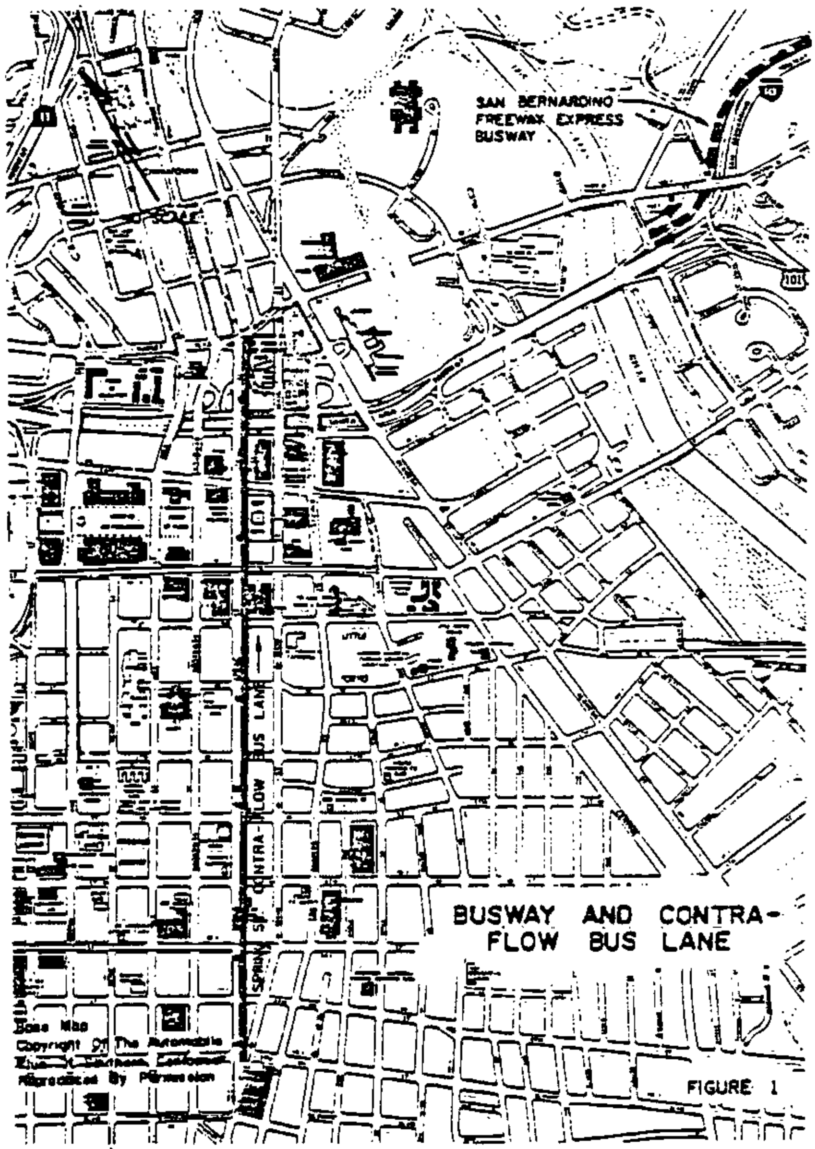
SOURCE: "Evaluation of the Spring Street Contra-Flow Bus Lane Widening", City of Los Angeles Department of Transportation and Southern California Rapid Transit District, December 1980, p. 6.

FIGURE 3.4



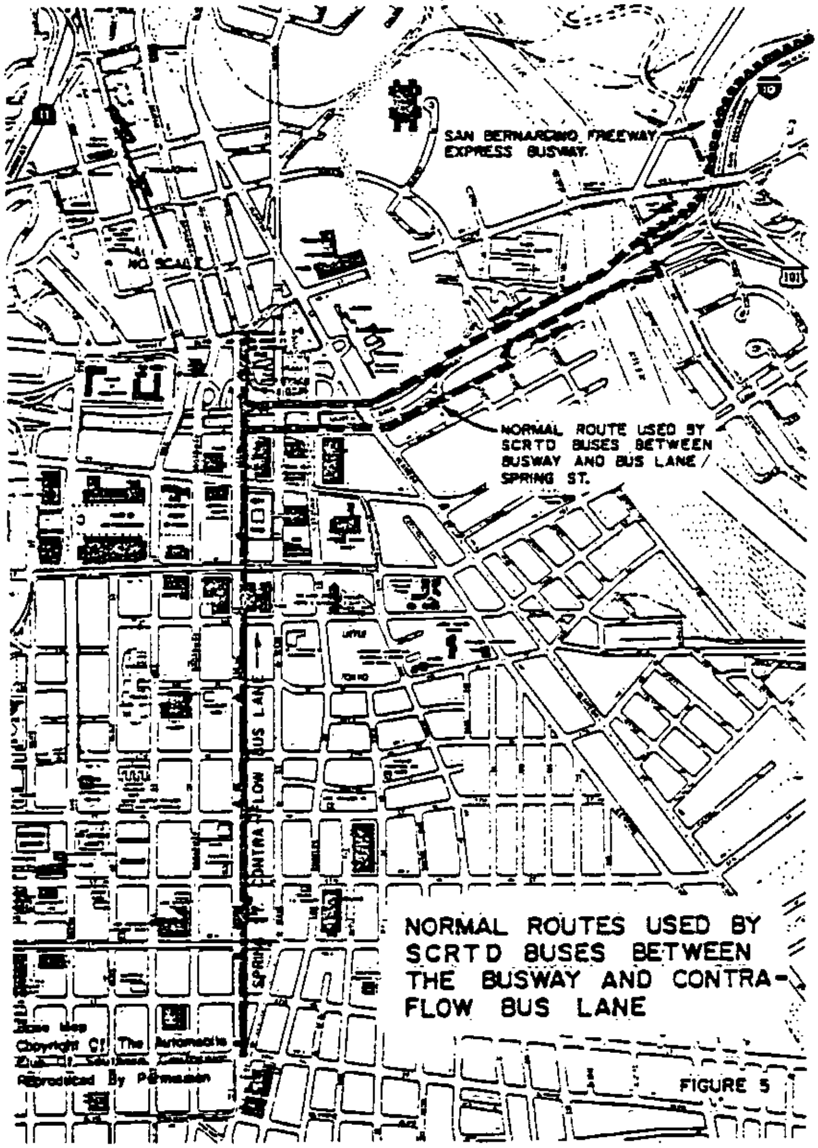
SOURCE: "Evaluation of the Spring Street Contra-Flow Bus Lane Widening", City of Los Angeles Department of Transportation and Southern California Rapid Transit District, December 1980, cover photo.

FIGURE 3.5



Source: <u>Evaluation of the Spring Street-Contraflow Bus Lane widening</u>, Southern California Rapid Transit District and the City of Los Angeles Department of Transportation, December, 1980.

FIGURE 3.6



Source: Evaluation of the Spring Street Contraflow Bus Lane Widening, Southern California Rapid Transit District and the City of Los Angeles Department of Transportation, December, 1980.

The Spring Street Contraflow Bus Lane: History and Development

The Spring Street Contraflow Bus Lane essentially evolved out of the recognition of the need for short-range, more efficient use of existing local transportation facilities. But the lane's real origins began with the birth of the San Bernardino Freeway Express Busway in the early 1970's. However, no agency or official could then predict its existence. A long and controversial history preceded the final location and form of the Spring Street Contraflow Bus Lane.

The San Bernardino Freeway Express Busway opened in 1973 and initially provided exclusive use to Southern California Rapid Transit District buses travelling between El Monte and downtown Los Angeles. UMTA and the FHWA funded most ofthe $51 million busway as a demonstration project for bus rapid transit in the Los Angeles area. SCRTD and the California Division of Highways developed the project and cited its travel time savings and convenience as the incentives commuters needed to abandon their automobiles in favor of a Busway bus.

Federal and local officials divided the Busway project into three parts, each having a unique demonstration purpose.

They also felt each part must function effectively for the Busway's overall success. The first part consisted of the functioning of the El Monte Terminal and the route operation along the Busway from El Monte to Mission Road. The second part involved the routing and operating procedure from Mission Road to the Central Business District. A downtown passenger distribution and collection system to determine the feasibility of new downtown distribution concepts, comprised the third part.[47]

SCRTD officials felt that the continuance of express service into downtown was essential to the Busway's attractiveness. City officials, influenced by UMTA's continued push for short-range preferential bus treatment, felt the downtown element could publicly illustrate local government commitment to efficient bus rapid transit. Therefore, the Busway agreement between the City of Los Angeles and SCRTD "included a program of preferential treatment for express buses within the central business district" to satisfy the downtown demonstration element.[48] To aid in fulfilling this decree, SCRTD hired a consultant to develop a plan to extend the Busway system into downtown Los Angeles.

The consultant, Wilbur Smith and Associates, studied numerous distribution alternatives and submitted the final report and recommendations to the SCRTD Board of Directors in March, 1973, three months after the Busway's opening. To conform to project goals and TSM philosophies, each alternative plan attempted to increase person volume and time savings while using existing downtown facilities. In developing the plans, the consultants focused the distribution service on the downtown areas with high employment concentrations because these areas could supply the most potential ridership. They identified the Civic Center area and a core area bordered roughly by Seventh Street, Main Street, Fourth Street, and Grand Avenue as the two major employment centers in downtown Los Angeles. (See Appendix III) Wilbur Smith and Associates also considered street capacities, widths, curb use, and various other characteristics before formulating eight alternative plans. Only three of the eight plans included the Spring and Main Streets one-way couplet. Just two of these three involved the contraflow bus lane concept for an entire eleven block length of the two streets. (See Appendix IV) In these plans, express buses would use the proposed contraflow lane while local buses continued to run with regular traffic. This separation reinforced the downtown distribution system's purpose to serve as an express feeder to the Busway.

The consultants, however, recommended the plan containing the Spring Street/Main Street contraflow lane for only two blocks between Macy and First Streets, and another contraflow lane on Hill and Olive Streets between First Street and Pico Boulevard. A median reserved bus lane on First Street would provide access between the two north-south contraflow sets. (See Appendix V) However, this plan's implementation depended on the pending conversion of Hill and Olive Streets to a one-way couple. The City Traffic Department was seriously considering such action at the time.

Several factors prevented the eleven block Spring/Main contraflow plans from placing as the consultants top choice. The downtown activity center was obviously moving west over time. The consultant's criteria stated that bus patrons would only walk four minutes from their workplace to a bus stop. A walk from the new financial center to Main and Spring Streets on the east exceeded this time limit. And, even though Main and Spring Streets each carried more buses during the afternoon peak hour than any other north-south street in the downtown area, only one of the six Busway lines used this couple for the eleven block distance while nine local lines ran its length. In addition, a straight Spring/Main Street route didn't serve the entire western civic center area, an area with an employment concetration of 4,000 people per block.[49] Nevertheless, the consultants did recognize that Main/Spring was the only existing one-way couple and they believed traffic volumes were such that the removal of one lane for exclusive bus use wouldn't inhibit traffic flow on the remaining lanes.[50] Moderate to high employment concentrations still existed along Main and Spring Streets and nearby Broadway, too. (see Appendix III)

The consultant's report planted the seed. SCRTD presented the study to the Los Angeles City Council shortly after its completion. The Council's Ad Hoc Committee on Rapid Transit reviewed the alternatives and recommendations and, with the aid of technical advisers, narrowed Wilbur Smith and Associates' elaborate plans down to a comparatively minor proposal to implement a contraflow bus lane on an eleven block segment of Spring Street.[51]

The Ad Hoc Committee and SCRTD did face constraints in dealing with the consultant's proposed plans and recommendations that led to the scaled-down, final proposal. The City Department of Traffic decided against changing Hill and Olive Streets into a one-way couple. Without this provision, the consultant's primary recommendation could not be implemented. And, although all alternatives had relatively low cost, the City Council appeared reluctant to allocate funds for the more expensive alternatives for its first demonstration project. These two constraints rapidly narrowed the possibilities down to the consultant's two Spring Street/Main Street proposals. Finally, extensive storm drainage construction on Main Street at the time and the upcoming Civic Center Mall construction eliminated Main Street as a part of the project.[52]

The Ad Hoc Committee's technical advisers represented diverse interests that also appear to have contributed to the compromise on the consultant's recommendations. City Traffic Engineer Sam S. Taylor was a member of this group. Taylor adamantly opposed exclusive bus lanes, favoring preferential treatment for all high occupancy vehicles instead. In addition, he had grave reservations about the safety of contraflow lanes, although literature and previous studies hailed them as safe. Taylor felt that if a contra-flow experiment were to take place at all, the two block length of Spring Street between Aliso and First Streets would suffice.[53] The SCRTD consultants had included this portion in their first recommendation.

On the other side ofthe issue, City Planning Director Calvin S. Hamilton, the technical advisory group's chairman, urged the Ad Hoc Committee to approve the entire lane despite any problems it might create.[54] He most likely concurred with Mayor Bradley that Los Angeles should do "everything we can to cooperate with the federal Department of Transportation which funded the... downtown to El Monte Busway".[55] Los Angeles needed to show a local commitment to rapid transit to qualify for future transit funding.

And, SCRTD officials had another goal in mind. These officials publicly stated their desire to remove express bus routes from Main Street, the City's skid row.[56] They even advocated moving many local lines onto the proposed contraflow lane so local bus patrons would not have to wait at bus stops in an undesirable area, either. In January, 1974, SCRTD's Manager of Operations and General Manager made a presentation to the Los Angeles City Council regarding the Spring Street Contraflow Bus Lane and said both express buses and "other buses serving that section of downtown" would use the lane.[57] SCRTD sought the improved transit identity the contraflow lane could provide for all routes and anticipated increased ridership with the new, more aesthetic bus stop surroundings.

The combination of the Federal government's expectations, the Busway's mandate, the local pressures and peculiarities finally resulted in the Ad Hoc Committee's recommendation that City Council approve a one year experiment for a single northbound contraflow bus lane on Spring Street from Macy to Ninth Streets. The recommendation included the Council's right to terminate the experiment at any time.[58] As a plan for downtown distribution and preferential bus treatment, it was certainly less than complete. But in the first week of February, 1974, the City Council voted to accept the Committee's recommendation.

City Traffic Engineer S.S. Taylor believed, contrary to the consultant's projections, that the contraflow lane would not help speed buses through the downtown. And, even if it did, Sam Taylor stated that he was "convinced that the time saved for buses would not justify the disruption of the rest of the traffic on key city streets.[59] This belief earned him the reputation of a staunch transit oponent.

In December, 1973, prior to the Council's February acceptance of the contraflow proposal, the City Traffic Department released a study of its projections for the Spring Street Contralflow operation. The study, using "facts and computer simulation" actually predicted slower bus speeds on the contraflow lane than currently existed on Main Street's northbound routes.[60] It also predicted increased traffic congestion on the remaining southbound

Spring Street lanes. At the time, Taylor also stated that new signal timing intended to improve with-flow movement was scheduled to take effect on the Spring/Main Street couple in January, 1974. Buses running against normal traffic flow would also run against this new signal progression, further decreasing their speed.[61]

SCRTD and their consultants disputed all of Taylor's findings. SCRTD officials produced studies of their own, predicting 5-6 minute time savings for buses travelling on the eleven block length, as well as increased vehicle and passenger volumes.[62] They also advocated that, even if time savings were small, the contraflow lane would greatly improve schedule reliability.

But Taylor considered other factors besides just speeds on the lane itself. He also cited large losses in travel times for contraflow buses due to the lengthy route modification needed to get onto the lane from the downtown terminal. SCRTD consultants had recommended a shorter approach where buses would enter the lane from Seventh or Eight Streets. But the design of the corners at these two streets prohibited buses from turning onto the lane. The City Council's unwillingness to spend the money needed to improve the curb radii at either street resulted in the more lengthy approach route via Olympic Boulevard.[63]

Another contributor to the Traffic Engineer's stance may have been the fact that his department had created the Spring and Main Street one-way couple just three years earlier and considered it an overwhelming success. Taylor's May, 1970 preliminary findings indicated that the conversion of Main and Spring Streets to a one-way system increased intersection capacity by 26%, decreased conflict points by 22%, and increased peak hour traffic volume by 18%.[64] The installation of a contraflow lane would reinstate many features of a two-way system. In the report, Taylor noted that the one-way operation possibly increased pedestrian travel distance to certain bus stops but reported that SCRTD liked the one-way operation due to the reduced bus travel times it created.[65] Taylor's department had also just completed the new "integrated signal timing strategy" for the downtown area that required "months of effort" to produce.[66] A contraflow lane could not benefit from the new changes.

Taylor also recognized the Council's desire to keep the demonstration project's costs low. He claimed it would cost the City Traffic Engineering Department "tens of thousand of dollars" to implement the contraflow lane.[67] But the City Police Department voiced even stronger concerns about costs. Police Department spokespersons estimated the Police

Department would need $314,000 a year to control traffic and enforce the contraflow operation. The Police Department believed it would be easier to set aside a northbound with-flow bus lane on Main Street.[68] Their perceived enforcement problems and financial needs contradicted the dozens of studies and reports that espoused the self-enforcement characteristics of the contraflow lane concept. And, in fact, the Council's Ad Hoc Committee supplied cost figures that totalled only $64,000 to convert Spring Street to a contraflow operation and maintain traffic control for one year. Therefore, the Council did not approve the Police Department's expense request.[69]

The contraflow proposal had yet another very vocal opposing faction. Business-people and merchants from establishments located along the east side of Spring Street expressed their fears that the contraflow lane might adversely affect their business. Some even filed formal complaints and petitions with the City Council. Their concern centered around the elimination of adjacent parking and loading zones the contraflow lane would cause. Deliveries would be more difficult, especially for businesses without alley access, because the delivery trucks would have to park around the corners or on the west side of Spring Street. Financial institutions expressed special concern over this because cash deliveries from armoured trucks would be carried long distances.[71] In addition, merchants felt the "no stopping any time" policy would hinder customer access to their establishments. Even taxis would be prohibited from dropping off and picking up passengers in the lane. Despite these concerns, Mayor Bradley responded that "there was some indication from downtown businessmen that they would prefer (the contraflow lane) on Spring Street" because their clientele would increase.[72]

Despite all the objections and skepticism, on March 25, 1974, the Los Angeles City Council unanimously passed an ordinace authorizing funding for and implementation of the Spring Street Contraflow Bus Lane between Ninth and Macy Streets in downtown Los Angeles.[73] But the Council, considering Sam Taylor an expert, tried to appease the Traffic Engineer by adopting the ordinance "to facilitate the expeditious movement of traffic".[74] With this stipulation, the Council's goals and concerns appeared similar to Sam Taylor's and then, their decision seemed justified. On May 19, 1974, the Spring Street Contraflow Bus Lane opened.

But the protest didn't stop. The Central City Association, originally a supporter of the experiment, called for a halt to the experiment in December, 1974, claiming the actual operation had confirmed the Spring Street business community's fears and had not worked.[75] The local councilman, Gilbert Lindsey, influenced by these business interests, also objected to the experiment after its implementation.[76] But arguments were made that Spring Street establishments were losing business to those in the western central business district even before the contraflow lane existed, so their cries went unheeded.[77]

However, the biggest controversy still existed between City Traffic Engineer Sam Taylor and officials at SCRTD. The City Traffic Department produced an evaluation of the contraflow lane's performance three months after it opened. It found average bus speeds on the contraflow lane to be 21% slower than previous northbound bus speeds on Main Street (7.6 mph to 9.6 mph).[78] Travel time for buses heading for the Busway increased 55% due to the circuitous route to reach the lane.[79] Only three Busway routes with 33 daily buses used the entire eleven block contraflow length to reach the Busway.[80] The report results also disclosed that speeds of regular southbound traffic on Spring Street decreased 19.0% (from 19.4 mph to 15.7 mph) during the morning peak period and 19.7% (from 19.8 mph to 15.7 mph) during the evening period.[81] South of First Street, southbound bus speeds also declined 9.6% and 17.2% for the two peak periods respectively.[82] The Traffic Department attributed the slower northbound speeds to signal delays, loss of passing opportunities, and the integration of local and express buses on the lane. Express buses were especially delayed by the more frequent and longer stops of local buses along the route. The Department attributed slower southbound speeds to increased traffic congestion caused by the loss of one southbound lane.[83]

The evaluation stated no "measurable delay" on the six Busway routes that used the contraflow lane for the two block distance between Aliso and First Streets, Sam Taylor's original proposal for the experiment.[84] But, in concluding the evaluation, the City Department of Traffic recommended "that the entire Spring Street northbound contraflow lane experiment be terminated and RTD bus lines be returned to their previous Main Street northbound routes".[85]

SCRTD had produced a report on the Spring Street Contraflow Bus Lane one month earlier than the Department of Traffic. The SCRTD data indicated that contraflow bus speeds increased 1.3 mph over previous northbound Main Street speeds.[86] But the Traffic Department examined the data and concluded that they were inaccurate because SCRTD used 1972 bus speed data rather than data gathered after the improved signal timing of January 1974. After much discussion, SCRTD revised its data.[87]

Taylor never considered providing preferential treatment for buses through new signal timing. Although his Department's downtown signal timing system had only been in effect for five months when the contraflow lane opened, minor signal modifications on the lane could have produced signifiant time saving benefits for the buses. But throughout the whole contraflow lane development, S. S. Taylor appeared very reluctant to penalize automobile drivers. A signal timing system that gave more green time to the contraflow lane buses meant less green time for motorists on cross streets.

Nevertheless, with the revised data, SCRTD conceded that the contraflow lane's evening peak period bus speeds were actually 0.8 mph slower than the northbound Main Street bus speeds after the January signal timing changes took place, and morning peak period speeds were 2.5 mph slower.[88] And, SCRTD's final report agreed with the Traffic Department's report that southbound Spring Street automobile traffic speeds fell for both morning and evening peak periods. However, the data indicated little or no change for southbound Spring Street bus speeds. In addition, SCRTD found that morning traffic speeds on Main Street also decreased even after many buses were rerouted to the contraflow lane.[89]

SCRTD continued to justify the contraflow lane, stating that Busway ridership had increased since the contraflow lane's installation and this caused longer loading times along the contraflow lane. Furthermore, riders perceived the contraflow lane to be faster. SCRTD obtained rider perceptions from a June, 1974 survey of 1463 contraflow bus riders where 56.2% thought buses went faster on the lane and only 11.3% felt they went slower.[90] Perhaps improved bus schedule reliability influenced these perceptions.

Although potential speed improvement was the City Council's primary rationale for authorizing the contraflow lane, these two reports didn't influence Council members to revoke the lane, even after the year long trial period had expired. The contraflow lane continued unchanged for exactly four and a half years.

In 1979, SCRTD and the Council did concede to some of lane's operational problems. The most noticeable problem existed between First and Aliso Streets where hundreds of Civic

Center employees boarded the eight Busway buses that used this portion of the lane. Each weekday, 1145 local and express buses shared the same stops on this segment.[91] Large time losses resulted when long lines of buses formed at these stops. SCRTD policy stated that only the first three buses in the queue could board passengers. However, some anxious drivers farther down the line would open their doors and allow boardings. These drivers often did not stop again when they arrived at one of the first three positions in front of the bus stop. This caused many waiting patrons, fearing they may be passed up, to dash to the buses as they joined the queue. Mass confusion resulted. Additionally, occasional traffic tie-ups on the Santa Ana Freeway (the access from the contraflow lane to the Busway) would back traffic up to the contraflow lane. Local buses using the lane would also be caught in the traffic jam and be unable to continue along their routes.[92]

Therefore, in November 1979, the contraflow lane was widened between First and Macy Streets and separate bus stops were designated for local and express buses. The widening allowed buses to pass each other, and the bus stop distinction reduced bus queues in front of each stop. This action decreased confusion for waiting patrons.[93]

A joint evaluation by the Los Angeles Department of Transportation and the SCRTD Planning Department declared the new operation a success. The skip-stop and bypass operation "resulted in approximately 12% (15 seconds) and 20% (46 seconds) decreases in travel time during the evening peak period (4-6pm) for each Busway and local bus respectively".[94] "Long bus queues have also disappeared and waiting passengers seem more certain as to where their bus will stop. The appearance of the contraflow lane has been vastly improved".[95]

South of First Street the contraflow operation continued unchanged and much of the original controversy has never been resolved. City Traffic Engineer Sam S. Taylor retired from the Department in 1977. His concerns and objections appear to have faded into history, as have those of many others. Perhaps attitudes and opinions have changed, but, more likely, those concerned have just come to accept the seven year old contraflow lane as a permanent fixture.

Either way, the Spring Street Contraflow Bus Lane's success as an express feeder to the Busway remains questionable and the City Council still has the power to terminate it at any time. SCRTD officials abhor the idea of returning buses (and patrons) to skid row. But, more importantly, those

SCRTD officials feel very strongly that the Spring Street Contraflow Bus Lane provides positive transit identity and contributes favorably to the much needed transit image for Los Angeles. So far, the City Council appears to agree.

Analysis and Conclusion

The history of the Spring Street Contraflow Bus Lane demonstrates the way a widely accepted objective can become a specifically controversial issue. Few officials and decision-makers in Los Angeles disagreed with the need for more efficient transportation facilities. Their attitude reflected the national mood. However, they also had to deal with local interest groups. Even though many members of these groups concurred with the overall objective, they did not want the means to accomplish it to reduce their existing benefits. So on the local level, politicians and government officials were reluctant to disurb the status quo. They wanted to avoid controversy. And, to make matters worse, the plans they were discussing to meet the generally acceptable goal, penalized the largest interest group that existed; automobile drivers.

Each agency also wanted to promote its own particular interest within the larger plan. SCRTD officials wanted transit identity and a bus lane for local as well as express buses. Sam Taylor didn't want to disturb a successful street system. And, the City Council and Mayor Bradley wanted to please UMTA without displeasing their constituents (motorists and business-people). These agencies and officials did not work together to implement a plan to meet the real objective (efficient transportation improvements), but rather worked at odds with each other for their own ends. Their contact resulted in a final plan that was not based on much integrated decisionmaking.

The Spring Street Contraflow Bus Lane was a compromise. It was not placed in a more strategic location (the western central business district) possibly to avoid confrontation with the more powerful commercial interests located there. It was scaled down tremendously, probably to appease the Traffic Department's desire to maintain existing traffic flow in downtown. But it was implemented to satisfy SCRTD and the Federal government and because, under all the controversy, most parties involved still agreed that bus lanes are satisfactory solutions to transportation problems.

But the "satisfactory solution" in its final form has little possibility of proving itself as such. A partial plan won't demonstrate the benefits an entire integrated downtown distribution system can provide. The selfish interests and compromises all but destroyed the Spring Street Contraflow Bus Lane as a viable demonstration project.

Lester C. Thurow discusses a similar phonomenon in his book The Zero-Sum Society. Although he is describing the nation's economic situation, his general theory seems applicable to the Spring Street Contraflow Bus Lane's historical development. Thurow states (the word "economic" has been omitted and replaced with "..."),

> "Our ... problems are solvable. For most of our problems there are several solutions. But all these solutions have the characteristic that someone must suffer large...losses. No one wants to volunteer for this role, and we have a political process that is incapable of forcing anyone to shoulder the burden. Everyone wants someone else to suffer the necessary...losses, and as a consequence none of the possible solutions can be adopted."[96]

He concludes that,

> "The ability to decide collapses into lengthy adversary procedures where everyone is worn out and no one is the long-run winner."[97]

The Busway still needs a downtown distribution system. In its seven years, the Spring Street Contraflow Bus Lane has not prompted similar bus lanes in other parts of downtown. Nevertheless, the time for it to do so may be near. The City Traffic Department is now considering changing

Broadway and Hill Streets into a one way couple.[98] If the change occurs, there is a potential to simultaneously add contraflow lanes. Therefore, SCRTD officials authorized an extensive evaluation of the Spring Street Contraflow Bus Lane to determine its current status. The remainder of this report is the result of that undertaking. The data it contains may be used to justify continuance of the existing contraflow lane and project the possible benefits for additional contraflow lanes in downtown Los Angeles, especially on Broadway and Hill Streets. Since the Spring Street Contraflow Bus Lane is an incomplete demonstration project, any quantitative or qualitative benefits the evaluation shows it provides should encourage expansion of preferential bus treatment. The current enviromental and public financial situation should also bolster support for additional bus lanes for downtown Los Angeles. Perhaps a complete downtown distribution system for the Busway is still a possibility. After all, it is a good idea.

CHAPTER IV

As indicated in Chapter III, several evaluations of the Spring Street Contraflow Bus Lane have been conducted during its years of operation. Downtown express bus routing onto the contraflow lane at First Street created excessive bus volumes on this portion of the lane and prompted close scrutiny by SCRTD and other local agencies. As a result of these evaluations, several modifications have been made on the contraflow lane north of First Street and have already been discussed.

The contraflow lane segment between First and Ninth Streets has been virtually neglected since the contraflow lane controversy subsided about a year after the lane's installation. The success of this southern segment in meeting the local goals set for its operation are unknown in today's circumstances. Furthermore, the degree to which the contraflow lane meets transit industry warrants also remains a mystery. Local officials' major goals for the contraflow lane included travel time savings (increased speeds), passenger convenience and improved transit identity, but all these were encompassed under the objective that the contraflow lane provide expedited and improved express bus service through downtown to the El Monte Busway. Major transit industry warrants revolved around bus and passenger volumes, safety and travel speeds. Both the goals and warrants have been discussed in previous chapters.

This neglect in evaluating the lane's operational performance is especially disturbing in view of the fact that renewed local interest in bus lanes in general and contraflow lanes in particular may develop if the Los Angeles Department of Transportation (LADOT) carries through with its inclination to possibly convert Broadway and Hill Streets into a one-way couple. This study attempts to fill the gap by providing a current extensive evaluation of both quantitative and qualitative aspects of the Spring Street Contraflow Bus Lane.

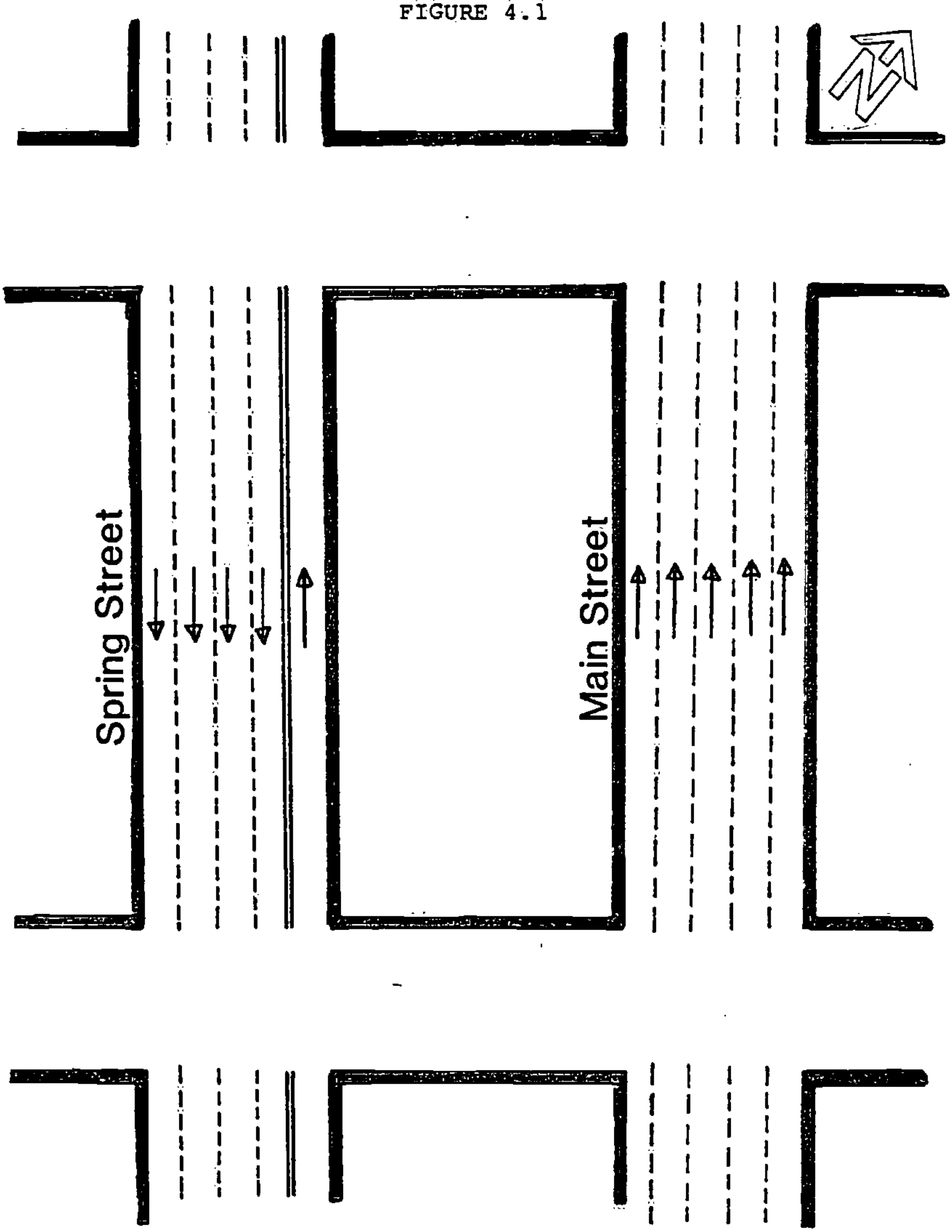
Study Area Description

The study area of the current evaluation incorporates both Spring Street and Main Street between First and Ninth Streets. Before the contraflow lane was installed, all study area traffic flowed southbound on five Spring Street lanes and northbound on five Main Street lanes. Today, normal traffic still travels northbound on the five Main Street lanes and southbound on four lanes on Spring Street. As described in Chapter III, the fifth lane on the east side of Spring Street is devoted to the northbound contraflow lane. (See Figure 4.1)

Many land uses on Main Street tend to reflect the declining nature of the area. Pornographic movie theaters, liquor stores and rundown motels and cafes dot the area. A shelter for the homeless exists in the midst of these uses. Street life predominantly consists of male loiterers and patrons of these establishments. Nevertheless, a significant number of "legitimate" small business are located along Main Street, as well as a Security Pacific Bank and the SCRTD Headquarters building which dominates the strip. At the north end of Main Street, the Civic Center extends across First Street into the study area.

Spring Street is also no longer the financial center it once was. However, the blight and skid row nature of Main Street does not exist on Spring Street. Several banks, restaurants, and older but kept-up office buildings and hotels line Spring Street. This street also houses an abundance of small retail businesses (camera shops, clothing stores, shoe stores, card shops, etc.). Street life predominantly consists of shoppers and people of both sexes and all ages

FIGURE 4.1



conducting business with Spring Street establishments. Loitering does exist on Spring Street but not nearly to the extent that it occurs on Main Street.

Evaluation Methodology

The evaluation is based upon a one group pre-test post-test design. The study "group" or area consists of the one-way street couple of Spring and Main Streets between First and Ninth Streets. The pre-test quantifies traffic circulation characteristics in the study area for a period between 1970, when the one-way couple was initiated and May 19, 1974 when the northbound contraflow lane was installed on Spring Street. The post-test quantifies the same study area traffic characteristics as they exist today, after seven years of contraflow lane operation on Spring Street. The traffic characteristics compared in the "pre-test" and "post-test" are bus and general traffic speeds, accident rates, vehicle volumes and passenger volumes. Each characteristic is compared separately by street, travel direction, and time of day. Time of day is usually distinguished in time period as follows; a 24-hour period, an "all day" period of the 14 hours between 6am and 8pm, the morning peak period of 7am to 9am, and the evening peak period of 4pm to 6pm. In both the pre- and post-tests, southbound is the morning peak period's peak direction and northbound is the evening peak period's peak direction. Additional pre-test and post-test comparisons are made between the northbound traffic flow on Main Street and that on the northbound contraflow lane. All comparisons are for weekdays (Monday through Friday) only.

Data gathering and analytical methodology for each performance measurement is described in the corresponding chapters. Additionally, problems with the data and threats to the comparison's validity are also discussed in the respective sections. However, several factors that can reduce the study's validity in general are 1) untested changes that may have occurred with the passage of time between the pre- and post-tests that reduce the comparability of the data and, 2) the existence of pre- and post-test data that are not directly comparable whether or not the first threat occurs. Nevertheless, all efforts have been made to reduce these threats and valid conclusions can be drawn from the strengths of this study with an awareness of its threats to validity.

A qualitative discussion of the contraflow lane follows the quantitative analysis. In this case, the pre-test post-test methodology has been abandoned and user surveys replace statistical data. The summary, final conclusions, and recommendations incorporate both the quantitative and qualitative analyses. The final chapter discusses recommendations for future research on the Spring Street Contraflow Bus Lane.

CHAPTER V

Bus Volumes

Prior to the contraflow lane's installation, buses traversing Main and/or Spring Street travelled southbound on Spring Street and northbound on Main Street with the regular traffic flow. A small number of buses did use southbound Spring Street for the inbound portion of their routes, but they used Broadway or Hill Streets, rather than Main Street, for the outbound journey. After the contraflow lane's opening, many northbound Main Street buses were transferred to the northbound contraflow lane on Spring Street. The contraflow lane sparked service changes and route modifications for many bus lines. From the contraflow lane's opening in 1974 to today, several express bus lines have been initiated on or rerouted to the contraflow lane to take advantage of its stated purpose as a feeder to the El Monte Busway. However, most of these express lines used the contraflow lane north of First Street only and many deletions, additions and modifications have taken place on the lines that travelled the entire contraflow lane length in the seven years since its opening. Therefore this chapter compares the bus volume changes from the pre-contraflow time period to those of 1980-81 and analyzes the bus volume changes from the pre-test to this current post-test study period.

Bus Volume Methodology

Weekday volumes for both pre-test and post-test periods were obtained from SCRTD time tables for each line using Main and Spring Streets during these times. The time table in use for each line immediately prior to the May 19, 1974 contraflow lane opening date was used to determine pre-test bus volumes, and the existing service time tables (as of December, 1981) were used to determine post-test bus volumes. Time tables display each daily trip scheduled for a specific bus line by time of scheduled arrival at a point. By counting the number of trips scheduled per hour or day, bus volumes can be obtained. Excessive deviation from the time table schedule is rare. Therefore, this source gives an accurate account of weekday bus volumes on both Spring and Main Streets. The volume data obtained for this chapter are of weekday bus volumes between 6 a.m. and 8 p.m. only. SCRTD officials estimate downtown bus volumes during this time period to be about 90% of the 24-hour volumes.[99]

In 1974, 130 bus trips a day (6am - 8pm) on four lines travelled from only one to four blocks along Spring and Main Streets and therefore were not included in the total bus volumes. Line 52 travelled nine of the eleven study area blocks and was included in the volume totals. In 1981, Line 49 volumes (63 trips) were excluded from the totals for the same reason selected 1974 volumes were excluded. From the final data, a simple comparison of bus volumes for pre- and post-test periods can be made. (See Appendix VI)

Spring Street Bus Volumes

The pre-test indicates that 604 bus trips travelled along Spring Street every weekday between 6 a.m. and 8 p.m. (see Table 5.1). The morning peak period (7-9 a.m.) had the highest bus volumes as Spring Street traffic flowed in the morning peak direction (inbound/southbound). 145 buses traversed Spring Street every weekday between 7 and 9 a.m. Only 94 buses travelled on southbound Spring Street during the evening peak period (4-6 p.m.)

By 1981, southbound Spring Street weekday bus volume had risen to 700 trips between 6 a.m. and 8 p.m. This is an increase of 96 trips or 15.9% over pre-contraflow volumes. The morning peak period still carries 143 buses indicating that little change has taken place in peak period/peak direction bus volumes. Eighteen more trips occurred during the evening peak period (4-6 p.m.) in 1981 than occurred in 1974 in the southbound direction (see Table 5.1). Overall, southbound Spring Street bus volumes appear to have increased from the pre- to post-contraflow studies. (see Figure 5.1)

Main Street Bus Volumes

The pre-test on Main Street shows that 615 bus trips occurred there every weekday between 6 a.m. and 8 p.m. prior to the contraflow lane's opening. Main Street's peak period/peak direction traffic flow occurred in the evening (4-6 p.m.- outbound/northbound) when 151 buses travelled its length. Eighty-four of these buses used Main Street between 4 and 5 p.m. Morning peak period bus volumes on Main Street were higher (99 trips between 7 and 9 a.m.) than the hourly midday volumes, but much lower than the evening peak period volumes. (see Figure 5.2 and Table 5.1)

In 1981, weekday bus volumes on Main Street dropped substantially to 215 trips between 6 and 8 a.m. Evening peak period volumes were still higher than at other times of

TABLE 5.1

WEEKDAY BUS VOLUMES

	Pre-test		Post-test				
	Spring St. (southbound)	Main St. (northbound)	Spring St. (southbound)	Main St. (northbound)	Spring St.* (nb-CF lane)	Spring St.* (nb & sb)	All Northbound (Spring/Main)
7am-9am	145	99	143	33	74	217	107
4pm-6pm	93	151	112	44	102	214	146
6am-8pm	604	615	700	215	474	1174	689

SOURCE: Pre-test-SCRTD Time Tables in effect on May 18, 1974
Post-test-SCRTD Time Tables in effect on October 1, 1981

*nb-CF lane=northbound contraflow lane
nb & sb=northbound and southbound

FIGURE 5.1

WEEKDAY HOURLY BUS VOLUMES

between First and Ninth Streets

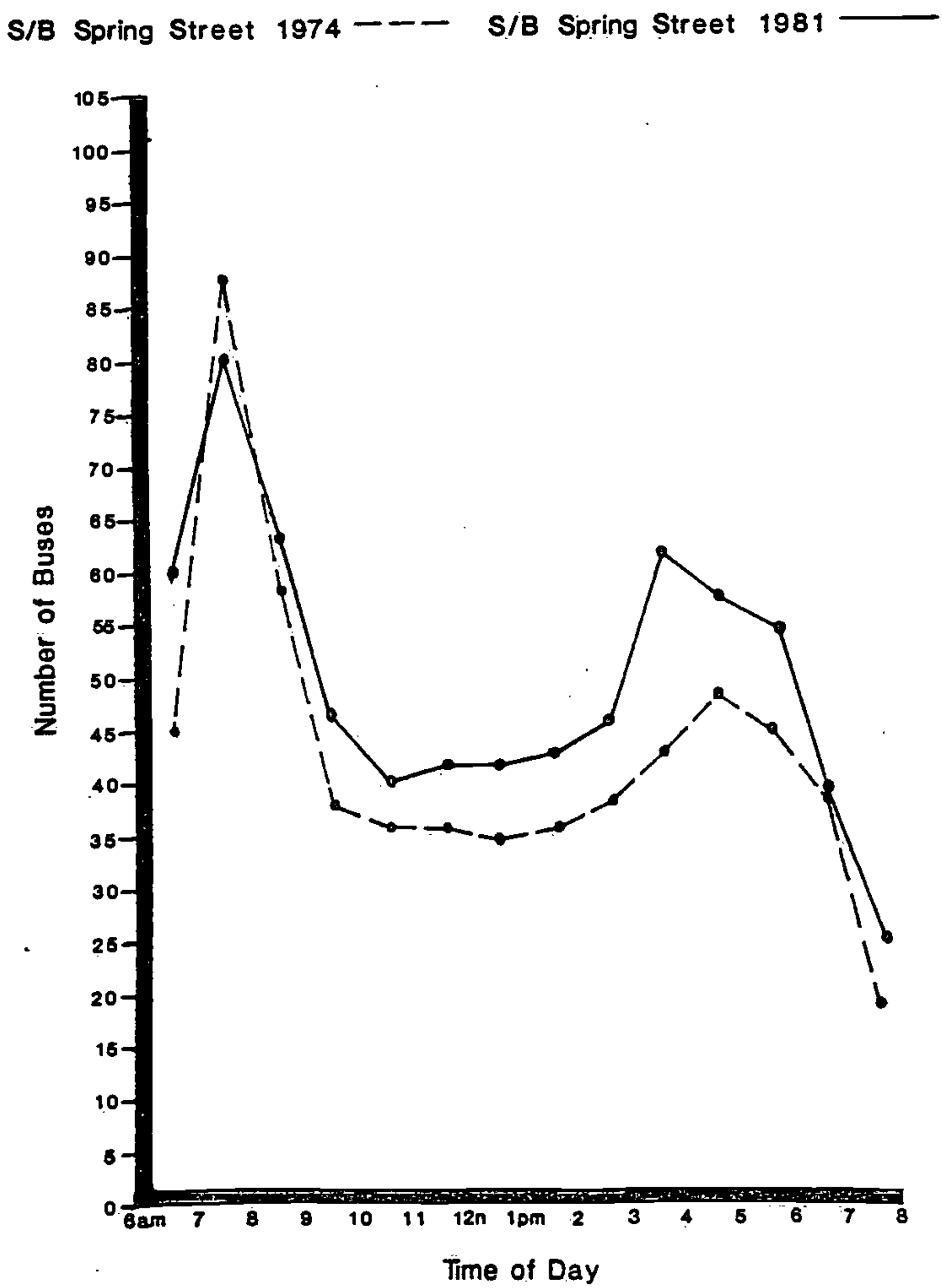
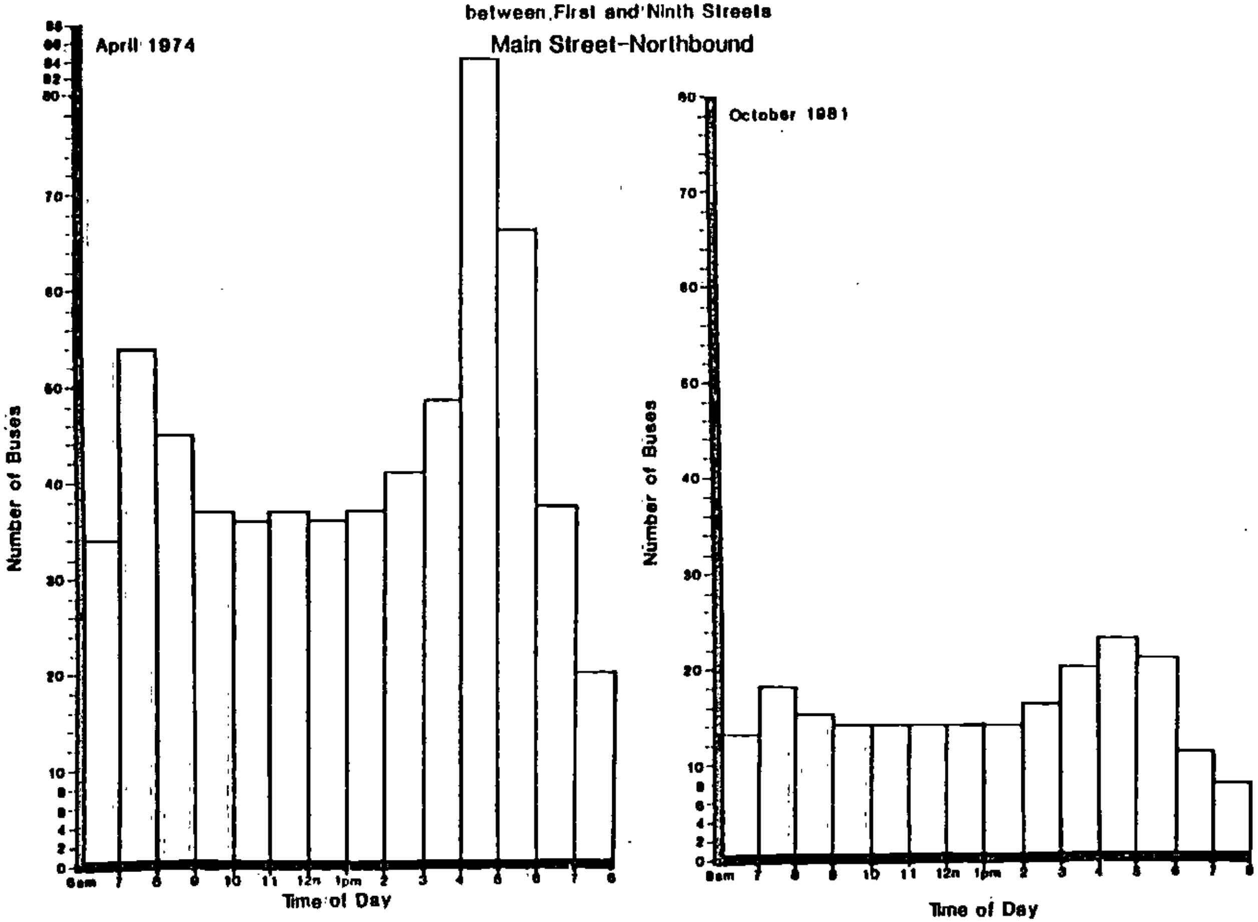


FIGURE 5.2

WEEKDAY HOURLY BUS VOLUMES

between First and Ninth Streets

Main Street-Northbound



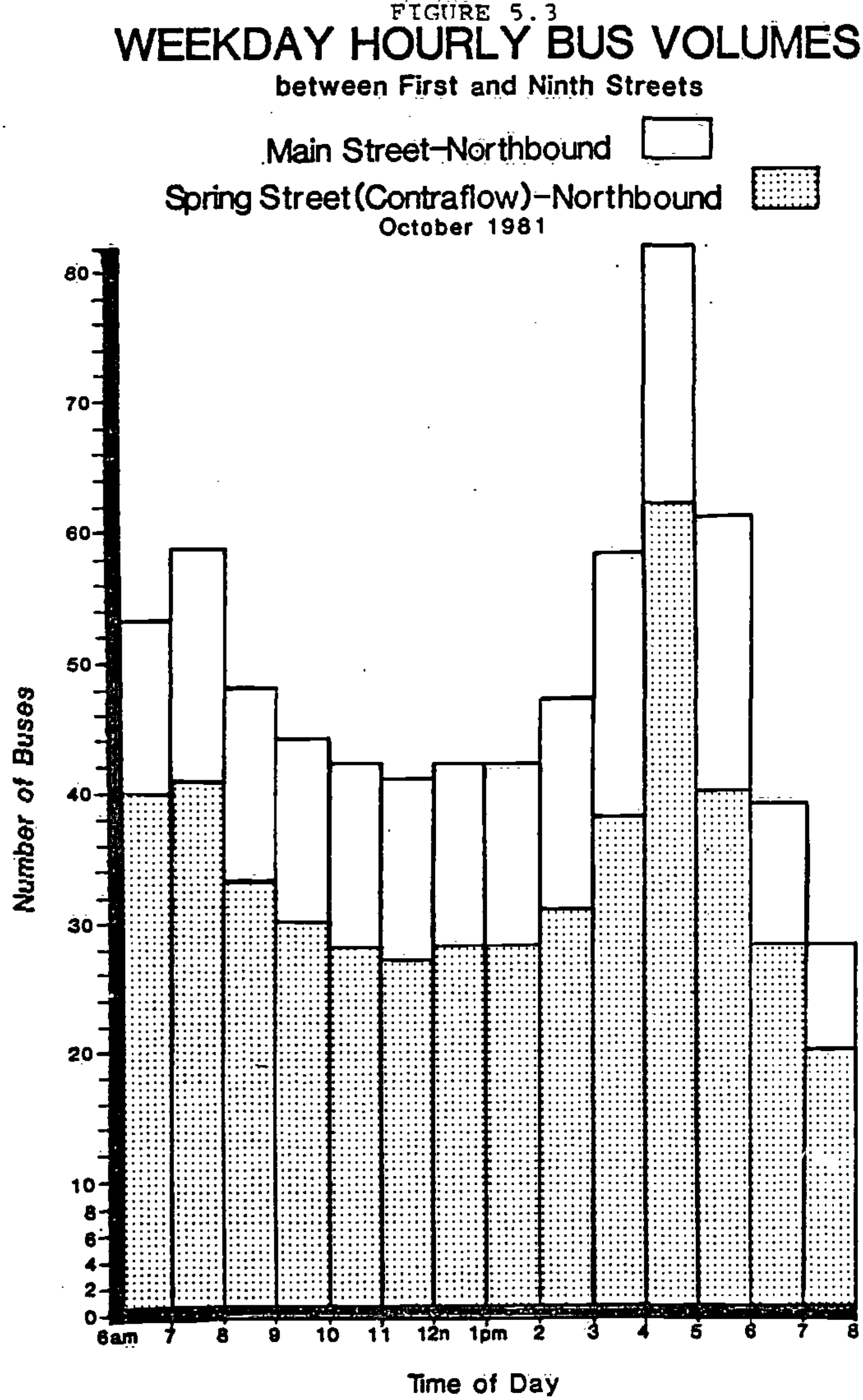
the day but also fell to 44 trips between 4 and 6 p.m. (see Figure 5.2 and Table 5.1). However, these volumes are not accurate representations of northbound bus volumes because most of Main Street pre-contraflow bus trips were transferred to the contraflow lane in May 1974.

Therefore, an accurate post-test count of northbound bus volumes in the study would have to combine northbound Main Street volumes with those on the contraflow lane.

Combined Main/Spring Northbound Bus Volumes

1981 combined northbound bus volume was 689 trips on weekdays between 6 a.m. and 8 p.m. 474 or 68.8% of these trips occur on the contraflow lane. (see Figure 5.3 and Table 5.1) The contraflow lane actually carries 141 fewer daily northbound buses in 1981 than Main Street carried in the pre-contraflow study period, but the contraflow lane and Main Street combined carried 74 (12.0%) more northbound buses in the post-test than Main Street carried in the pre-test. Again, northbound is the evening peak direction and much higher bus volumes occurred during the evening peak period. However, five fewer northbound trips occurred

FIGURE 5.3


WEEKDAY HOURLY BUS VOLUMES
between First and Ninth Streets
Main Street-Northbound
Spring Street (Contraflow)-Northbound
October 1981
Number of Buses
80
70
60
50
40
30
20
10
8
6
4
2
0
6am
7
8
9
10
11
12n
1pm
2
3
4
5
6
7
8
Time of Day

between 5 and 7 p.m. in 1981 than in the pre-test period. (see Figure 5.4).

Bus Volume Analysis

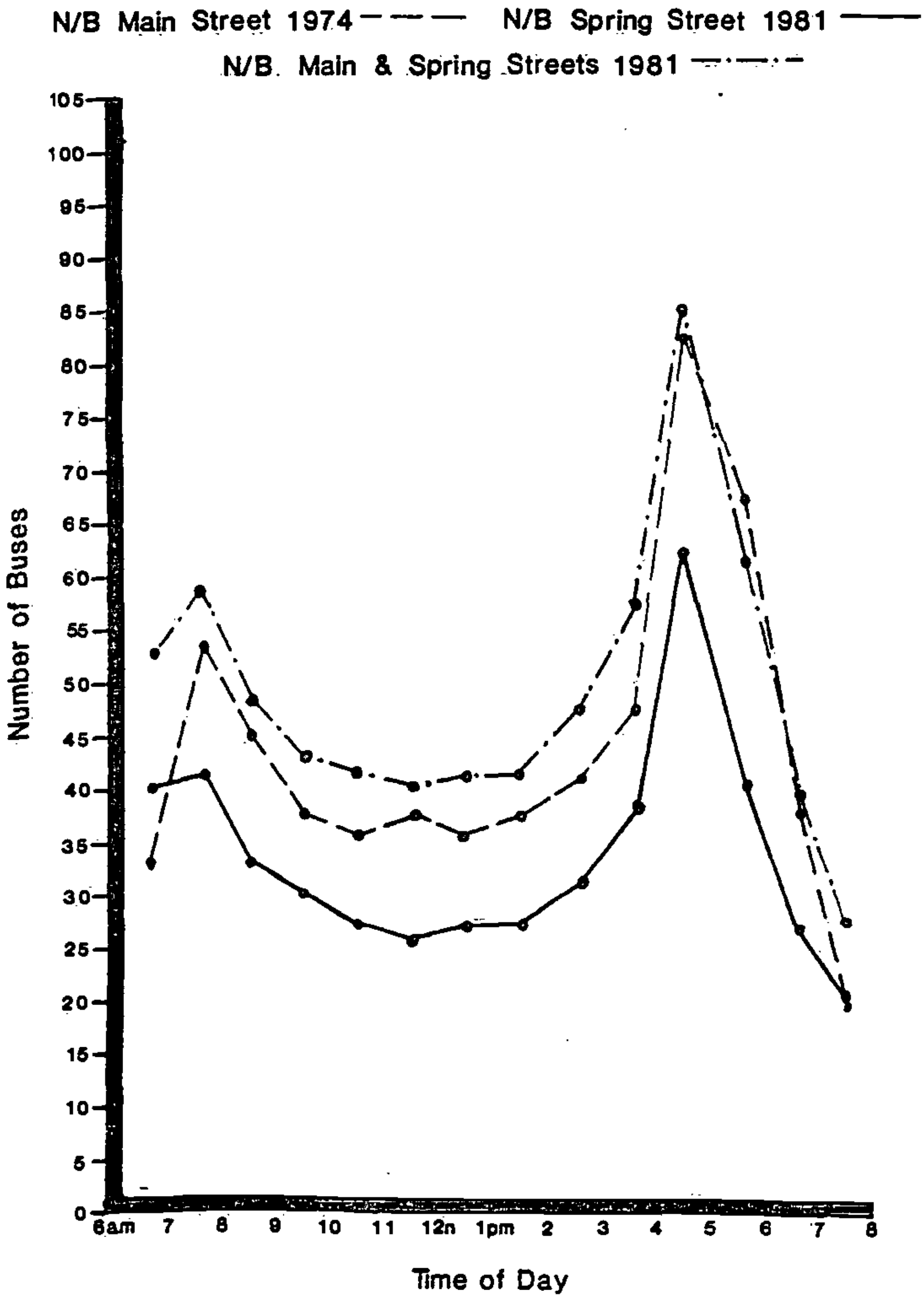
Overall, north and southbound weekday bus volumes on Main and Spring Streets combined have risen by 170 trips or 13.9% from pre-contraflow volumes. However, Main Street bus volumes have dropped dramatically as northbound buses moved to the contraflow lane, and, contraflow lane bus volumes have not exceeded previous Main Street bus volumes. Nevertheless, the contraflow lane does carry more than 60 buses during the peak period hour (in the peak direction) and thus meets the warrants suggested by the Institute of Traffic Engineers. And, more northbound buses did travel the study area's length in the post-test period than the pre-test period. Additional data would be necessary to analyze the effect this added volume would have had on the study area, had it occurred entirely on Main Street.

It is true that in 1981, only 12.7% (60) of the contraflow bus trips (four lines) were express trips. Bus volumes in the study area have been upheld by creating new local lines on, or rerouting existing local lines to the contraflow

FIGURE 5.4

WEEKDAY HOURLY BUS VOLUMES

between First and Ninth Streets



lane. Thus, the success of the contraflow lane south of First Street as an express bus feeder to the El Monte Busway remains questionable. Nevertheless, many local lines serve as connectors to express lines that use the contraflow lane north of First Street. And, these local contraflow lines also provided transfer opportunities for West Los Angeles express bus patrons. Additionally, it can be reasonably argued that local lines merit the same benefits that express lines derive from a contraflow lane.

In summary, these data appear to indicate that the contraflow lane has not had a negative effect on either southbound Spring Street bus volumes, or northbound bus volumes in the study area and, in fact, has encouraged bus volume increases in the study area. It is unknown whether or not similar post-test bus volumes would have been found in the study area even in the absence of the contraflow lane. In view of the documented westward shift of the downtown activity center, it is possible that bus volume growth would have occurred outside the study area.

Bus Speeds

Prior to the contraflow lane's installation, its advocates cited the potential for bus travel time savings as a major benefit of the lane. They declared that increased bus speeds would greatly enhance access to the El Monte Busway and thus, attract bus patrons. Decisionmakers and politicians cited this potential contraflow lane feature, and, as a result, increased bus speeds and fast, efficient service to the El Monte Busway became a widely stated objective for the contraflow lane.

This chapter compares and analyzes bus speeds during the pre-test and post-test for northbound and southbound buses on Spring and Main Streets. In most cases, pre-test and post-test data are not directly comparable because travel time data were gathered for different distances in the study area. For instance, pre-test morning peak period bus travel times were gathered for buses buses travelling between Eighth Street and Aliso while evening peak period data represent bus travel times between Ninth and Macy Streets or Seventh and First Streets. All post-test bus travel time data conform to the present study area between Ninth and First Streets. Nevertheless, converting travel time into miles per hour provides a fairly accurate comparison of bus speeds along the present study area.

Pre-Test Bus Speed Methodology

The pre-test data were obtained from the August 28, 1974 Los Angeles Department of Traffic Spring Street Contraflow Bus Lane Operational Evaluation Study and the November, 1975 Wilbur Smith and Associates Evaluation of the Spring Street Contraflow Lane. According to the Department of Traffic report, the bus speed data were gathered "from timed observations at various locations along the route" and "speeds have been calculated from travel time."[100] These data are displayed in Table 5.2.

The study areas in the 1974 evaluations vary and do not directly conform to the First to Ninth Street Study area of the present report. Furthermore, in several instances Busway and non-Busway bus speeds were displayed separately. In an effort to derive just one speed for the current evaluation's purposes, the two were simply averaged. This procedure does not control for differing volumes of Busway and non-Busway buses and results in an unweighted speed. However, this average result is the best single estimate as the Department of Traffic gave no indication of the number of buses in each category for which speed data were gathered. Additionally, in some instances these pre-test

TABLE 5.2

AVERAGE WEEKDAY BUS SPEEDS

	7am-9am		9am-4pm		4pm-6pm	
	Time (min.)	Speed (mph)	Time (min.)	Speed (mph)	Time (min.)	Speed (mph)
Pre-test						
Main St. (N/B)	--	13.0	--	--	--	9.6
Spring St (S/B)	--	10.3	--	--	--	9.3
Post-test						
Main St. (N/B)	5.9	10.2	6.2	9.7	7.8	7.7
Spring St (S/B)	5.8	10.3	6.3	9.5	7.0	8.6
Spring St Contraflow	6.3	9.5	6.8	8.8	7.7	7.8

SOURCE: Pre-test-Spring Street Contra-flow Bus Lane Operational Evaluation Study, Los Angeles Department of Traffic, August 28, 1974, pp 25-26, and Evaluation of the Spring Street Contra-flow Lane, Wilbur Smith and Associates, November 30, 1975,pp. 20 and 42.

Post-test-Southern California Rapid Transit District Point Checks made October 1981.

Note: Pre-test data were gathered for buses travelling between Macy and Ninth Streets and include bus trips that travelled between Macy and First Streets only. Post-test data were gathered for the study area (between First and Ninth Streets) only.

data include buses that traverse Spring and Main Streets north of First Street only. These buses run entirely out of the current study area but cannot be separated from the final 1974 data. And, lastly, pre-test data are only available for morning and evening peak periods. Therefore, no midday or all day pre-test, post-test comparisons can be made.

Even given the shortcomings of the pre-test data for the purposes of the present evaluation, a fairly valid and accurate account of bus speeds on Spring and Main Streets is obtained from them. Therefore, meaningful and pertinent, albeit qualified, conclusions can still be drawn from a comparison of the pre-test and post-test bus speed data.

Post-Test Bus Speed Methodology

Post-test bus speed data were obtained from SCRTD point checks. Point checks are made by SCRTD employees located at various points along a bus route. These employees or "checkers" record the bus number and time of day (in hours and minutes) that each bus passes their particular location or point. The time it took each bus to traverse the study area was obtained by comparing the point checks of the checkers located at First and Ninth Streets. A point check at these two locations was made for every bus traversing Spring and Main Streets between 7 a.m. and 7 p.m. on Thursday, October 15, 1981. These travel time were averaged separately for peak period and midday buses and converted into miles per hour. Table 5.2 displays the results.

<u>Bus Speed Analysis - Spring and Main Streets</u>

As stated earlier, southbound Spring Street carries morning peak period traffic in the peak direction (inbound). Bus speeds on southbound Spring Street during this peak period/ peak direction flow remain unchanged at 10.3 mph from the pre-test to the post-test studies. It appears that the contraflow lane has had no affect on southbound Spring Street bus speeds during this most heavily trafficked time of day. However, data does indicate that bus speeds on southbound Spring Street during the evening peak period (off-peak direction) decreased 0.7 mph from 9.3 mph in the pre-test to 8.6 mph in the post-test study period. However, this change is so slight it appears to be insignificant. Similar pre-test, post-test peak period comparisons of Main Street bus speeds showed a much more dramatic decrease even in the absence of a contraflow lane. Main Street 7-9 a.m.

bus speeds decreased 2.8 mph from 13.0 mph in the pre-test analysis to 10.2 mph in the post-test study and 4-6 p.m. speeds declined 1.9 mph in the pre-test to post-test comparison from 9.6 to 7.7 mph respectviely.

1981 bus speed data indicate that the contraflow lane provides little or no speed advantage during the peak periods over northbound Main Street buses. The evening peak period (peak direction) speeds on the contraflow lane are only 0.1 mph faster than northbound Main Street speeds and morning peak period (off-peak direction) speeds are 0.7 mph slower on the contraflow lane than on northbound Main Street. An explanation for the slower bus speeds on the contraflow lane during the morning peak period may be that the heavier morning volume of the opposing southbound peak period/ peak direction traffic on Spring Street affects the contraflow lane operation. But more significantly, northbound contraflow lane buses during all periods are also travelling against the southbound signal progression implemented by the Los Angeles Department of Traffic in 1974. A similar signal progression was implemented on northbound Main Street at the same time. The combination of the northbound contraflow lane buses flowing against the signal timing and the northbound Main Street buses flowing with it may possibly contribute to the lack of faster 1981 bus speeds on the contraflow lane as compared to those on northbound Main Street. The fact that this signal timing was in effect at the time the pre-test bus speed data were gathered leaves unexplained the significant drop in bus speeds on Main Street from the pre-test to post-test study. But since this phenomenon did occur and signal timing advantages are not equal, the slower 1981 bus speeds on the contraflow lane versus pre-test northbound Main Street speeds cannot be attributed without qualification to the contraflow lane's characteristics. It should be noted that 1981 midday contraflow lane bus speeds are slightly lower than both 1981 southbound Spring Street and northbound Main Street bus speeds. But, the effect that improved schedule adherence has on contraflow lane bus speeds has not yet been discussed. (See recommendations for future research) Therefore, no definitive conclusions can be drawn about this latter observation.

In conclusion, it appears that southbound Spring Street bus speeds have changed very little since the installation of the contraflow lane. However, northbound bus speeds (on both Main Street and the contraflow lane) decreased significantly from the pre-test to post-test analysis.

Nevertheless, there is little difference in bus speeds between 1981 northbound Main Street and contraflow buses, leaving doubt that the contraflow lane led to reduced bus speeds. And, 1981 Main Street, contraflow, and southbound Spring Street bus speeds are all very similar, ranging between 7.7 and 10.3 mph, a spread of only 2.6 mph. The similarity is even more striking when these speeds are compared by time of day. Therefore, it appears that overall the contraflow lane may not provide a speed advantage for buses, but neither does it cause a speed hindrance to northbound or southbound Spring Street buses.

CHAPTER VI

Traffic Volumes

Comparisons of traffic volume counts from before and after the contraflow lane's installation can help evaluate the effect, if any, of the contraflow lane on general traffic patterns. Pre- contraflow traffic volumes were obtained from the August 28, 1974 Spring Street Contraflow Bus Lane Operational Evaluation Study produced by the Los Angeles Department of Traffic. The Los Angeles Department of Transportation (LADOT) provided the current traffic volumes from their Traffic Survey Count records.

Overall Traffic Volume Methodology

The methodology used by the Los Angeles Department of Traffic/LADOT to obtain the weighted traffic volume for street segments from station (intersection) counts was also used in this report to obtain the weighted average volume for the eight block study area. The LADOT obtains weighted average volumes as follows: "The average of the vehicular volumes at two adjacent count stations (intersections) are multiplied by the distance between the count stations.

These results are then summed and divided by the route distance to obtain a single volume, representing the average volume over that street section".[100] James Okasaki of the LADOT aided in adapting this formula to the specific study area between First and Ninth Streets. Since the study area is comprised of eight blocks of equal length (660 feet each) actual and estimated average traffic counts at each of the nine count stations (intersections) in the study area were added and divided by 8 (the distance in segments rather than miles or feet) to obtain the weighted average volume over the length of the study area.

Pre-Test Traffic Volume Data Methodology

The 1974 Department of Traffic report contained traffic volume data on Spring and Main Streets from 7-9 am and 4-6 pm only. On Spring Street, the Los Angeles Department of Traffic took counts in the Summer of 1973 for count stations at Temple, Fifth and Seventh Streets, and in February 1974 for count stations at Temple, Second, Fifth and Seventh Streets. On Main Street volume counts were taken in the Summer 1973 at Temple, Fifth and Seventh Streets. (See Table 6.1)

TABLE 6.1

PRE-TEST TRAFFIC VOLUMES

Spring Street				
Intersection	7am-9am		4pm-6pm	
	Summer 1973	February 1974	Summer 1973	February 1974
Temple	4,520	4,490	2,000	1,930
2nd	--	3,980	--	2,110
5th	3,430	3,340	2,320	2,290
7th	1,980	1,760	1,950	1,980
Main Street				
Temple	1,790	--	3,920	--
2nd	--	--	--	--
5th	1,650	--	3,170	--
7th	1,800	--	2,660	--

SOURCE: Spring Street Contra-flow Bus Lane Operational Evaluation Study, Los Angeles Department of Traffic, August 28, 1974, p.27.

Counts were needed at each intersection in the study area to use the Los Angeles Department of Transportation (LADOT) methodology. To estimate traffic volumes for intersections where counts were not taken, several techniques were used. First, on Spring Street the ratio between the February 1974 count station volumes at Temple and Second Streets was assumed unchanged from Summer 1973 to February 1974. Therefore, the missing count at Second Street for Summer 1973 could be estimated using the February ratio. Second, lack of data at the south end of the study area for both Spring and Main Streets required that Eighth and Ninth Streets be assumed to have the same traffic volumes as those found at Seventh Street. This assumption may result in a slightly higher pre-test traffic volume estimate than would be the actual case because 1981 data indicate traffic volume declines slightly from Seventh to Ninth Streets. Third, the remaining missing counts on each street were estimated by averaging the count station volumes on both sides of the missing count station (intersection).

Having obtained the actual and estimated traffic volume counts for each of the nine intersections, the LADOT format was followed and the weighted average traffic volumes for Main and Spring Streets were calculated for the pre-test during the two peak periods.

Since there were no pre-test traffic volume data available for off-peak or 24-hour periods, a 14-hour (6 a.m. - 8 p.m.) volume was estimated by assuming the peak period/off-peak direction hourly volumes remained constant for 12 of the 14 hours from 6 a.m. - 8 p.m. The peak period/peak direction volumes were added to the 12-hour total to obtain the 14-hour traffic volume. According to Mel Huber at the LADOT the area's traffic volume between 6 a.m. and 8 p.m. is approximately 90% of the 24-hour total traffic volume.[102] Therefore, a 24-hour traffic volume figure was easily estimated for the pre-contraflow period from the given peak period volumes.

Although these data represent the most accurate account of pre-contraflow traffic volumes available, a note regarding a threat to the internal validity of the Main Street pre-test data must be made. In 1973 and 1974, construction of the East Mall on Temple Street between Los Angeles and Main Streets forced periodic temporary closure of Temple

Street.[103] The hindrance caused to traffic circulation by this construction, and the resulting inconvenience to vehicle drivers in the area may have affected traffic volumes on adjacent Main Street even though this Temple Street location is one block north and 1/2 block east of the study area boundaries. If this was the case, we would expect to find higher traffic volumes on Main Street than the available data indicates. This possible threat to the data's internal validity is considered in the final traffic volume analysis.

Post-Test Traffic Volume Data Methodology

Current traffic volume data on Spring and Main Streets were obtained from the 1977-81 LADOT Traffic Survey Counts. The data are available by hour and for a 24-hour period. LADOT does not survey every intersection each year. By using surveys from the most recent five years, actual traffic counts could be obtained for most intersections in the study area. This procedure eliminates excessive estimation that would be necessary from data gaps that would ensue if only 1980 and/or 1981 survey counts were used. Therefore, it gives a more accurate account of recent traffic volumes in the study area than would be possible if analysis was limited to data from a shorter time frame. The LADOT does not keep traffic volume counts over five years.

Every count made from 1977 through 1981 was tabulated and averaged by intersection for both peak periods (7-9 a.m. and 4-6 p.m.) and a 24-hour period. (See Appendix VII) If the LADOT did not take a survey count at an intersection in the last five years, a count estimation was made by averaging the average counts of the stations (intersections) on both sides of the missing intersection. The nine intersections' average traffic counts were then summed and divided by eight blocks following the LADOT methodology to obtain the post-test weighted average traffic volume within the study area.

Spring Street Traffic Volumes

Table 6.2 and Figure 6.1 display the weighted average traffic volumes on Spring and Main Streets during the pre- and post-test periods. Weekday twenty-four hour southbound traffic volumes on Spring Street declined significantly from 21189 in the pre-test to 13225 in the post-test, a 37.6% decrease. The morning (7-9 a.m.) and evening (4-6 p.m.)

TABLE 6.2

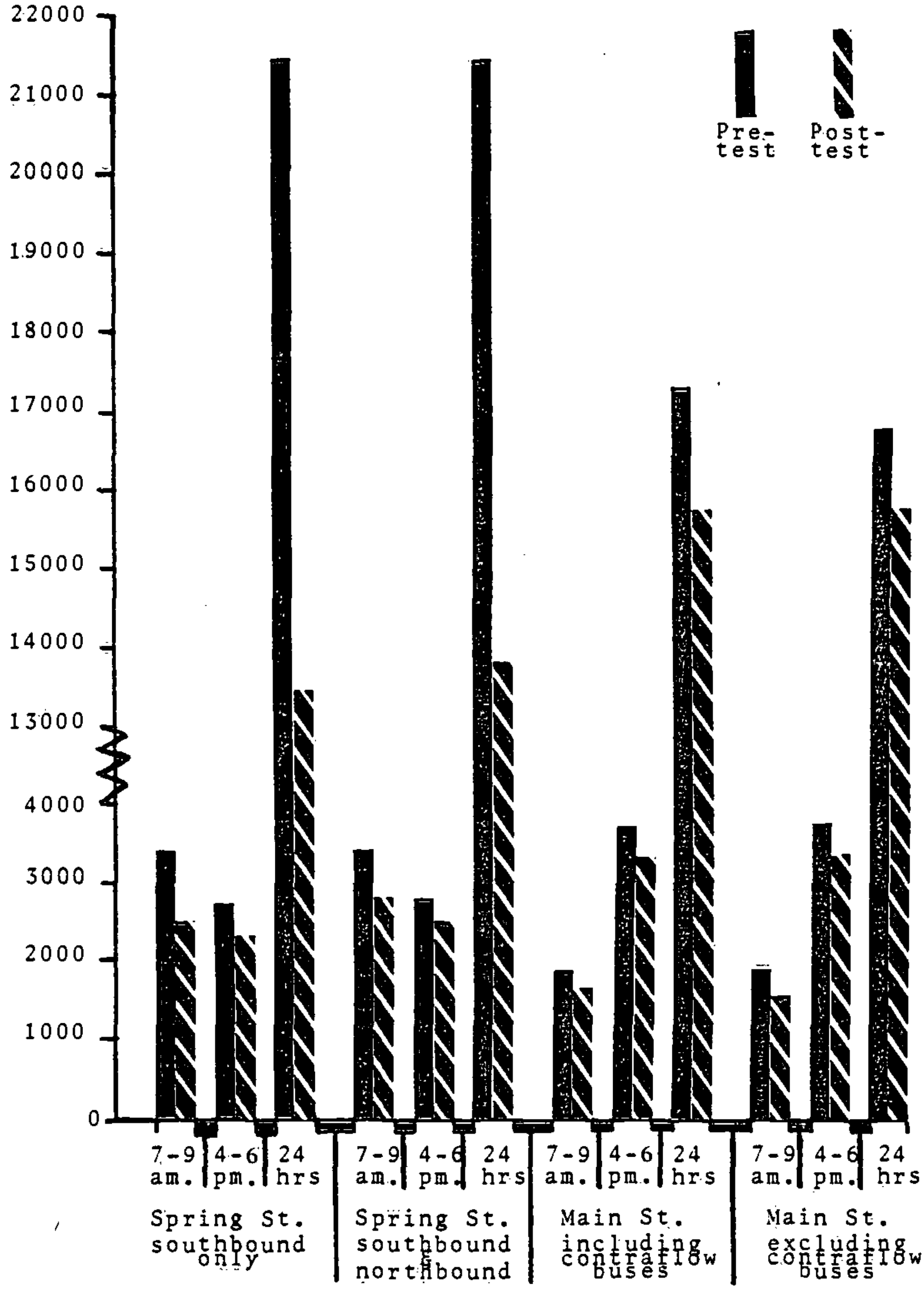
WEIGHTED AVERAGE WEEKDAY TRAFFIC VOLUMES

	Spring Street						Main Street					
	Southbound Only (excludes contra-flow lane buses in post-test data)			Northbound and Southbound (includes contra-flow lane buses in post-test data)			Northbound (includes buses later transferred to contraflow lane in pre-test data)			Northbound (excludes buses later transferred to contraflow lane in pre-test data)		
	7-9am	4-6pm	24hrs	7-9am	4-6pm	24hrs	7-9am	4-6pm	24hrs	7-9am	4-6pm	24hrs
Pre-test	3405	2611	21189	3405	2611	21189	1957	3841	17314	1891	3734	16897
Post-test	2455	2284	13225	2529	2386	13775	1660	3348	15780	1660	3348	15780
% Change	-27.9	-12.5	-37.6	-25.7	-8.6	-8.7	-15.2	-12.8	-8.9	-12.2	-10.3	-6.6

SOURCE: Pre-test-Spring Street Contra-flow Bus Lane Operational Evaluation Study, Los Angeles Department of Traffic, August 28, 1974 and Southern California Rapid Transit District Time Tables in effect April 1974.
Post-test-Los Angeles Department of Transportation Traffic Survey Counts and Southern California Rapid Transit District Time Tables in effect October 1981.

FIGURE 6.1

WEIGHTED AVERAGE WEEKDAY TRAFFIC VOLUMES



peak period traffic volumes declined 27.9% from 3405 to 2455 and 12.5% from 2611 to 2284, respectively.

When bus volumes on the northbound contraflow lane are included in the pre- and post-test Spring Street comparison, the post- test volumes increase slightly to 13775 for a 24-hour period, 2529 for the morning peak period, and 2386 for the evening peak period, but are still well below the pre-test traffic volumes.

Main Street Traffic Volumes

A less dramatic traffic volume decline occurred on Main Street. Pre-Test Main Street traffic volumes for a 24-hour period were 17314, while post-test volumes fell 8.9% to 15780. Morning peak period volumes decreased in pre- to post-test comparisons by 15.2% from 1957 to 1660 and evening peak periods declined 12.8% from 3841 to 3348. If the bus volumes of the buses later transferred to the contraflow lane are removed from the pre-test Main Street data, pre-test traffic volumes still remain slightly higher than post-test volumes (See Table 6.2).

Downtown Traffic Volume Trends

These declining trends occurred over a time span when the actual number of vehicles entering and leaving the downtown area increased by 11.0%. In 1974, before the contraflow lane's installation, 602,891 vehicles a day crossed the CBD Cordon boundaries. In 1980, this figure rose to 677,147 vehicles a day.[104]

Traffic Volume Analysis

The decline in Spring Street traffic volumes from the pre- to post-test seems to indicate that the contraflow lane may have provided a deterant for motorists who used Spring Street prior to its installation. However, if the contraflow lane negatively effected Spring Street traffic volumes, it would seem logical to expect Main Street traffic volumes to be positively effected by the removal of buses from Main Street after the contraflow lane opened and the absence of the East Mall construction. But, as the data indicate, traffic volumes on Main Street also declined slightly from the pre- to post-test.

Since both Spring and Main Street traffic volumes declined, it appears that factors other than the contraflow lane most likely contributed to the traffic volume decline on Spring Street. The most significant of these contributing factors is the documented gradual shift of the downtown activity center to the west. The importance of Main and Spring Streets to the Los Angeles business and financial community has decreased dramatically over time.

Traffic Speeds

A major priority of the LADOT has been to ensure smooth, efficient traffic flow in the city. To enhance that goal in downtown Los Angeles, the Los Angeles Department of Traffic made signal timing modifications on 210 CBD intersections, including those in the study area, in January 1974.[105] The optimum signal progression traffic speed from these signal modifications was taken to be 23 mph.[106] The installation of the contraflow lane changed the street characteristics in the study area and thus changed traffic flow patterns there. The effects these changes would have on the "improved" traffic speeds were of great concern, especially to the Los Angeles Department of Traffic. This section compares and analyzes average traffic speed data from the pre-test to post-test to determine what, if any, effect the contraflow lane has had on regular traffic speeds on Spring and Main Streets.

Pre-Test Traffic Speed Data Methodology

The pre-test traffic speed data were obtained from the August 28, 1974 Department of Traffic's Spring Street Contraflow Bus Lane Operational Evaluation Study. The data were gathered in April, 1974, after the signal modifications and prior to the contraflow lane's installation.

Traffic speed data were available for both Spring and Main Streets for three time periods: 7:00-8:30 a.m., 11:00 a.m.-12:30 p.m. and 4:00-5:30 p.m. Although these time periods do not conform directly to the post-test time periods, they provide adequate data for peak period and midday comparisons. All day average traffic speeds were not available from the Los Angeles Department of Traffic report. Therefore, speeds from the three available time periods were averaged to obtain an all day average traffic speed for the pre-test period. Furthermore, the pre-test Spring Street traffic speeds represent travel from Macy to Ninth Streets and pre-test Main Street traffic speeds represent travel from Seventh to Macy Streets. These lengths also do not coincide directly with the post-test study area, but it can reasonably be assumed that average speeds vary very little on Spring and Main Streets inside and outside the current study area. Therefore, pre-test traffic speeds provide valid comparable data to post-test speeds.

Post-Test Traffic Speeds Data Methodology

Post-test traffic speed data was obtained by SCRTD staff using the floating car method. On Thursday, February 4 and Tuesday, February 9, 1982, a total of 52 trips each on Spring and Main Streets between First and Ninth Streets were taken by automobile. The automobile flowed with regular traffic and each trip was timed from the mid-points at either the First and Spring Street (for the Spring Street trip) or the Ninth and Main Street (for the Main Street trip) intersections to the Ninth and Spring Street (Spring Street trip) or the First and Main Street (Main Street trip) intersections. All traffic rules and laws were obeyed and time spent waiting at red lights was included in the travel times. These times were then averaged separately for peak period (7:00-9:00 a.m. and 4:00-6:00 p.m.) midday, and all day trips and converted into miles per hour. The comparability of this methodlogy with that of the Los Angeles Department of Traffic pre-test study can only be speculated but all available information indicates the comparison will be valid.

Traffic Speed Analysis

Overall, average traffic speeds on Spring and Main Streets changed very little from the pre- to post-test studies. However, peak period/peak direction speeds on both Spring and Main Streets did decline slightly (See Table 6.3). Pre-test morning peak period average traffic speeds on Spring Street were 19.4 mph while post-test speeds for the same time period were 17.7 mph. This represents a speed reduction of 1.7 mph or 9% from pre- to post-test speeds. Pre-test evening peak period traffic speeds on Main Street were 17.2 mph and post-test speeds were 16.2 mph; a reduction of 1.0 mph or 6%.

With the exception of the Spring Street evening peak period speeds which declined only 0.4 mph or 2% (from 19.8 mph to 19.4 mph) from the pre- to post-test study, traffic speeds during all other time periods increased by 1.0 mph to 2.3

TABLE 6.3

AVERAGE WEEKDAY TRAFFIC SPEEDS

	Pre-test							
	Spring Street				Main Street			
	7-8:30 am.	11-12:30	4-5:30 pm.	24 hrs.	7-8:30 am.	11-12:30	4-5:30 pm.	24 hrs.
minutes	-	-	-	-	-	-	-	-
MPH	19.4	19.9	19.8	19.7	22.8	19.7	17.2	19.9
	Post-test							
	Spring Street				Main Street			
	7-9 am.	9-4	4-6 pm.	24 hrs.	7-9 am.	9-4	4-6 pm.	24 hrs.
minutes	3.4	2.7	3.1	2.9	2.5	2.9	3.7	3.0
MPH	17.7	22.2	19.4	20.7	24.0	20.7	16.2	20.0

SOURCE: Pre-test-Spring Street Contra-flow Bus Lane Operational Evaluation Study, Los Angeles Department of Traffic, August 28, 1974. Note: Pre-test traffic speeds calculated from Macy to Ninth Streets on Spring St. and from Macy to Seventh Streets on Main St.
Post-test- SCRTD field survey.

mph from the pre- test to the post-test periods. Spring Street midday speeds increased from 19.9 to 22.2 mph, Main Street morning peak period speeds increased from 22.8 to 24.0 mph and Main Street midday speeds increased from 19.7 to 20.7 mph. (See Table 6.3) Overall, all day average speeds on Spring Street increased by 1.0 mph in the pre-test to 20.7 mph in the post-test. All day average speeds on Main Street remained fairly constant, increasing by only 0.1 mph from 19.9 mph in the pre-test to 20.0 mph in the post-test.

In conclusion, it appears that the contraflow lane (or at least the removal of one southbound lane for the contraflow lane use) may have a slight negative effect on traffic speeds on southbound Spring Street during the peak period/peak direction flow (7:00-9:00 a.m.) However, peak period/peak direction (evening-northbound) speeds on Main Street also declined slightly in the pre-test, post-test comparisons in both the absence of a contraflow lane intrusion and after a substantial decrease in bus volumes on the street occurred. (Many buses were transferred from Main Street to the contraflow lanw in the post- test study). Therefore, an absolute relationship between the contraflow lane and reduced bus speeds during this time period is impossible to substantiate.

The contraflow lane also appears to have little or no negative effect on traffic speeds during times of day other than peak period/peak direction times. And, in fact, in most cases, traffic speeds increased significantly from the pre- to post-test studies. Additionally, all day traffic speeds increased on both streets from the pre- to post-test analyses and Spring Street, with the contraflow lane, showed the most significant all day traffic speed increase.

It must be remembered when analyzing these traffic speed data that traffic volumes affect traffic speeds and traffic volumes in the study area have declined substantially from the pre-test to post-test periods. An increase in traffic speeds may be expected with a decrease in traffic volumes. Nevertheless, comparisons of post-test Spring Street and post-test Main Street traffic speed data may somewhat control for the pre- to post-test volume changes. And this comparison does not indicate that the contraflow lane has caused a negative effect on Spring Street traffic speeds. In fact, all day post-test Spring Street average traffic speeds are 0.7 mph faster than all day post-test Main Street average speeds. Therefore, the final conclusion must be that the contraflow lane has not caused a decrease in traffic speeds in the study area.

CHAPTER VII

Accident Numbers and Rates

Prior to the contraflow lane's installation, the Los Angeles Department of Traffic expressed concern that a contraflow lane would reduce traffic safety on Spring Street and cause an increase in the number of accidents there. Analysis of contraflow lanes in several other U.S. Cities has indicated that accident rates and/or the number of accidents on contraflow lanes are actually lower than those on other city streets. (See Chapter II) However, few conclusions have been reached regarding the effect of contraflow lane may have on accident rates on regular traffic lanes in the immediate vicinity of the lane.

Methodology

LADOT supplied study area traffic accident data from their T-10/T-10R Traffic Accident Report for three time periods to facilitate analysis of both the contraflow lane's accident record and any effect the lane may have had on the occurrance of traffic accidents in the study area. Two of the three time periods, November 1, 1971 - October 31, 1973 and

November 1, 1979 - October 31, 1981 are in comparable two year blocks and these data were used to make pre- and post-test comparisons of total accidents and accident rates on both Spring and Main Streets. The third time period supplied by LADOT is for the six month period (November 1, 1973 - April 30, 1974) just prior to the contraflow lane's opening. Accident data from this group has been omitted from the accident rate calculations to maintain consistency in the pre- and post-test analysis by comparing only data from equal length and coinciding monthly time periods. However, this six month period does provide data on the accident record immediately preceding the contraflow lane's opening. As is true throughout the report, all data and analyses throughout this chapter are for weekday (Monday through Friday) accidents only.

The LADOT traffic accident data consist of all reported single vehicle, multiple vehicle and vehicle-pedestrian accidents that resulted in property damage and/or injury that occurred on Spring Street and Main Street between First and Ninth Streets, as well as on all cross streets within 200 feet of a Spring or Main Street intersection. Although not always the case, many cross street accidents are the result of actions (such as turns, etc.) relating to the approaching intersection, and have therefore been included in the data. The accidents that occurred on a cross street within 200 feet of Spring Street were considered southbound Spring Street accidents, unless a contraflow (northbound) bus was involved or the cross street vehicle was attempting to turn (illegally) onto the contraflow lane.

The Los Angeles Department of Transportation accident records indicate the type of vehicle involved in the accident, but does not distinguish between SCRTD buses and other buses (tour, school, etc.). Therefore, the bus accident data may include accidents from other than SCRTD buses. Nevetheless, SCRTD buses make up the vast majority of buses traversing these two streets and would presumably be involved in most of the bus related accidents. Automobile accident data include trucks, vans, etc. District staff has considered any accident involving a bus (i.e., single bus, bus-auto, bus-pedestrian, bus-bus) a bus accident regardless of which vehicle contained the driver at fault. Table 7.1 displays these LADOT accident data by street, time period, time of day, vehicle type, and direction.

The LADOT gives every indication to assume that the accident reporting procedures have remained the same from the

TABLE 7.1

Annual Number of Weekday Accidents

		Spring Street									Main Street								
		24 hours			7-9am			4-6pm			24 hours			7-9am			4-6pm		
		Auto	Bus	Total	Auto	Bus	Total	Auto	Bus	Total	Auto	Bus	Total	Auto	Bus	Total	Auto	Bus	Total
Pre-test	11/73-4/74 (6 mos.)	20	2	22	3*	0*	3*	5	0	5	35	2	37	5	1	6	6*	1*	7*
Pre-test	11/71-10/73 Annual Avg.	50	3	53	8.5*	.8*	9.3*	6	0	6	70	1.5	71.5	9	.5	9.5	14*	0*	14*
Post-test	Southbound 11/79-10/81 Annual Avg.	24	4.5	28.5	2.5*	.5*	3*	2	.5	2.5	-	-	-	-	-	-	-	-	-
Post-test	Northbound 11/79-10/81 Annual Avg.	1	5	6	0	1.5	1.5	0*	1.5*	1.5*	44.5	4	48.5	2.5	.5	3	7.5*	2*	9.5*
Post-test	S/B & N/B 11/79-10/81 Annual Avg.	25	9.5	34.5	2.5	2	4.5	2	2	4	-	-	-	-	-	-	-	-	-

Source: Los Angeles Department of Transportation

*Peak period/peak direction

pre-test to the post-test study period. If any differences do exist in police response, driver or witness reporting, etc., they will not be reflected in the comparison. Nevertheless, the data represent the best available accident comparison because they have been gathered and compiled by one agency.

Spring Street Accident Number Analysis

The data reveal that the number of average annual traffic accidents on Spring Street was dramatically lower during the two year study period after the contraflow lane's installation than before. An average of 53.0 traffic accidents occurred annually on Spring Street during the pre-test study period from November 1, 1971 to October 31, 1973 and just 28.5 southbound (without the contraflow lane) and 34.5 southbound and northbound (including the contraflow lane) accidents occurred annually during the post-test study period from November 1, 1979 to October 31, 1981. The same relationship occurs for both morning and evening peak periods on Spring Street, although it is not as dramatic during the evening peak period. An average of 9.5 accidents a year occurred between 7-9 a.m. in the pre-test analysis and only 3.0 southbound and 4.5 southbound and northbound morning peak period accidents occurred annually in the post-test analysis. The 4-6 p.m. average annual accidents totalled 6.0, 2.5, and 4.0, respectively. A similar accident pattern exists when bus accidents are excluded from the comparison. For automobiles, trucks, and all other non-bus vehicles, fewer accidents occurred along Spring Street after the contraflow lane's installation than before (See Table 7.1).

Average annual bus accidents on Spring Street, however, appear fairly constant overall in the pre- post-test for southbound traffic. A slight increase occurred in the 24 hour period from an average of 3.0 bus accidents a year prior to the contraflow lane's installation to an average of 4.5 after the contraflow lane's installation. But, the figures for the 7-9 a.m. peak period declined slightly from 0.8 and 0.5, respectively, and the 4 - 6 p.m. peak period average annual accidents rose slightly from 0.0 and 0.5, respectively.

By including the contraflow lane (northbound) data in the pre- and post-test bus accident comparison, the average annual number of bus accidents is higher after the contraflow lane's installation, having increased for the

24-hour period from 3.0 to 9.5 annually, for the 7-9 a.m. period from 0.8 to 2.0, annually, and for the 4-6 p.m. period from 0.0 to 2.0, annually (See Table 7.1). This is a result of the fact that more buses travel on Spring Street (in both directions) in the post-test period than travelled there in the pre-test period.

Main Street Accident Number Analysis

Accident data for Main Street indicate that a similar pattern exists there, too. Both total traffic accidents and non-bus accidents were significantly higher before the contraflow lane existed than after for round-the-clock and peak period analyses. Bus accidents either remained constant or were higher after the contraflow lane's installation. (See Table 7.1)

Overall Accident Number Analysis

Because fewer total traffic accidents occurred in the post-test period, it cannot be concluded that the installation of the contraflow lane on Spring Street caused more traffic accidents on either Spring or Main Streets. Nor can it be concluded that the installation of the contraflow lane caused an increase in average annual bus accidents occurring on regular Spring Street traffic lanes because, for the most part, bus accidents remained fairly constant. The number of bus accidents was higher in the post-test analysis of northbound and southbound Spring Street combined. However, we cannot conclude that the contraflow lane caused this higher bus accident occurrance on Spring Street because Main Street also experienced a dramatically higher bus accident count for both around-the-clock and peak period/peak direction (4 - 6 p.m.) analyses even after a large portion of the Main Street buses were transferred to the Spring Street contraflow lane. The Department of Traffic also notes this fact in its 1975 "after" study in a report titled <u>Accident Analysis-Contraflow Lane Experiment</u>.[101] The higher number of Spring Street bus accidents occurred only after including the transferred buses (on the northbound contraflow lane) in the data.

Additionally, speculation that safety will be reduced due to the potential for many vehicles to unintentionally travel the wrong way on the contraflow lane also cannot be substantiated. In the post-test period, three Main Street accidents involved vehicles travelling the wrong way on this northbound one-way street, while only two accidents occurred on the contraflow lane involving wrong-way vehicles and one of these involved an emergency vehicle intentionally travelling in the contraflow lane.

Accident Rate Analysis

This inability to make definitive conclusions from actual accident counts focuses attention on a crucial point in the accident analysis: A study and discussion of the number of accidents is valuable to develop a picture of actual events in the study area before and after the contraflow lane's installation, however, no valid analysis or conclusion can be made from these accident data without relating them to the traffic volume on the streets at the time. Therefore, traffic and bus volume data from Chapters V and VI and the LADOT accident data from this chapter have been used to calculate the accident rate per million vehicle miles for both Spring and Main Streets during the pre- and post-test periods. (See Appendix VIII for accident rate formula and calculations.)

Table 7.2 displays the accident rates for all traffic (including buses) and for buses only on Spring and Main Streets during the pre- and post-test periods. 1980-81

TABLE 7.2

ACCIDENT RATES
(annually per million vehicle miles)

		All Traffic (includes buses)				Buses Only			
		Pre-test	Post-test			Pre-test	Post-test		
			S/B	N/B*	S/B & N/B		S/B	N/B	S/B & N/B
Spring Street	24 hrs.	8.63	8.45	35.65	9.82	17.08	23.01	35.65	28.29
	7-9am.	10.94	4.79	79.49	6.98	21.64	13.71	79.49	41.57
	4-6pm.	9.01	4.29	57.67	6.58	0	17.51	57.67	27.49
Main Street	24 hrs.	14.39	--	12.05	--	8.38	--	64.03	--
	7-9am.	19.04	--	7.09	--	19.81	--	59.42	--
	4-6pm.	14.29	--	11.13	--	0	--	178.25	--

*Buses only
SOURCE: Los Angeles Department of Transportation

Spring Street rates have been calculated for southbound traffic only, northbound buses (and other vehicles) only, and southbound and northbound traffic combined to allow pre- and post-test comparisons of regular traffic lanes' (southbound) accident rates and the entire streets' accident rates including the contraflow lane.

Accident Rate Analysis - General Traffic

Spring Street

The contraflow lane does not appear to negatively affect overall accident rates in normal traffic lanes on southbound Spring Street. Prior to the addition of the contraflow lane, 8.63 accidents per million vehicle miles (MVM) occurred on Spring Street during a 24-hour period and after the contraflow lane's installation 8.45 accidents/MVM occurred there during this time period. Traffic accident rates for the two peak periods on southbound Spring Street were significantly lower after the addition of contraflow lane than before (see Table 7.2). When the accident rate calculations include contraflow lane data (bus accident rates on the contraflow lane - northbound Spring Street), the post-test 24-hour accident rate increases only slightly from the previous 8.45/MVM to 9.82/MVM for a difference of 1.37 accidents/MVM resulting from the addition of contraflow lane bus accident rates in the data. Nevertheless, the two peak period accident rates for southbound and northbound Spring Street combined are still substantially lower after the contraflow lane's installation than before.

Main Street

On Main Street accident rates are also much lower in the post-test than in the pre-test analysis. Around-the-clock rates dropped from 14.39/MVM before the contraflow lane's installation to 12.05/MVM after the contraflow lane's installation. Morning peak period and evening peak period rates dropped from 19.04/MVM too 7.09/MVM and from 14.29/MVM to 11.13/MVM, respectively.

Overall General Traffic Accident Rate Analysis

These data seem to indicate that the contraflow lane has had no negative effect on the accident rates on Spring Street, and in fact, pre-test to post-test accident rates, on both Spring and Main Streets follow similar declining patterns further enforcing the conclusion that the contraflow lane has not produced any unusual accident creating circumstances for general traffic flow.

Accident Rate Analysis - Buses

Spring Street

Although post-test accident rates on Spring Street for all traffic combined are comparable to or lower than pre-test rates, bus accident rates on Spring Street do not follow the same pattern. During the 1971-74 pre-test analysis, 17.08 bus accidents/MBM (Million Bus Miles) occurred on Spring Street during the 24-hour time period, 21.64/MBM during the 7-9 a.m. peak period and no accidents occurred during the evening peak period. In the post-test analysis, southbound (normal traffic lanes) 24-hour and 4-6 p.m. rates rose to 23.01/MBM and 17.51/MBM, respectively. (The evening peak period rate difference may be the result of an unusual circumstance that no accidents occurred during this time in the pre-test study period. Had just one bus accident occurred during the evening peak period in the pre-test, the accident rate would have been 41.72/MBM.) However, the post-test 7-9 a.m. (peak period, peak direction) bus-accident rate on southbound lanes was only 13.71/MBM, 7.93 accidents/MBM lower than in the pre-test study.

The post-test study shows that although the actual number of accidents on the contraflow lane is lower than the three southbound lanes (or even the average of the three southbound lanes), bus accident rates on the contraflow lane are significantly higher than bus accident rates on the southbound lanes (35.65/MBM, 79.49/MBM and 57.67/MBM for contraflow lane 24-hour morning peak period, and evening peak period, respectively.) The post-test bus accident rates for both northbound and southbound Spring Street combined is 28.29/MBM, 41.57/MBM and 27.49/MBM for the 24-hour morning and evening peak periods, respectively. This calculates to a corresponding 39.6%, 47.9% and 100.0% increase in the post-test Spring Street bus accident rates over the pre-test rates.

This Spring Street accident rate appears to indicate that the contraflow lane has had an extreme negative influence on both southbound and northbound bus accident rates. However, such a conclusion cannot be substantiated for several reasons. First, a similar bus accident rate pattern is evident in the pre-test, post-test comparison on Main Street as was found in the pre- to post-test Spring Street analysis. And, more significantly 1980-81 all day and peak period/peak direction (4-6 p.m.) contraflow bus accident rates are much lower than 1980-81 Main Street bus accident rates during these periods resulting in the conclusion that the contraflow lane appears to be the safer facility for northbound buses, especially during the heavily trafficked peak period/peak direction. (See Table 7.2) The Main Street bus accident rate analysis follows.

Main Street

Before the installation of the contraflow lane, 8.38 bus accidents/MBM occurred on Main Street. The 7-9 a.m. Main Street accident rate was 19.81/MBM while no accidents occurred during the evening peak period. But after the opening of the contraflow lane, when most Main Street buses were rerouted to the contraflow lane, the Main Street bus accident rate still jumped to 64.03/MBM, 59.42/MBM and 178.25/MBM for 24-hours, 7-9 a.m. and 4-6 p.m. periods, respectively. This is an increase of 86.9%, 59.42% and 100.00% over pre-contraflow lane bus accident rates.

Overall Bus Accident Rate Analysis

Since post-test bus accident rates on southbound Spring Street are only slightly higher than pre-test rates for the 24-hour period, and post-test southbound Spring Street bus accident rates are actually lower during the most heavily trafficked peak period/peak direction analysis (7-9am), it cannot be concluded that the contraflow lane has a negative effect on southbound Spring Street bus accident rates.

Additionally, since post-test bus accident rates on Main Street are higher than pre-test rates, the higher post-test rates on north and southbound Spring Street combined also cannot be unflailingly attributed to the contraflow lane's impacts. In this case, it appears that factors other than the contraflow lane have resulted in the higher post-test rates on both Spring and Main Street. Perhaps accident reporting and recording data became more accurate over time, or perhaps the pre- and post-test study periods do not encompass large enough time frames to obtain conclusive data. But neither option can be substantiated and the conclusion remains that the contraflow lane has not caused the increase in the accident rates on Spring Street.

Most importantly, however, since 1980-81 bus accident rates on the contraflow lane during the 24-hour and the more significant peak period/peak direction analysis are substantially lower than 1980-81 Main Street rates during the corresponding time periods, it appears that the contraflow lane <u>does</u> contribute toward lowering current accident rates and provides a safer facility for bus travel. This contraflow lane-Main Street bus accident rate difference is most dramatic during the peak period/peak direction flow (contraflow = 57.67/MBM, Main Street = 178.25/MBM; see Table 7.2) and, therefore clearly demonstrates the safety advantages of a contraflow lane during times of more extreme traffic congestion.

Additional Accident Rate Analysis - Buses

1980 Comparison with Broadway and Hill Street

To further study bus accident rates on Spring and Main Streets, 1980 bus accidents and accident rates for Broadway and Hill Streets between First and Ninth Streets in downtown Los Angeles were obtained from current SCRTD accident records (January 1, 1980 through December 31, 1980) and compared with 1980 bus accidents and accident rates for

Spring and Main Street. To analyze another date source and maintain data comparability between Broadway-Hill rates and Spring-Main rates, the current Spring and Main Street accident data was taken from SCRTD records rather than LADOT records as was done in the previous sections. The SCRTD records contain every accident involving an SCRTD bus by type of accident, data, and time of day the accident occurred. All single vehicle (one bus), multiple vehicle (bus-automobile, bus-bus, etc.), and bus-pedestrian accidents were counted. All four streets' bus volumes, used to calculate accident rates, were obtained from SCRTD timetables using the methodology described in Chapter V.

The SCRTD bus accident counts are much higher than those of the LADOT because, unlike the LADOT reporting procedure, SCRTD bus drivers and road supervisors report and record every major and minor incident that occurs, whether or not it involves property damage or injury. Due to these recording differences, accident rates from the two sources are not comparable. It is interesting to note in relative terms, however, that the LADOT data reveal higher post-test bus accident rates on the contraflow lane than on southbound Spring Street while the SCRTD data indicate the opposite.

The LADOT data provided valid comparisons over time. The SCRTD data will provide a valid comparison between bus accident rates in the study area and those on nearby downtown streets outside the study area. This comparison should reveal whether Spring Street, with the contraflow lane, experiences higher accident rates than similar streets without contraflow lanes during the same time period. Broadway and Hill Street were chosen for comparison over other downtown streets due to their proximity and similar land use characteristics to the study area. Bus accident rates are displayed in Table 7.3 and Figure 7.1 by street and direction.

The 1980 SCRTD data indicate that the bus accident rates on Spring and Main Streets are lower than those on Broadway and Hill Street. In fact, the 99.82 bus accidents per million vehicle (bus) miles (MBM) on the contraflow lane is significantly lower than northbound rates on both Broadway (393.64/MBM) and Hill Street (218.78/MBM). And, even though the southbound Spring Street rate of 168.72/MBM is much higher than the contraflow lane rate, it is comparable to that on southbound Hill Street (179.65/MBM), and much lower than that on southbound Broadway (371.68/MBM). Broadway may be experiencing higher bus accident rates than the other

TABLE 7.3

BUS ACCIDENTS AND ACCIDENT RATES (MVM)
(weekday 24 hour period)
1980

Broadway and Hill Street

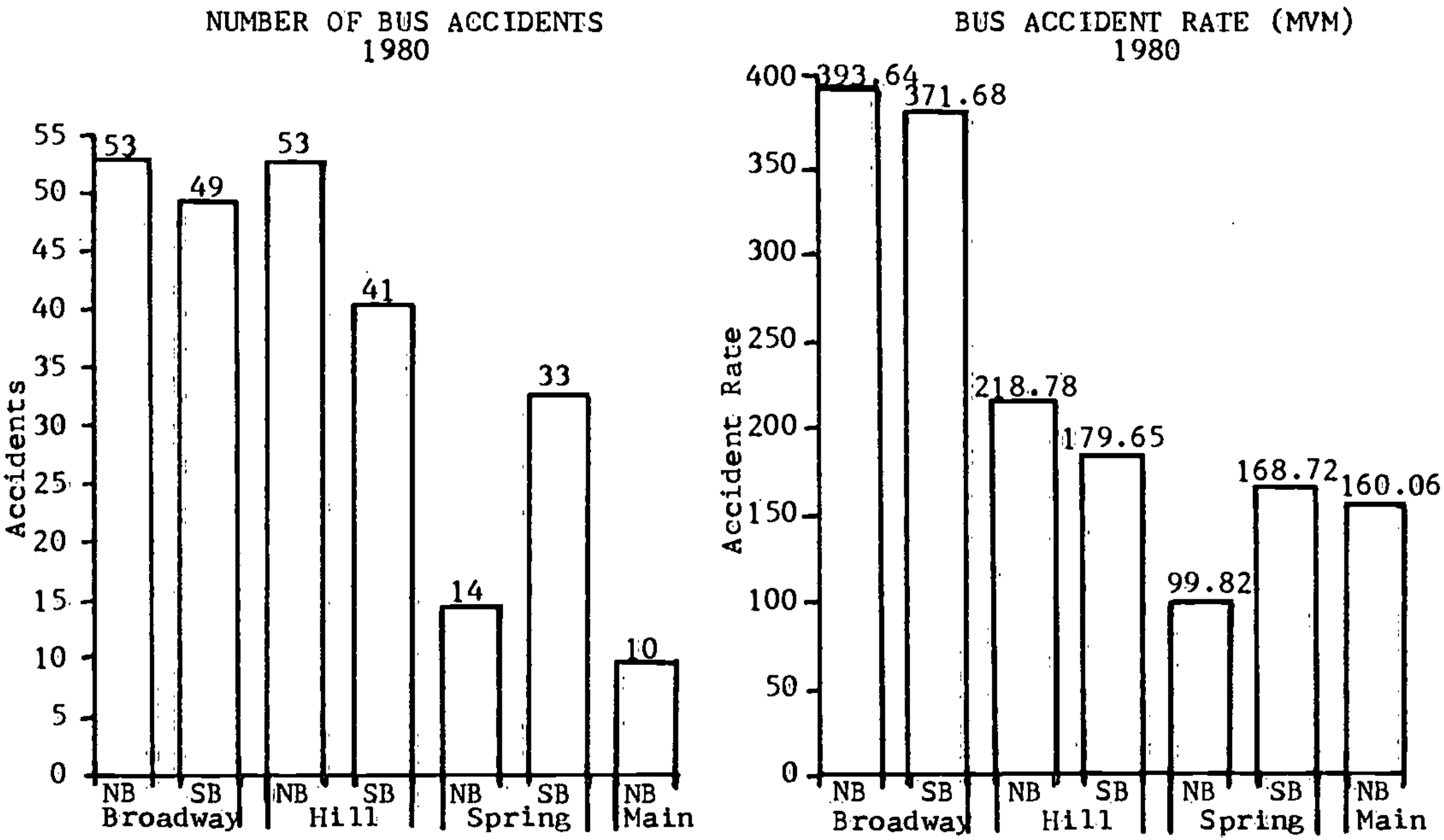
	Broadway		Hill Street	
	N/B	S/B	N/B	S/B
Annual Number of Accidents	53	49	53	41
Daily Bus Volumes	528	517	950	895
Annual Accident Rate	393.64	371.68	218.78	179.65

Spring and Main Streets

	Spring Street		Main Street	
	N/B	S/B	N/B	S/B
Annual Number of Accidents	14	33	10	--
Daily Bus Volumes	474	700	215	--
Annual Accident Rate	99.82	168.72	160.06	--

SOURCE: Southern California Rapid Transit District Safety Department, 1980 data.

FIGURE 7.1



SOURCE: Southern California Rapid Transit District
Safety Department

three streets due to its higher overall traffic volume and density of commercial activity. However, Hill Street experienced much lower bus accident rates even though bus volume along this street is almost twice that of Broadway. Main Street (northbound) also experienced lower rates than either northbound Broadway or Hill Street and this may be attributable to its one-way feature and overall traffic volume differences. Nevertheless, transforming the actual number of accidents into accident rates should somewhat control for these differences in street characteristics. And, Main Street rates are still significantly higher than contraflow lane rates. (See Figure 7.2)

Analysis

The data still strongly indicate that the contraflow lane is a safe facility for bus travel. It appears that removing buses from regular traffic flow lowers their accident rate below that of buses travelling on integrated street lanes and even below that of one-way streets. The data also indicate that the contraflow lane has had no unusual effects on the accident rate of normal southbound traffic on Spring Street.

CHAPTER VIII

Bus Passengers

The change in the number of bus passengers using Spring and Main Streets from the pre-test to post-test would be a valuable measure of the contraflow lane's effects and operating performance. Unfortunately, data do not exist for the number of bus passengers using Spring and Main Streets before the contraflow lane's installation. Therefore, a pre-test, post-test bus passenger comparison cannot be made.

Nevertheless, data are available for the number of bus passengers currently using the study area buses and these data will be displayed and discussed in this chapter. Additionally, the current ridership data will be analyzed in relationship to the number of bus passengers entering and leaving the downtown area in 1980. Furthermore, the maximum ridership potential of the contraflow lane will be estimated and compared with existing ridership.

Bus Passenger Counts Methodology

Existing bus ridership in the study area was gathered by SCRTD point checkers and obtained from the most current weekday SCRTD Profile 50 computer printouts. These printouts display the checkers' results by line and trip for both the number of passengers on board a bus at its departure from particular stop (point) and the number of passengers boarding a bus at a patricular stop. To determine ridership in the study area, the number of passengers boarding a particular bus at each stop in the study area except the first stop was added to the number of passengers on board when that bus departed from the first stop. This procedure was followed for every bus that travelled the entire study area length between First and Ninth Streets and the results were tabulated to obtain ridership figures for both peak periods and a 24-hour period. The final figure does not represent the number of passengers on board when the buses leave the study area as many patrons alight along the way. On the contrary, the ridership data intends to display the number of weekday passengers that use all or part of Spring and Main Streets between First and Ninth Streets.

Bus Ridership

The contraflow lane carriers 17,009 passengers and Main Street carriers 8,877 passengers in a weekday 24-hour period. When compared to bus volumes in Chapter V, it can be seen that 69% of the northbound Spring and Main Street buses travel on the contraflow lane and they carry 66% of the northbound passengers.

Even though 24-hour bus volumes on southbound Spring Street are equivalent to 24-hour bus volumes on northbound Spring and Main Streets combined (797 versus 795), southbound Spring Street carriers 1,933 or 7.5% more passengers a day than northbound Main and Spring Streets combined. And, southbound Spring Street carries 10,810 or 63.3% more daily passengers than the contraflow lane (see Table 8.1).

A similar but more extreme pattern exists when analyzing morning peak period study area ridership. Northbound Spring and Main Streets combined carry 3,567 passengers between 7 and 9 a.m., or 64.6% of that carried on southbound Spring Street in the morning peak period. The contraflow lane carries 63.7% of these total northbound morning peak period passengers and, southbound Spring Street carriers 3,250 or 143.1% more passengers during this period than does the contraflow lane. Nonetheless, it must be remembered that the morning peak period is the peak direction for southbound flow and thus higher southbound volumes would be expected.

TABLE 8.1

BUS PASSENGER COUNTS
1981

			Spring Street	Main Street	Total
Southbound	Number of Passengers on board at First St.	7-9am.	4238	--	4238
		4-6pm.	2199	--	2199
		24 hours	17,775	--	17,775
	# Pass. boarding between 2nd & 9th Sts.	7-9am.	1284	--	1284
		4-6pm.	1973	--	1973
		24 hours	10,044	--	10,044
	Total # of Passengers travelling 1st-9th St.	7-9am.	5522	--	5522
		4-6pm.	4172	--	4172
		24 hours	27,819	--	27,819
Northbound	Number of Passengers on board at Ninth St.	7-9am.	1218*	688	1906
		4-6pm.	2207*	1057	3264
		24 hours	8221*	3664	11,885
	# Pass. boarding b/t 8th & 1st Sts.	7-9am.	1054*	607	1661
		4-6pm.	2682*	1456	4138
		24 hours	8788*	5231	14,001
	Total # of Passengers travelling 9th-1st St	7-9am.	2272*	1295	3567
		4-6pm.	4889*	2513	7402
		24 hours	17,009*	8877	25,886

*Contraflow lane
SOURCE: SCRTD Profile 50 Line Counts

This is substantiated when evening peak period ridership is analyzed.

Four thousand eight hundred and eighty-nine (4,889) bus passengers use contraflow lane buses in the evening peak period while only 2513 passengers use Main Street buses and 4172 passengers use southbound Spring Street buses during this time. The contraflow lane's evening peak period bus passenger volumes are 94.6% higher than northbound Main Street volumes and 17.2% higher than those on southbound Spring Street. Main and Spring Streets' combined northbound ridership is 7,402 or 77.4% higher than southbound Spring Street passenger volumes during the evening peak period reflecting the northbound peak direction characteristic during this time.

As this discussion indicates, comparing just peak period/ peak direction passenger volumes in the study area may reveal the effect the contraflow lane has had on bus ridership during the most heavily travelled times of day. Although 5,522 daily passengers traverse southbound Spring Street during its peak period/peak direction flow and only 4,889 daily passengers traverse the contraflow lane during its peak period/peak direction flow, higher average load factors (percentage of seats filled) exist on contraflow lane buses. The peak period/peak direction load factor on the contraflow lane is 95.9% while that on southbound Spring Street is 77.2%. But, northbound Main Street's peak period/peak direction load factor is 114.2%. This data may lead to the hasty conclusion that the contraflow lane has little or no positive effect on peak period/peak direction load factors and/or total passenger volumes.

However, 7,402 daily peak period/peak direction passengers travelled northbound in the study area and the combined Main Street-contraflow lane load factor during this time was 103.5%. It remains speculative whether this total northbound peak period/peak direction ridership would or could have occurred in the absence of the contraflow lane, or in the event that all northbound buses travelled on the contraflow lane. Analyses for either scenario must include consideration of the small absolute bus and passenger volumes currently existing on Main Street, route differences between Main Street and contraflow lane buses outside the study area, and the degree of existing contraflow lane patrons' aversion to Main Street travel and/or Main Street patrons' aversion to contraflow lane travel.

Therefore, from the available data, the contraflow lane's effect on passenger ridership during the peak period/peak direction flow remains inconclusive.

Study Area Bus Riderhsip in Relationship to Total Downtown Bus Ridership

To aid in determining the extent of patron use of the study area buses, the following section compares the number of buses and bus passengers entering and leaving the entire downtown area during an average weekday with the number of buses and bus passengers traversing the study area during an average weekday. The total number of buses and passengers entering and leaving downtown Los Angeles was obtained from the 1980 SCRTD Cordon Counts. The number of buses and passengers in the study area was obtained from Chapter V and the present chapter of this report. The Cordon Count data was available for a 14-hour daily total only. Therefore, the previously discussed assumption that 14-hour totals represent 90% of 24-hour totals was used to obtain 24-hour totals for this discussion.

The data are not directly comparable as the Cordon Counts do not include bus passengers who board and alight in the downtown area without crossing a cordon line. Conversely, the study area does not cross a cordon boundary where passenger counts tend to be highest. These two data inequities somewhat offset each other and slightly increase the comparison's validity. In any event, the comparison can give some indication of the effects of the contraflow lane on bus ridership in downtown Los Angeles.

In 1980, 11,972 bus trips and 402,122 bus passengers entered and left the downtown area each weekday. The most recent study area data indicate that 1,592 buses and 53,705 bus passengers traversed Main and Spring Streets between First and Ninth Streets each weekday. Five hundred and fifty (550) of these study area buses and 17,009 of these study area bus passengers travelled on the contraflow lane.

The comparisons indicate that 13.3% of the downtown area buses and 13.4% of the downtown area passengers travelled in the study area each weekday. Furthermore, 4.6% of the downtown area buses and 4.2% of the downtown area passengers travelled on the contraflow lane each weekday, and 8.7% of the downtown area buses and 9.1% of the downtown area bus passengers travelled on Main Street and southbound Spring Street each weekday. (See Table 8.2)

The similarities in the bus and passenger proportions indicate that the contraflow lane does not attract a higher

TABLE 8.2

BUS AND PASSENGER COUNTS
CENTRAL BUSINESS DISTRICT AND STUDY AREA

	Number of Buses	Number of Passengers	% of total buses entering & leaving CBD	% of total passengers entering & leaving CBD
Entering and Leaving CBD	11,972	402,122	-	-
Traversing Entire Study Area	1,592	53,705	13.3	13.4
Traversing Contraflow Lane	550	17,009	4.6	4.2
Traversing Main St. & S/B Spring St.	1,042	36,696	8.7	9.1

Source: Southern California Rapid Transit District 1980 Cordon Count.
Chapter V and Chapter VIII of this study.

proportion of passengers per bus than do other downtown streets, and in fact it attracts slightly fewer passengers per bus than both other downtown areas and the remaining study area. In conclusion, it appears that the contraflow lane has no effect in attracting patrons or increasing bus service efficiency in the downtown area over a 24-hour weekday period.

Contraflow Lane Passenger Capacity Potential

Some indication of the degree of the contraflow lane's current utilization can also be estimated by estimating its passenger capacity potential. Estimates of the potential number of buses and passengers are based on cited evidence in the historical chapter of this report, additional literary documentation below, and two capacity potential studies by John Hillmer of the SCRTD.

Neil J. Rowan estimated in his report Alternatives for Improving Urban Transportation: A Managment Overview that the maximum vehicle capacity of a contraflow lane could possibly rise above 100 buses per hour (see footnote 22). UMTA's 1974 Characteristics of Urban Transportation Systems: A Handbook for Transportation Planners documented that the highest observed bus volumes for contraflow lanes with on-line bus stops was 100 buses per hour as of the report date.[108] Additionally, Wilbur Smith and Associates' "Bus Capacity Analysis" presented at the 1975 Fifty-Fourth Annual Meeting of the Transportation Research Board estimated maximum capacities on downtown single lane streets with bus stops to be 90-120 buses per hour.[109]

In 1978, John Hillmer of SCRTD conducted a bus and passenger volume study of the contraflow lane's City Hall stop (between First and Temple Streets). Since this study occurred before the contraflow lane widening north of First Street, the findings can be applied to the single lane portion of the present study area. As in Hillmer's study, each study area stop along the contraflow lane has three berths. In theory three buses can continuously and simultaneuously load and unload passengers at each stop. However, it takes time for a bus to enter, position itself in the berth and open its doors. Wilbur Smith and Associates indicates that clearing and spotting a bus in a berth requires around 15 seconds if a bus is waiting right behind the berth.[110] But maintaining a queue of buses behind the berths causes delay to those buses and is undersirable. Such a queue indicates that bus volumes have exceed the lane's capacity. But without a queue, the last two berths will be unoccupied for short intervals even during busiest periods.

Additionally, the first "berth is not utilized a significant amount of time. For example, when a bus in a trailing berth is still loading after a coach in a leading berth has departed, the leading berth will be empty."[111] Therefore, even under maximum capacity conditions, all berths cannot be used all the time. This situation has been considered when calculating the contraflow lane's capacity potential.

Under pressure conditions (queuing) at the City Hall stop, Hillmer observed 121 buses using the first three berths and seven additional buses loading and unloading passengers in unauthorized fourth and fifth berths during the peak hour. He deemed this situation as undesirable as the capacity overload beyond the third berth caused significant delays for queued buses. During the peak two hours, Hillmer observed 101 buses per hour using the first three berths of the stop. During this period only 5 buses per hour were forced to use berths 4 and 5. (See Table 8.3). This observation appears nearer to a volume capacity that could

TABLE 8.3

BERTH UTILIZATION
SPRING STREET CONTRA-FLOW LANE
CITY HALL STOP
THURSDAY, JUNE 22, 1978

	BERTHS				
	1	2	3	4 & 5	Total
	No. - Pct.	No. - Pct.	No. - Pct.	No. - Pct.	No.
	TWO HOUR TOTALS (330 - 530)				
Buses	116 - 54.7	60 - 28.3	26 - 12.3	10 - 4.7	212
Boardings	508 - 56.8	257 - 28.7	101 - 11.3	29 - 3.2	895
Total Passengers (* B & A)	563 - 48.6	345 - 29.8	177 - 15.3	73 - 6.3	1,158
	PEAK HOUR (415 - 515)				
Buses	61 - 47.7	40 - 31.3	20 - 15.6	7 - 5.4	128
Boardings	315 - 53.9	170 - 29.1	82 - 14.1	17 - 2.9	584
Total Passengers (* B & A)	347 - 45.7	219 - 28.8	138 - 18.2	56 - 7.3	760
	PEAK 20 MINUTES (455 - 515)				
Buses	23 - 47.9	15 - 31.3	7 - 14.6	3 - 6.2	48
Boardings	111 - 52.6	67 - 31.8	28 - 13.3	5 - 2.3	211
Total Passengers (* B & A)	113 - 42.2	74 - 27.6	56 - 20.9	25 - 9.3	268
	PEAK 15 MINUTES (415 - 430)				
Buses	18 - 50.0	11 - 30.6	4 - 11.1	3 - 8.3	36
Boardings	89 - 53.9	42 - 25.5	28 - 17.0	6 - 3.6	165
Total Passengers (* B & A)	101 - 50.5	45 - 22.5	46 - 23.0	8 - 4.0	200
	PEAK 5 MINUTES (415 - 420)				
Buses	6 - 40.0	5 - 33.3	2 - 13.3	2 - 13.3	15
Boardings	35 - 46.1	22 - 28.9	17 - 22.4	2 - 2.6	76
Total Passengers (* B & A)	35 - 37.2	22 - 23.4	35 - 37.2	2 - 2.1	94

* B & A - Boardings & Alightings

SOURCE: "Contra-flow Lane-City Hall Stop Analysis", SCRTD memo from John Hillmer to Ben Urban.

be sustained over long periods but still indicates a slight overload. Therefore, Hillmer's data indicates that about 90 buses per hour appears to be a reasonable estimate of the capacity potential of a single lane, three-berth contraflow lane stop. In fact, in another study by Hillmer on the maximum per hour passenger capacity of the El Monte Station, he calculated 80 buses per hour to be the optimum peak period capacity in the first three of ten berths.[112] (See Table 8.4) Although the situation is different at the El Monte Station, the capacity potential of its on-line station should be somewhat comparable to on-line stops along the contraflow lane.

Thus, from the evidence cited above, the capacity potential of one stop along the Spring Street Contraflow Bus Lane appears to be about 90 buses per hour. The average SCRTD bus has 43 seats and can carry 0.4 standees per seat for a maximum passenger capacity of 60 passengers per bus. Ninety buses per hour times 60 passengers per bus results in a passenger capacity potential for the contraflow lane of 5,400 passengers per hour. Assuming no passenger turnover and that demand for this capacity exists for two peak hours a day, the contraflow lane could, in theory, carry 10,800 passengers during its 4-6 pm peak period/peak direction

TABLE 8.4

El Monte Station Optimum Capacity

A.M. - Inbound to Los Angeles

Standard Buses

Berth No.	Travel Time	Dwell Time	Total Time	Buses Per Hr.	Adj. Buses Per Hr.	Passengers Per Hour Enter	Alight	Check	Board	Leave
9	11.0	112.2	123.2	29.2	20.4	665	124	541	479	1,020
10	15.5	112.2	127.7	28.2	19.7	642	120	522	463	985
1	19.5	112.2	131.7	27.3	19.1	623	117	506	449	955
2	23.5	112.2	135.7	26.5	18.6	606	113	493	437	930
3	27.0	112.2	139.2	25.9	18.1	590	110	480	425	905
4	30.0	112.2	142.2	25.3	17.7	577	108	469	416	885
5	32.5	112.2	144.7	24.9	17.4	567	106	461	409	870
6	35.0	112.2	147.2	24.5	17.2	561	105	456	404	860
7	37.5	112.2	149.7	24.0	16.8	548	102	446	394	840
8	40.0	112.2	152.2	23.7	16.6	541	101	440	390	830
Total Passengers Per Hour					181.6	5,920	1,106	4,814	4,266	9,080
Total Less Berths 9 & 10					141.5	4,613	862	3,751	3,324	7,075
Total Less Berths 1,2,3,9 & 10					85.7	2,794	522	2,272	2,013	4,285

P.M. - Outbound from Los Angeles

Standard Buses

Berth No.	Travel Time	Dwell Time	Total Time	Buses Per Hr.	Adj. Buses Per Hr.	Passengers Per Hour Enter	Alight	Check	Board	Leave
9	11.0	112.0	123.0	29.3	20.5	1,025	541	484	217	701
10	15.5	112.0	127.5	28.2	19.7	985	520	465	209	674
1	19.5	112.0	131.5	27.4	19.2	960	507	453	204	657
2	23.5	112.0	135.5	26.6	18.6	930	491	439	197	636
3	27.0	112.0	139.0	25.9	18.1	905	478	427	192	619
4	30.0	112.0	142.0	25.4	17.8	890	470	420	189	609
5	32.5	112.0	144.5	24.9	17.4	870	459	411	184	595
6	35.0	112.0	147.0	24.5	17.2	860	454	406	182	588
7	37.5	112.0	149.5	24.1	16.9	845	446	399	179	578
8	40.0	112.0	152.0	23.7	16.6	830	438	392	176	568
Total Passengers Per Hour					182.0	9,100	4,804	4,296	1,929	6,225
Total Less Berths 4 & 5					146.8	7,340	3,875	3,465	1,556	5,021
Total Less Berths 1,2,3,4&5					90.9	4,545	2,399	2,146	963	3,109

SOURCE: Maximum Per Hour Passenger Capacity of El Monte Station by J. Hillmer, SCRTD.

flow. In reality, the current contraflow passenger volumes are less than half this potential. It must be remembered, however, that although these figures represent the potential of the contraflow lane, most literature and the Institute of Traffic Engineers agree that 60 transit vehicles and 2,400 passengers per peak hour can warrant a contraflow lane.[113] The Spring Street Contraflow Bus Lane currently meets these guidelines. It carries 62 buses and approximately 2,900 passengers during its peak hour.

CHAPTER IX

Automobile Occupant Volumes

Automobile occupant volumes for both the pre- and post-test analyses were obtained by multiplying the traffic volumes (obtained from Chapter VI) by average automobile occupancy. The average automobile occupancies were obtained from the Los Angeles Department of Transportation's Downtown Cordon Counts and were available by year and time of day. The Downtown Cordon Counts provide a more detailed account of automobile occupancies in the downtown area than would regional automobile occupancy rates. Although the time periods used for the Cordon Count average automobile occupancies don't correspond exactly to the study's peak periods, these occupancy rates do portray peak period and all day data and therefore result in accurate automobile occupant volumes by time of day. 1978 Cordon Count data were used for the post-test analysis as 1980 data are as yet unavailable.

Pre-Test Methodology

In the pre-test, weighted average traffic volume on Spring Street was 3,405 vehicles during the morning peak period and 2,611 during the evening peak period. All day traffic volume on Spring Street was 21,189. When these volumes are multiplied by the corresponding time period's average automobile occupancy for 1974 (1.31, 1.38 and 1.37, respectively), the average number of automobile occupants that used Spring Street during the pre-test period was 4,461 during the morning peak period, 3,603 during the evening peak period, and 29,030 for a 24-hour weekday period. (See Table 9.1)

When the same procedure is followed for Main Street, the average number of automobile occupants using Main Street in the pre-test period was 2,564 during the morning peak period, 5,301 during the evening peak period and 23,720 for a 24-hour weekday period.

Post-Test Methodology

After the contraflow lane's installation, the average weighted traffic volume on Spring Street was 2,455 in the

TABLE 9.1

AUTOMOBILE OCCUPANT VOLUMES

		Weighted Average Auto Volumes[1]		Average Automobile Occupancy[2]		Total Auto Occupant Volumes[3]		% of Post-test Auto Occupant Volumes of Pre-test Auto Occupant Volumes
		Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	
Spring Street	7-9am.	3405	2456	1.31	1.31	4461	3215	72.1
	4-6pm.	2611	2284	1.38	1.39	3603	3174	88.1
	24 hrs.	21189	13225	1.37	1.40	29030	18514	63.8
Main Street	7-9am.	1957	1660	1.31	1.31	2564	2175	84.9
	4-6pm.	3841	3348	1.38	1.39	5301	4654	87.8
	24 hrs.	17314	15780	1.37	1.40	23720	22092	93.1

1. Source: Traffic Volume Chapter of this Report.
2. Source: LADOT Downtown Cordon Count 1978, p. 38.
   Time periods used from Cordon Counts:
   6am-10am for morning peak period
   2pm-6pm for evening peak period
   6am-10pm for 24 hour period
3. Weighted Average Automobile Volumes times Average Automobile Occupancy.

morning period, 2,284 in the evening peak period and 13,225 for the 24-hour period. These volumes multiplied by the 1978 automobile occupancy rates of 1.31, 1.39 and 1.40 for each respective period yields automobile occupancy volumes in the post-test period on Spring Street of 3,215, 3,174 and 18,514, respectively.

Post-test Main Street automobile occupancy volumes are 2,175 during the morning peak period, 4,654 during the evening peak period, and 22,092 during a 24-hour weekday period. (See Table 9.1)

Analysis

Although average automobile occupancies entering and leaving the downtown area rose slightly from the pre- to the post-test, the total number of automobile occupants using Spring and Main Streets declined. This decline can be attributed to the decline in traffic volumes discussed in Chapter VI and many of the conclusions drawn here are directly related to those drawn in that chapter. The obvious conclusion is that to the extent the contraflow lane negatively affects traffic volumes in the study area so does it negatively affect automobile occupant volumes.

CHAPTER X

Impacts on Users: Qualitative Analysis

Within a year after the contraflow lane's opening, W. Smith and Associates conducted surveys of Spring Street motorists, bus drivers, bus passengers and business people to obtain their attitudes towards and perceptions of the lane and its operation. Although these surveys are dated, they provde substantial qualitative evidence of the degree of the contraflow lane's acceptance by these various interest groups. Nevertheless, the results should only be cited generally because these surveys were conducted prior to the contraflow lane's widening north of First Street. The widening eliminated the most severe trouble-spot and it is reasonable to believe results of similar surveys taken today would reflect the improvement. Additionally, familiarity with the operation over time may also lead to a different (most likely, more positive) survey outcome.

Despite the tendency to believe surveys conducted today would yield more positive responses, the surveys conducted within a year after the contraflow lane's implementation procured siginificant positive responses. The following survey summaries are abstracted from Wilbur Smith and Associates 1975 <u>Evaluation of the Spring Street Contraflow Lane</u> and complete survey results can be found in Appendix IX.

The roadside survey of motorists driving on Spring Street indicated the following:

- Over 76 percent of the drivers have <u>not</u> noticed increased congestion or encountered additional delays;
- Only 17 percent of the drivers have experienced difficulties upon entering or exiting off-street parking facilities;
- Over 78 percent of the drivers indicated that the contraflow has <u>not</u> produced any undesirable operating conditions on Spring Street;
- Over 79 percent of the drivers indicated that the traffic signing of the contraflow lane is adequate; and
- Over 81 percent of the drivers provided favorable or neutral general comments regarding the contraflow lane.

Automobile drivers indicate little or no problems with contraflow lane operation and indicate little difficulty with left and right turns, as well as turns entering and exiting parking lots that involve crossing the contraflow lane.

From these results it can be concluded that system performance of the contraflow lane was perceived by Spring Street motorists as being adequate.

The bus driver survey of contraflow lane bus drivers indicated the following:

- o Over 72 percent of the drivers have found operating conditions of the contraflow lane to be adequate;
- o Over 62 percent of the drivers have <u>not</u> noticed any confusion on the part of motorists driving in the opposite direction;
- o Over 67 percent of the drivers have received favorable comments from passengers regarding the contraflow lane;
- o Over 84 percent of the drivers have found the physical form of the contraflow lane to be adequate.

Bus passenger survey results indicated the following:

- Over 87 percent of the passengers felt that bus travel times are faster or the same as before with contraflow operation;
- Over 78 percent of the passengers indicated that schedule adherence was better or the same as before with contraflow operation;
- Over 71 percent of the passengers indicated that the bus stop locations on Spring Street are more convenient as compared to former bus stops on Main Street;
- Approximately 91 percent of the passengers felt that the traffic signing of the contraflow lane is adequate;
- Only 10 percent of the passengers had unfavorable general comments regarding the contraflow lane.

The survey regarding the Spring Street business-people's attitudes toward the contraflow lane generally showed strong positive reaction from businessmen on the west side of Spring Street. Reactions from businessmen on the east (contraflow lane) side, however, indicated a somewhat evenly split reaction.

These survey results are summarized in the following:

- On the west side of Spring Street over 87 percent of the businessmen expressed positive acceptance by their customers regarding the contraflow lane. On the east side, 45 percent or 19 businessmen indicated customer displeasure regarding the contraflow lane. Of this 45 percent, 10 of the businessmen thought that this negative customer reaction was of major concern.
- On the west side of Spring Street, 95 percent or 38 businessmen indicated that commercial loading has not been impeded by contraflow operation. On the east side, over 48 percent or 20 businessmen felt that the lane's operation has impeded commercial loading. However, only 13, or 31 percent, indicated that this was a major problem.
- On the west side of Spring street only 3 businessmen or 7 percent indicated that the contraflow lane has been disadvantageous to their business. On the east

side, 13 businessmen or less than 32 percent, indicated that it was disadvantageous.

- On the east side of Spring Street approximately 23 businessmen, or 56 percent, indicated that access to off-street parking has been encumbered by the contraflow lane. However, 13 or less than 32 percent, felt that it was a major problem.
- When asked to provide general comments regarding the contraflow lane 90 percent of the businessmen on the west side presented favorable or neutral comments. On the east side over 56 percent indicated favorability or neutrality. Of the 44 percent opposed to the contraflow lane, only 10 businessmen, or 24 percent were strongly opposed.

The analysis of general comments reveals the major complaint of business people to be the removal of curb loading. As previously stated, 20 of the east side business people, or 48 percent thought that this was a problem. Of these 20 business people, 17 do not have access to off-street commercial loading areas. A stratification of business type and complaint indicates the problem to be similarly pervasive for each business type with the exception being off-street parking facilities.

The second largest complaint of business people on the east side was that access to off-street parking has been encumbered by the contraflow lane. However, analysis of business type versus complaint reveals that over 66 percent of those complaining about the problem are off-street parking operators.

Another significant complaint on the east side is the bus stop locations. Approximately 18 percent of the business-people (7) on the east side felt that the people waiting for buses caused a dirt, noise, and trash problem in front of their stores.[114]

A much more recent survey prepared by the SCRTD Market Research Department in January 1982 can add insight into bus user attitudes towards the contraflow lane. The Market Research Department surveyed various ethnic groups about a wide range of aspects relating to transit service awareness and ridership. The survey report, titled "Ethnic Groups 1981 Service Awareness and Transit Ridership Study" states that the majority of Caucasians, Blacks and Hispanics strongly or very strongly agree that "special traffic lanes for buses on the freeways and downtown surface streets are a good idea and there should be more of them".[115] The survey analysts found that Hispanics are most likely to agree (72%) with this statement, followed by Blacks (61%) and Caucasians (57%). Refer to Appendix X for the survey methodology and response breakdown for this issue.

In general conclusions drawn from these surveys are that:

> "Transit riders, automobile drivers, and transit operators are all significantly in favor of the contraflow operation and have experienced little or no problems as a result of this operation. Transit riders are extremely pleased with the special identity of the lane and universally appear enthused about its continuance. The transit operators indicate no problems with maneuverability or operation and are generally in favor of the lane.[116]

Only the business community on the east side (contraflow) of Spring Street seemed to be waning in their support of the contraflow lane and even then the majority reacted favorably or remained neutral.

But most significantly, "both transit operators and transit riders tend(ed) to indicate that the contraflow lane (was) significantly faster than their previous operation on Main Street".[117] Their perceptions, however, were not backed by the statistical evaluations at the time. During the morning peak period, pre-contraflow Main Street bus speeds were 13.0 mph while contraflow bus speeds at the time of the surveys (1975) were only 10.5 mph (LADOT data). During the evening peak period the bus speeds were 9.6 and 8.8 mph, respectively.[118] Chapter VII indicates that similar pre- and post-test bus speed comparisons have been found in the current evaluation. If we assume bus operator and passenger perceptions have not changed, or have become more positive due to the contraflow lane's widening north of First Street since the 1975 survey, it seems reasonable to conclude that the contraflow lane's failure to increase bus speeds over pre-contraflow lane routes has not detered or negatively affected bus ridership. As Wilbur Smith and Associates state, "The feeling of faster operation comes from the increased speed of the bus when in operation and the lack of traffic induced delays in the contraflow lane."[119]

And, this feeling may even be a positive contraflow lane feature and act to attract bus patrons, increase ridership and produce a positive contraflow lane image.

The surveys also indicate that passengers also perceive better bus schedule adherence on the contraflow lane than on previous routes. No data exists to document whether or not this perception is accurate. However, as with bus speeds, perceived benefits seem to be just as important as real benefits.[120]

The attitudes and perceptions of the various interest groups indicate that the contraflow lane has fulfilled one of the objectives set for it by both SCRTD and the Federal government in that it has obviously created greater public awareness of transit and provided a positive transit identity in the Los Angeles area. Furthermore, the bus user survey indicates, as SCRTD expected, that patrons do prefer (71%) to wait at bus stops on Spring Street rather than in the skid row area on Main Street.[121] Patrons may also find the northbound Spring Street routes less confusing because they eliminate the need for the same bus line to travel on two different streets. Both of these factors add to the contraflow lane's desirability and qualitative benefits.

The study area contraflow lane does have limitations that have not been quantified in this study. The most obvious is the lack of a by-pass lane. The single lane characteristic of the study area contraflow lane prohibits buses from passing one another and contributes to significannt delays for subsequent buses and passengers when accidents occur or buses stall on the contraflow lane. Although the percentage of time accidents and stalled buses block the lane is unknown, personal observation indicates that it is insignificant.

As has been discussed, lack of passing opportunities became a problem north of First Street where large bus volumes occurred. Modification of the lane to allow passing eliminated the problem there. Furthermore, Chapter X indicates that the capacity potential for the single lane study area contraflow lane is as much as 90 buses per hour and 5,400 passengers per hour. Current operations on the contraflow lane would have to increase by almost 50% before lack of passing opportunities became a significant disbenefit. Meanwhile, adequate scheduling, and schedule adherence (which the contraflow lane promotes) can avoid passing problems altogether.

CONCLUSION AND RECOMMENDATIONS

It appears that the contraflow lane's installation has had little overall effect on quantitative travel patterns and characteristics in the study area. Northbound study area bus volumes did increase from the pre- to post-test, but contraflow lane bus volumes have not exceeded pre-test Main Street bus volumes. And, although contraflow bus speeds are slower than pre-test Main Street bus speeds, post-test Main Street bus speeds declined and compare with the current contraflow lane speeds. It is noteworthy that contraflow lane buses run against the signal progression which slows their speeds. Had they travelled with the signal progression as did Main Street buses, the analysis may have revealed faster bus speeds on the contraflow lane than on Main Street.

Traffic volumes declined but this is attributable more to the gradual shift of the downtown activity center away from the study area than to the contraflow lane's effects. Generally, traffic speeds have remained constant.

Data on the contraflow lane's effect on bus ridership in the study area is incomplete and, therefore, inconclusive. But, the data that are available indicate that the ratio of bus ridership to service in the study area is similar to that in other downtown areas.

Only study area traffic and bus accident rates appear affected by the contraflow lane. Twenty-four hour traffic accident rates on southbound Spring Street (with and without buses included) changed very little after the contraflow lane's installation, but Main Street rates declined as a result of the removal of many buses from that street. All day bus accident rates did rise on southbound Spring Street, but they fell during the most heavily travelled times of day (7-9am) there, indicating that the contraflow lane really has no negative effect on southbound Spring Street bus accident rates. But most significantly, although contraflow lane bus accident rates are higher than pre-test Main Street rates, they are substantially lower than post-test Main Street rates. Furthermore, contraflow lane bus accident rates are also significantly lower than those on other downtown streets. Therefore, the contraflow lane <u>does</u> contribute to lowering accident rates for both regular traffic in areas where buses have been removed for contraflow lane service <u>and</u> for buses by providing a safer facility for bus travel.

Although the Spring Street Contraflow Bus Lane provides only minimal quantitative benefits, it does meet many of the warrants for contraflow lanes previously stated and discussed in Chapter II and restated below:

1) Traffic congestion prior to the contraflow lane's installation should be severe enough to hinder normal traffic flow
2) The contraflow lane should carry at least as many passengers as the adjacent lane (or the average of all remaining lanes)
3) Bus ridership should increase after the contraflow lane's installation
4) The contraflow lane should carry about 60 buses per peak hour, and,
5) The street containing the contraflow lane should have at least two remaining lanes.

The second warrant expected a contraflow lane to carry at least as many passengers as the adjacent lane or the average of all remaining lanes. Spring Street contraflow lane buses carry 17,009 passengers a day (from Table 8.1) while the buses and automobiles travelling on remaining southbound Spring Street lanes carry an average of only 11,583 people per lane (calculated from Table 8.1 and 9.1). The fourth warrant required that at least 60 buses per peak hour travel on a contraflow lane. Sixty-two buses travel on the Spring Street Contraflow Bus Lane between 4 and 5 pm. The fifth warrant required that there be at least two remaining lanes on a street containing a contraflow lane. Spring Street has four remaining lanes. Only the fulfillment of the first and third warrants requiring increases in bus ridership after a contraflow lane's installation and traffic congestion severe enough to hinder normal traffic flow remains unknown or unmet.

The Spring Street Contraflow Bus Lane's attainment of the above warrants is further emphasized and reinforced when just its peak hour traffic characteristics are examined. Since contraflow lanes are predominantly implemented to expand peak hour and peak period capacity, a contraflow lane's major benefits should be most apparent during these times. And, not only do enough buses (62) travel on the Spring Street Contraflow Bus Lane during the peak hour to warrant its existence, but these contraflow lane buses carry about 3000 passengers during the peak hour while buses and automobiles travelling on the remaining southbound Spring Street lanes during the northbound peak hour carry an average of only 1100 passengers per lane.* If the peak-hour contraflow lane bus passenger figure was compared to passenger volumes during southbound Spring Street's peak-hour, southbound Spring Street still carries only about 1300 passengers per lane. Therefore, the Spring Street Contraflow Bus Lane does provide substantially higher peak-hour benefits for several traffic characteristics needed to justify its operation.

In addition to meeting most of the warrants, the Spring Street Contraflow Bus Lane provides substantial qualitative benefits. Many bus patrons perceive contraflow lane buses as faster and more reliable than previous Main Street buses. The vast majority also prefer bus stop locations on Spring Street rather than Main Street. And, a majority of all ethnic groups feel that exclusive bus lanes are a good idea. These factors help produce a positive transit image among bus patrons which is then passed on to other city residents.

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* This peak hour bus passenger figure is 60% of the two hour peak period passenger volumes (see Table 8.1). Sixty percent was used because it is the proportion of peak period contraflow lane buses travelling there during the peak-hour. The peak-hour traffic passenger figure assumes the same 60% peak-hour to peak-period proportion (calculated from Tables 8.1 and 9.1).

The visual distinction of the contraflow lane also produces positive effects. The contraflow lane creates a transit identity for an area and city generally thought to lack adequate mass transportation. This exposure benefits both SCRTD and the City of Los Angeles in that it may lead to both greater individual awareness of bus service (and subsequent increases in ridership) and future governmental attention devoted to transit in the region.

Because the Spring Street Contraflow Bus Lane meets most of the warrants for contraflow lanes, produces significant qualitative benefits, and increases safety for both general traffic and buses while at the same time not creating any substantial disbenefits, its operation should continue uninterrupted. The benefits of the Spring Street Contraflow Bus Lane definitely outweigh any inability to achieve every goal. Even the apparently unmet public goal that the contraflow lane act as an express feeder to the San Bernardino Freeway Express Busway is overshadowed by these benefits and the fact that many commuters do use local contraflow lane buses to make transfer connections with Busway and West Los Angeles express buses. Perhaps public officials should reevaluate this goal requiring the contraflow lane to be an express feeder to the Busway.

Nevertheless, disappointments in, and unfulfilled expectations of the effects of the Spring Street Contraflow Bus Lane are inevitable. It was not a complete demonstration project, nor was it placed in the most strategic location to achieve the potential quantitative benefits. However, it did produce benefits and, thus, should encourage future experimentation with the contraflow lane concept in the Los Angeles area.

These future contraflow lanes should be located in heavily congested areas-much more congested than the Spring Street Contraflow Bus Lane Study area. Additionally, a pair of contraflow lanes should be implemented simultaneously. This allows removal of <u>all</u> buses from regular traffic lanes which may have a substantial positive effect on traffic characteristics, and also provides service for commuters during both morning and evening peak periods. The combination of a congested location and a contraflow lane pair may provide significant benefits for commuters not realized by a partial project. Furthermore, signal timing and progression should favor (and especially not hinder) the contraflow lane buses.

Only a comprehensive project that incorporates all these features will have the characteristics to achieve the full potential benefits of such a project. When this occurs in downtown Los Angeles, Angelinos may finally have an express feeder to the Busway. And, they will definitely have an extremely cost-effective and efficient rapid transit system.

Recommendations for Future Research

This study analyzes a vast amount of data pertinent to the Spring Street Contraflow Bus Lane's operational characteristics, and a valuable, in-depth assessment of the Contraflow Lane's performance has resulted. Nevertheless, further research of pehnomena affecting the characteristics and performance of the contraflow lane and study area would enhance the study's validity by reducing many of the remaining voids and uncertainties in the current evaluation.

The first recommendation for future research is that a detailed analysis of the westward movement of the downtown hub be performed. It has already been speculated in this report that decreases in study area traffic volume, inability of the contraflow lane to attract ridership growth, and failure of the lane to serve as an express feeder to the Busway, are all, to some extent, attributable to the shift of the CBD focus away from the study area. A detailed quantitative measurement of this shift can determine the degree to which it affects the performance characteristics of the contraflow lane and study area. Once the effects of this shift have been identified and measured, a more accurate account can be made of the contraflow lane's effects on the features evaluated in this study.

Future research should also include a comparison of the operating costs of contraflow lane buses with those of regular downtown and systemwide buses. Such a study can provide a valid indication of the efficiency of the contraflow lane from an operator's and/or funding source's vantage. This data, when combined with other performance measures, may better enable decisionmakers to evaluate costs and benefits among various alternative transit projects.

Along the same line, data revealing the costs of traffic enforcement on the contraflow lane should also be compiled. As indicated in the historical analysis of this study, some disagreement over the traffic enforcement costs the Spring Street Contraflow Bus Lane would create occurred between the Los Angeles City Council and Police Department prior to the lane's implementation. A measure of these costs may solve this and any future enforcement cost disputes. And, as with operating costs, data on actual traffic enforcement related costs would again enhance the lane's cost-benefit analysis.

Three additional recommended areas for future research would expand and improve the performance characteristics already measured in this study. First, a quantitative analysis of bus schedule adherence on the contraflow lane compared to that in other areas of the city would provide new and valuable data on the contraflow lane's performance. Second, an actual log of the amount of time accidents and stalled buses block the contraflow lane would measure the extent to which these occurrances affect performance and may or may not be a problem. And third, research and perhaps computer simulation of the traffic capacity potential in the study area would help indicate the degree to which the contraflow lane affects traffic volumes and patterns there.

Lastly, since qualitative indicators have proven important in evaluating the Spring Street Contraflow Bus Lane, the final recommendation for future research is that an updated attitude survey be conducted. As with the earlier attitude survey, patrons, motorists, bus drivers, and business-people in the study area should all be surveyed. Major changes in the composition of each group may have occurred since the initial survey and/or their attitudes toward and perceptions of the contraflow lane may be quite different after six years of contraflow lane operation. A special effort should be made to survey business-people on Main Street who were not previously surveyed, because their businesses may have been affected by pedestrian declines that could have occurred on that street due to the rerouting of many buses to the contraflow lane. However, because so much time has passed since the contraflow lane's installation, these business- people may not remember or be aware of any effects on pedestrian traffic. Nevertheless, an updated attitude survey of all groups in the study area would prove an important resource in evaluating the contraflow lane's "value" among various populations.

APPENDIX I

Source: Bus Use of Highways: State of the Art, Report 143, 1973.

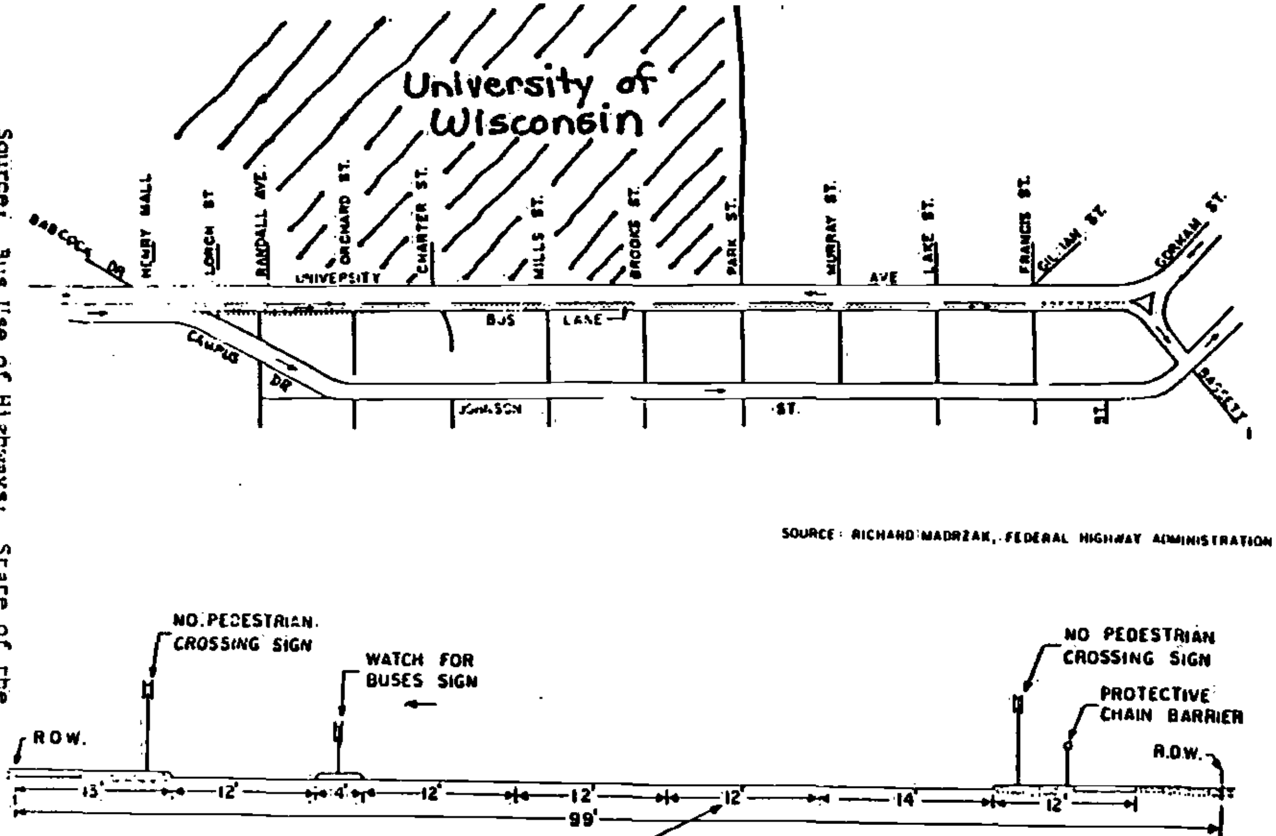


Figure C-39. Contra-flow limited-use lane Madison, Wis.

APPENDIX II

Table 2

EXISTING AND PROPOSED CONTRA-FLOW
CURB BUS LANES - UNITED STATES

CITY AND LOCATION	DATE STARTED OR STATUS	LENGTH (MILES)	HOURS OF OPERATION(1)	PAVEMENT MARKINGS	PEAK-HOUR BUS VOLUMES (AND PASSENGER VOLUMES	REPORTED BENEFITS	REMARKS
Chicago, Ill. N. Sheridan Rd.	1939	1.25 miles	7-9:30 A.M.	Orange and White lane lines	32 (1,100)		Local traffic allowed with buses
Harrisburg, Pa. Market St. 2nd-5th Sts.	1956	0.3 miles	24 hours	Cones-White/yellow lines	15		
Chicago, Ill. Canal St. N.W. Station Randolph-Washington	1964	0.7 miles	24 hours	Mountable jigger-bar median	80	Pedestrian vehicular conflicts reduced	7 bus routes serve 12,000 passengers per day
Indianapolis, Ind.	1965	2.75 miles	24 hours		10		
Madison Wisc. University Ave.	1966	2.0 miles	24 hours		15		Limited-Use Lane 7 Stops: 4 Farside, 3 Nearside

Source: Downtown Distribution Plan: San Bernardino Freeway Express Busway, Wilbur Smith and Associates, March, 1973.

EXISTING AND PROPOSED CONTRA-FLOW
CURB BUS LANES - UNITED STATES
(cont'd)

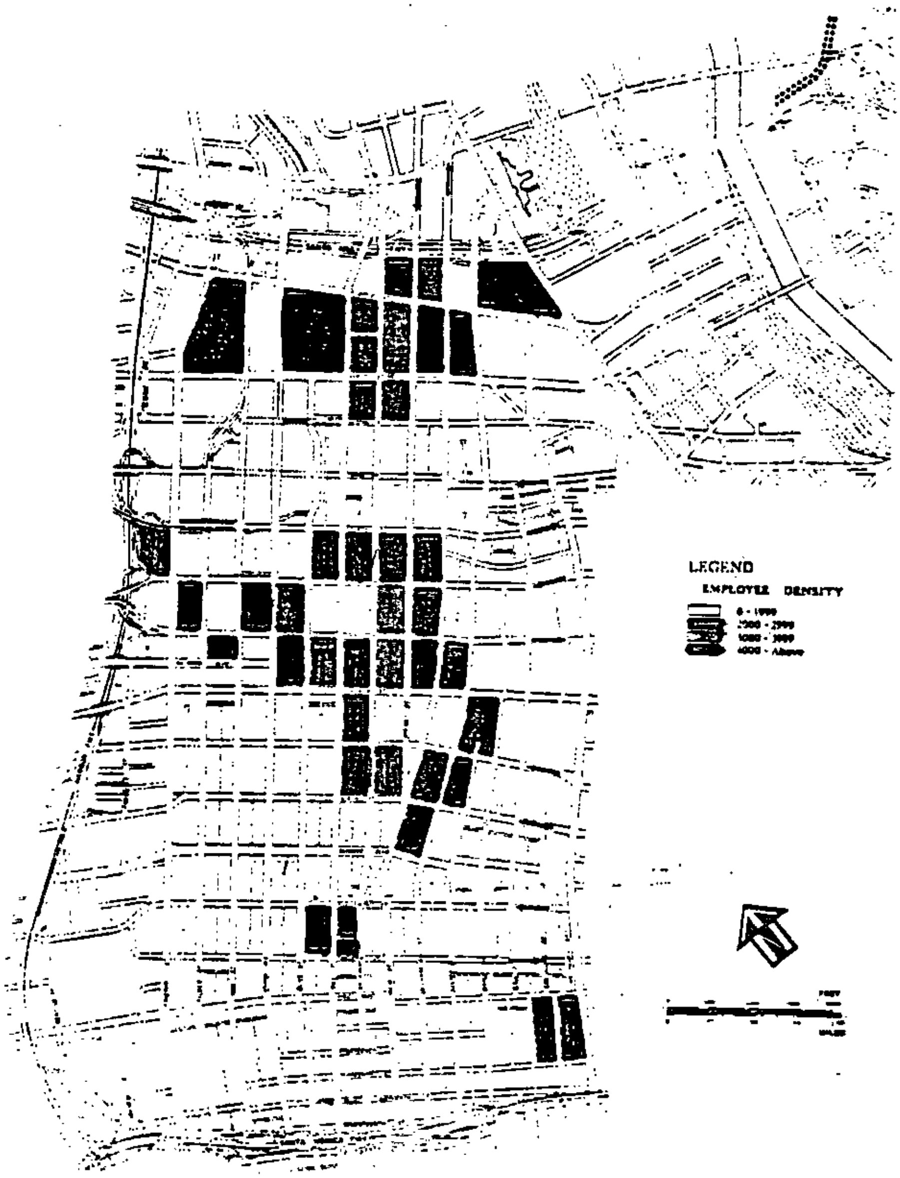
CITY AND LOCATION	DATE STARTED OR STATUS	LENGTH (MILES)	HOURS OF OPERATION[1]	PAVEMENT MARKINGS	PEAK-HOUR BUS VOLUMES (AND PASSENGER VOLUMES	REPORTED BENEFITS	REMARKS
San Antonio, Tex. Alamo Plaza Houston-Commerce	1968	0.23 miles	24 hours	Paint only	30 (1,600)		
Chicago, Ill. Canal St.-Union Sta. Adams-Jackson	1969	0.7 miles	24 hours	Median and fence	55		
Cleveland, Ohio Public Square Downtown	Existing	0.20 miles	24 hours	Paint			Curb and adjacent lane used for buses.
Seattle, Wash. 5th St. Terrace-Cherry-Columbia Ramp	1970	0.7 miles	24 hours	Paint	47[2]		Part of Blue Streak operations. Outbound buses use lane to reach I-5 Fwy.
Louisville, Ky. 3rd St. between Breckenridge and Avery	1971	1.50 miles	7-9 A.M.		12[2]	25% reduction in travel time	$4,600 cost 3 express bus lines

EXISTING AND PROPOSED CONTRA-FLOW CURB BUS LANES - UNITED STATES (cont'd)

CITY AND LOCATION	DATE STARTED OR STATUS	LENGTH (MILES)	HOURS OF OPERATION (1)	PAVEMENT MARKINGS	PEAK-HOUR BUS VOLUMES (AND PASSENGER VOLUMES	REPORTED BENEFITS	REMARKS
Louisville, Ky. 2nd St. between Kentucky and Avery	1971	1.25 miles	4-6 P.M.		12 (2)	25% reduction in travel time	$4,600 cost 3 express bus lines
San Juan P.R. Avenida Munoz Rivara (Old San Juan)	1971	1.4 miles	24 hours	Paint		Bus speeds increased from 8.5 to 12.5 MPH.	18-24 bus routes Approx. 10 bus lanes plus 3-4 other lanes
San Juan P.R. Avenida Munoz Rivera (Old San Juan)	1971	5.9 miles	24 hours	Paint	49		Est. costs of improvements-$100,000
San Juan P.R. Avenida Fernandez Juncos (Santurce)	1971	3.0 miles	24 hours	Paint	67		

(1) Hours of lane operation; hours of bus operation may vary
(2) Express bus volumes

APPENDIX III



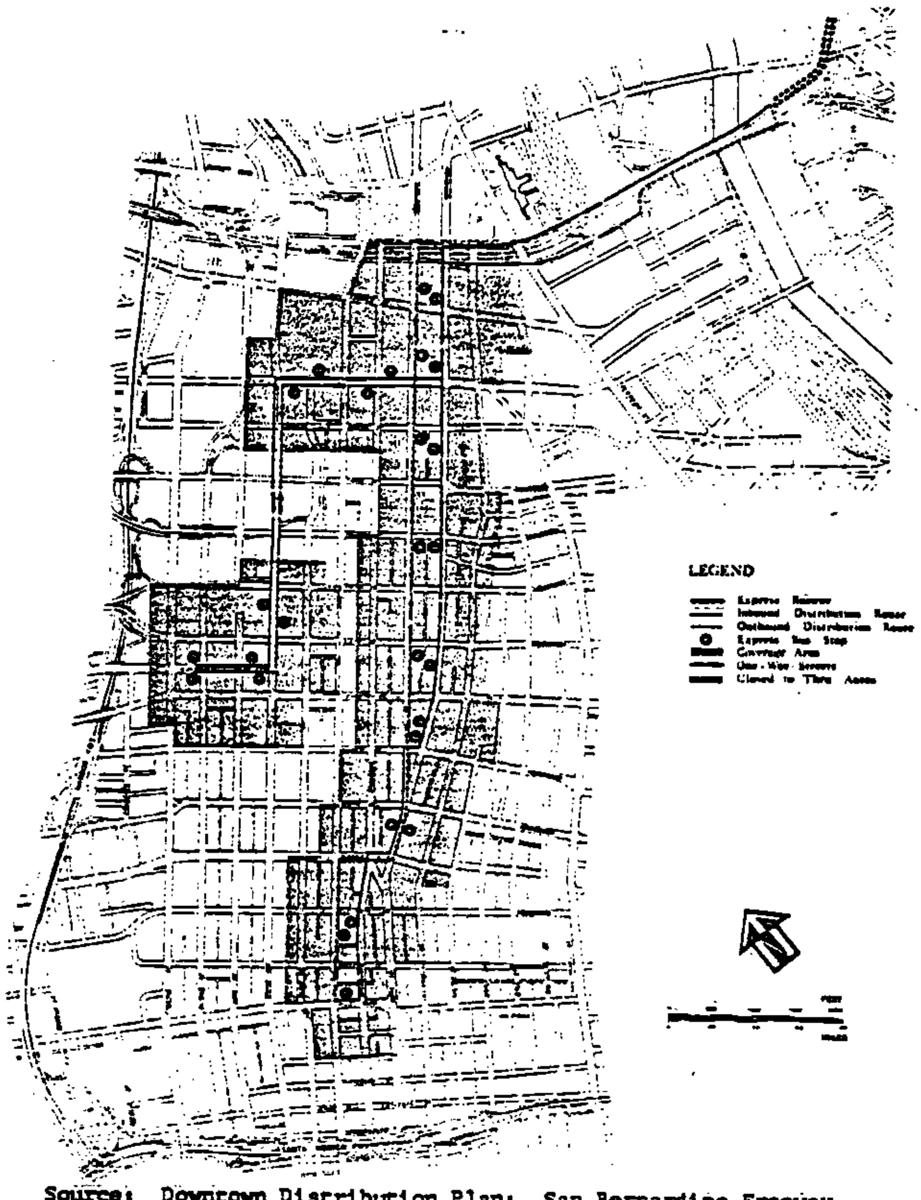
Source: Downtown Distribution Plan: San Bernardino Freeway Express Busway, Wilbur Smith and Associates, March, 1973.

DOWNTOWN EMPLOYMENT

Wilbur Smith & Associates

FIGURE 6

APPENDIX IV

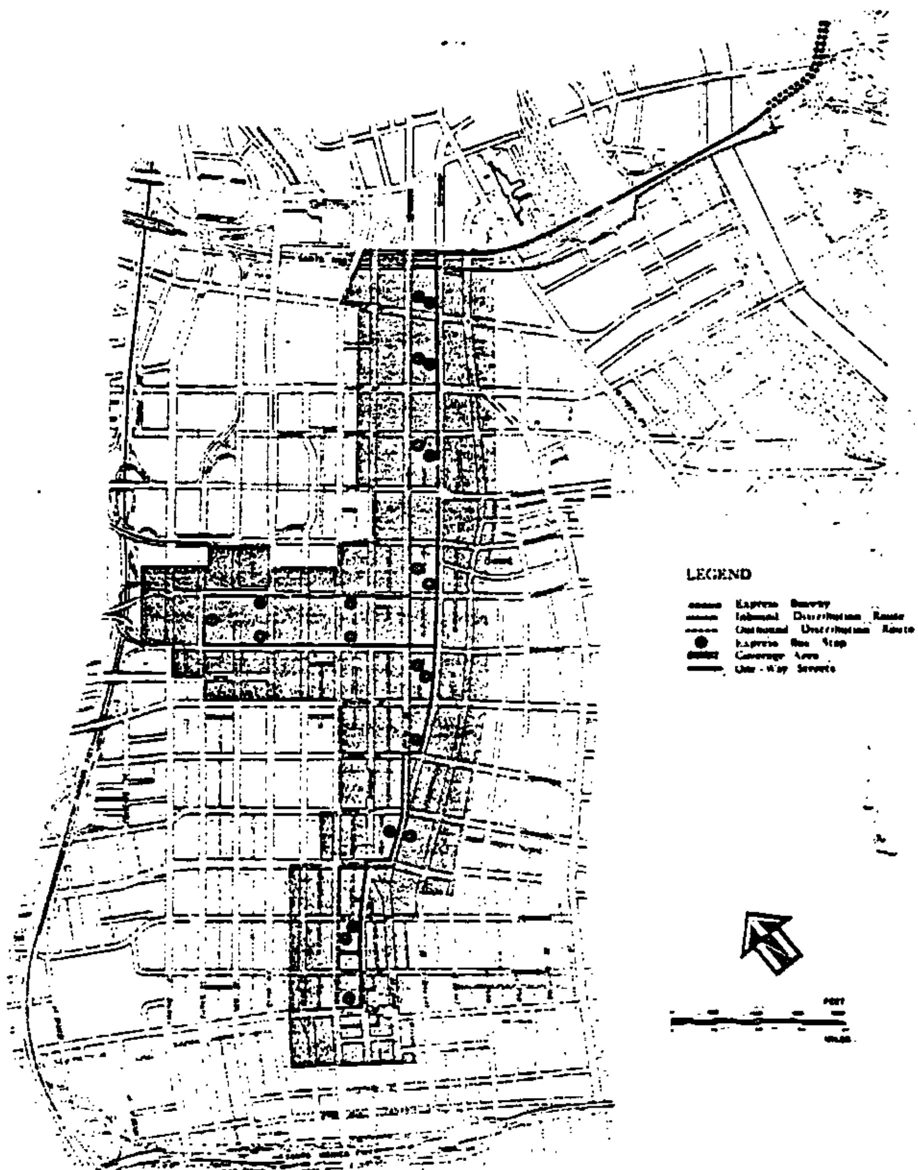


Source: Downtown Distribution Plan: San Bernardino Freeway Express Busway, Wilbur Smith and Associates, March, 1973.

Wilbur Smith & Associates

Alternative Plan Five
MAIN STREET-SPRING STREET CONTRA-FLOW LANES AND WILSHIRE BUS MALL

FIGURE 20



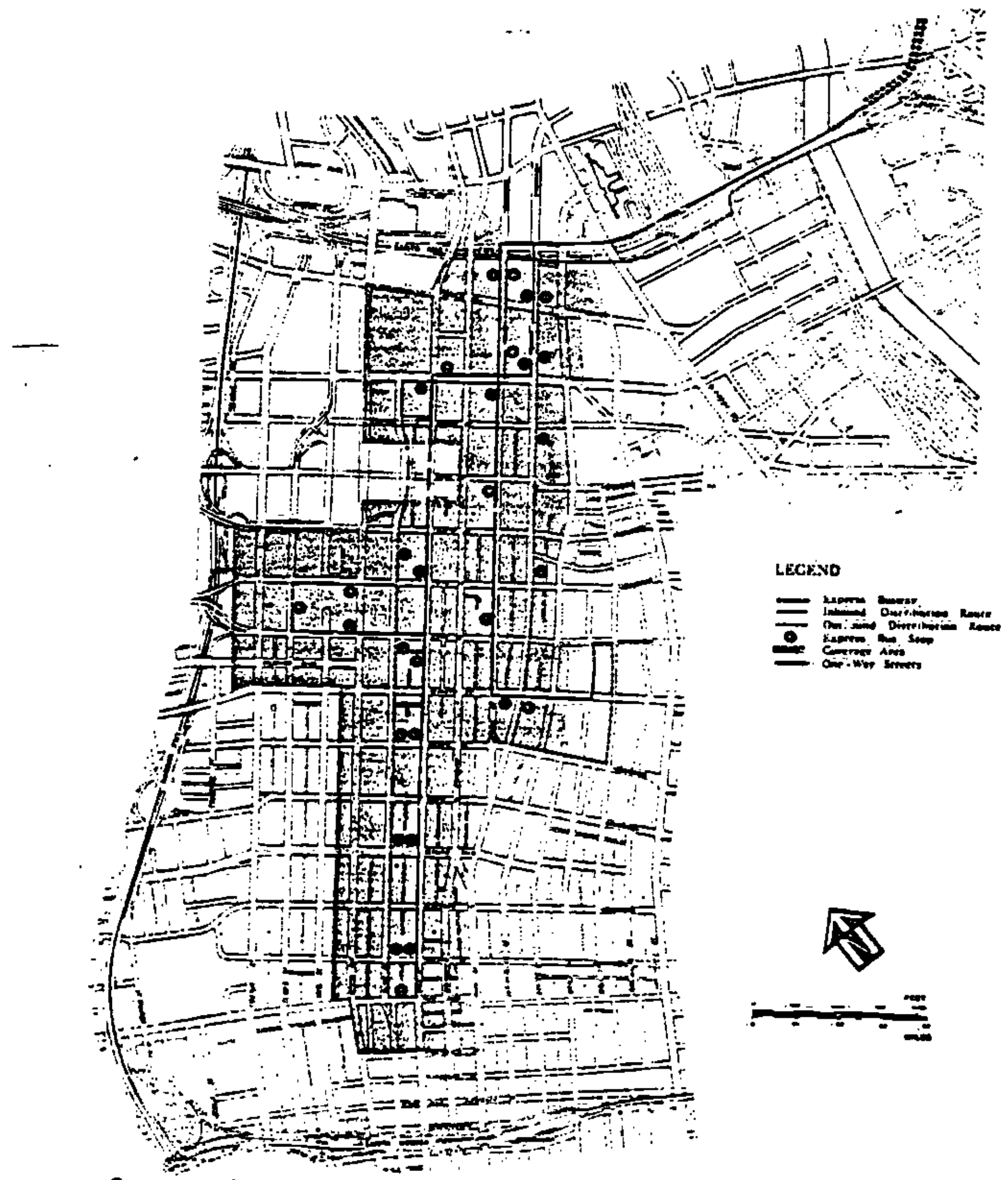
Source: Downtown Distribution Plan: San Bernardino Freeway Express Busway, Wilbur Smith and Associates, March, 1973.

Alternative Plan Six
MAIN STREET-SPRING STREET AND FIFTH STREET-SIXTH STREET
CONTRA-FLOW LANES

Wilbur Smith & Associates

FIGURE 21

APPENDIX V



Source: Downtown Distribution Plan: San Bernardino Freeway Express Busway, Wilbur Smith and Associates, March, 1973.

RECOMMENDED DOWNTOWN DISTRIBUTION SYSTEM

Wilbur Smith & Associates

FIGURE 24

APPENDIX VI

Weekday BUS VOLUMES – Pre-Test
Spring Street – Southbound

Line	Date of Timetable	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
2	6-17-73	6	12	7	3	3	3	3	3	3	3	4	4	4	2		60
8	6-17-73	3	4	3	3	3	3	3	3	3	4	3	4	3	2		44
13	4-7-74	0	0	0	0	0	0	0	0	0	0	2	1	0	0		3
24	6-17-73	2	3	3	2	2	2	2	2	2	2	2	3	2	1		30
39	5-6-73	5	11	6	5	5	5	5	5	5	5	5	5	5	2		74
52*	12-24-72	3	8	3	2	2	2	2	2	2	3	3	3	3	1		39
56	4-28-74	2	6	3	2	1	1	1	1	1	1	1	2	1	1		24
60	3-10-74	5	8	6	3	2	2	1	2	3	2	2	2	2	2		42
63	12-30-73	3	10	7	2	2	2	2	2	3	3	1	2	3	1		43
68	7-15-73	2	3	3	2	2	2	2	2	2	2	2	2	3	1		29
69	12-30-73	1	3	2	1	1	1	1	1	1	1	2	1	1	0		17
70	7-16-72	1	3	2	2	2	2	2	2	2	2	2	2	3	1		28
71	7-16-72	1	4	2	2	2	2	2	2	2	2	3	2	3	1		30

continued

SOURCE: SCRDT Time Tables

Weekday BUS VOLUMES - Pre-Test
Spring Street - Southbound
(Continued)

Line	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
75	4-7-74	6	6	5	3	3	3	3	3	3	5	11	6	4	2		63
92	1-13-74	5	6	6	6	6	6	6	6	6	9	6	5	3	2		78
TOTAL	//////	45	87	58	38	36	36	35	36	38	44	49	45	38	19		604

* Line 52 travels only 9 of the 11 study area blocks.

Source: RTD time schedules in effect on May 18, 1974 (the day before the contraflow lane opened)

Note: Lines 37, 47, 49 and 67 travelled in the study area for less than three blocks. Therefore, they are considered not to be contraflow lane buses and were not included in these bus volume totals.

Weekday BUS VOLUMES — Pre-Test
Main Street — Northbound

Line	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
2	6-17-73	3	3	3	3	3	3	3	3	5	7	13	10	5	2		66
8	6-17-73	5	6	3	3	3	3	3	3	3	4	5	3	3	2		49
13	4-7-74	0	2	2	0	0	0	0	0	0	0	0	0	0	0		4
24	6-17-73	2	2	2	2	2	2	2	2	2	2	3	3	2	1		29
39	5-6-73	3	5	5	5	5	5	5	5	5	5	8	6	5	2		69
52*	12-30-73	2	4	2	2	2	2	2	3	3	3	7	6	3	1		42
56	4-28-74	2	2	1	1	1	1	1	1	1	2	7	4	2	1		27
63	12-30-73	3	3	4	2	2	2	2	2	3	5	9	8	2	1		48
68	7-15-73	1	3	2	2	2	2	2	2	1	3	2	4	2	1		29
69	12-30-73	1	1	2	1	1	1	1	1	1	1	2	2	1	0		16
70	7-16-72	2	2	2	2	2	2	2	2	2	2	3	3	2	1		29
71	7-16-72	1	2	2	2	2	2	2	2	3	2	4	2	2	2		30
75	4-7-74	3	12	6	4	3	3	3	3	4	4	5	5	4	2		61

Continued

Weekday BUS VOLUMES - Pre-Test
Main Street - Northbound
(continued)

Line	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
92	1-13-74	5	6	6	6	6	6	6	6	6	6	6	5	3	2		75
TOTAL	/////	34	54	45	37	36	37	36	37	41	49	84	67	38	20		615

* Line 52 travelled only 9 of the 11 study area blocks

NOTE: Lines 37, 47, 49, 60 and 67 travelled less than four blocks in the study area. Therefore, they were not included in the volume totals.

Source: SCRTD Time Tables in effect on May 18, 1974.

Weekday BUS VOLUMES - Post-Test
Spring Street - Southbound

Line	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
7	*	4	8	5	4	4	4	4	5	7	9	8	9	4	3		78
8	*	3	4	3	4	2	3	3	3	3	4	3	4	3	2		44
24	*	3	3	4	3	3	3	3	3	3	5	5	6	4	2		50
25	*	6	8	6	4	4	4	4	4	4	4	5	4	4	2		63
39	*	6	8	6	5	5	5	5	5	5	5	5	5	4	3		72
55/2	*	7	10	6	3	3	3	3	3	4	5	4	4	4	2		61
75/313	*	12	12	12	7	4	4	4	4	4	9	9	7	5	3		96
410/39x	*	0	2	0	0	0	0	0	0	0	0	0	0	0	0		2
420	*	3	4	3	3	2	3	3	3	3	3	3	4	3	2		42
495	*	4	4	3	3	3	3	3	3	3	3	4	3	2	1		42
496	*	1	1	1	1	1	1	1	1	1	1	1	1	1	1		14
90/56x	*	2	3	3	1	1	1	1	1	1	2	1	1	1	1		20
91/56x	*	2	2	2	1	1	1	1	1	1	1	2	1	1	0		17

Weekday BUS VOLUMES – Post-Test
Spring Street – Southbound
(continued)

Line	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
97	*	1	1	1	1	1	1	1	1	0	2	0	1	1	1		13
406/56x	*	0	1	1	0	0	0	0	0	0	0	0	0	0	0		2
407/56x	*	0	2	1	0	0	0	0	0	0	0	0	0	0	0		3
TOTAL		60	80	63	46	40	42	42	43	46	62	57	55	39	25		700

* The timetables used were in effect on October 1, 1981

NOTE: Line 49 travelled less than four blocks in the study area. Therefore it was not included.

Source: SCRTD Time Tables

Weekday BUS VOLUMES – Post-Test
Main Street – Northbound

Line	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
39	*	3	5	5	5	5	5	5	5	6	6	7	6	3	2		68
55/2	*	4	7	4	3	3	3	3	3	4	8	8	8	5	3		66
92	*	6	6	6	6	6	6	6	6	6	6	6	7	3	3		79
410/39X	*	0	0	0	0	0	0	0	0	0	0	2	0	0	0		2
TOTAL	//////	13	18	15	14	14	14	14	14	16	20	23	21	11	8		215

NOTE: Line 49 travels less than four blocks in the study area. Therefore, it is not included in bus volume totals.

Source: SCRTD time tables in effect on October 1, 1981

Weekday BUS VOLUMES – Post-Test
Contraflow Lane
Spring Street – Northbound

Line	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
7	*	4	6	6	5	4	4	4	4	5	6	9	6	4	3		70
8	*	5	5	3	3	3	3	3	3	3	3	4	4	3	2		48
24	*	8	4	3	3	3	3	3	3	4	3	4	4	3	2		50
25	*	4	5	4	4	4	4	4	4	5	5	10	6	5	3		67
75/313	*	8	10	7	5	4	3	4	4	4	7	10	7	7	4		84
90	*	1	1	1	1	1	1	1	1	1	2	3	2	1	0		17
91	*	2	1	1	1	1	1	1	1	1	2	4	2	1	0		19
97	*	2	1	1	1	1	1	1	1	1	1	1	1	0	2		15
406	*	0	0	0	0	0	0	0	0	0	0	2	1	0	0		3
407	*	0	0	0	0	0	0	0	0	0	0	2	1	0	0		3
420	*	3	5	3	3	3	3	3	3	3	3	5	3	2	2		44
495	*	2	2	3	3	3	3	3	3	3	4	5	3	2	2		41
496	*	1	1	1	1	1	1	1	1	1	1	2	1	0	0		13
TOTAL	//////	40	41	33	30	28	27	28	28	31	38	62	40	28	20		474

Weekday BUS VOLUMES - Post - Test

TOTAL NORTHBOUND
Main Street and Contraflow Lane

	Date	6-7a	7-8a	8-9a	9-10a	10-11a	11-12	12-1p	1-2p	2-3p	3-4p	4-5p	5-6p	6-7p	7-8p		TOTAL
Main St.	—	13	18	15	14	14	14	14	14	16	20	23	21	11	8		215
Contraflow	—	40	41	33	30	28	27	28	28	31	38	62	40	28	20		474
TOTAL	—	53	59	48	44	42	41	42	42	47	58	85	61	39	28		689

APPENDIX VII

TRAFFIC VOLUMES

Pre-test

Spring Street 7-9am

	Temple** St.	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
Summer 1973	4520	4262*	4005*	3717*	3717*	3430	2705*	1980	1980*	1980*
Feb. 1974	4490	4235*	3980	3660*	3660*	3340	2550*	1760	1760*	1760*
Combined Avg.	--	4249	3992	3689	3689	3385	2628	1870	1870	1870

Weighted Average Volume (sum of combined averaged divided by 8)=3405

Spring Street 4-6pm

	Temple** St.	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
Summer 1973	2000	2066*	2131*	2226*	2226*	2320	2135*	1950	1950*	1950*
Feb. 1974	1980	2045*	2110	2200*	2200*	2290	2135*	1980	1980*	1980*
Combined Avg.	--	2056	2121	2213	2213	2305	2135	1965	1965	1965

Weighted Average Volume (sum of combined averages divided by 8)=2611

Spring Street 24 hour

Estimated 24-hour Average Weighted Traffic Volume (using 90% formula described in Chapter VI)=21,189

*Estimated Figures
**Needed for Estimating Purposes Only

TRAFFIC VOLUMES

Pre-test
(continued)

Main Street 7-9am

	Temple** St.	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
Summer 1973	1790	1720*	1720*	1720*	1720*	1650	1725*	1800	1800*	1800*

Weighted Average Volume (sum divided by 8)=1957

Main Street 4-6pm

	Temple** St.	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
Summer 1973	3920	3545*	3545*	3545*	3545*	3170	3270*	3370	3370*	3370*

Weighted Average Volume (sum divided by 8)=3841

Main Street 24 hour

Estimated 24-hour Average Weighted Traffic Volume (using 90% formula described in Chapter VI)=17,314

*Estimated
**Needed for Estimating Purposes Only
SOURCE: Spring Street Contra-flow Bus Lane Operational Evaluation Study, LA Dept. of Traffic, Aug. 28, 1974.

TRAFFIC VOLUMES

Post-test

Spring Street 7-9am

	Temple St.**	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
1977-80 Avg***	--	3307	2277*	1248	2074*	2901	2342	2160	1597	1730

Weighted Average Volume (sum divided by 8)=2455

Spring Street 4-6pm

	Temple St.**	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
1977-80 Avg***	--	1880	1328*	775	1555*	2334	2012	2147	1924	4314

Weighted Average Volume (sum divided by 8)=2284

Spring Street 24 hour

	Temple St.**	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
1977-8 Avg***	--	15004	10683*	6363	10842*	15382	13417	12679	10189	11239

Weighted Average Volume (sum divided by 8)=13,225

*Estimated
**Not Needed with Available Data
***Individual intersection data is an average of all survey counts taken for that intersection from 1977 to 1980 or 1981.

TRAFFIC VOLUMES

Post-test
(continued)

Main Street 7-9am

	Temple St.**	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
1977-80 Avg***	--	1337	1595	989	1854	1601	1529*	1451	1469	1459

Weighted Average Volume (sum divided by 8)=1660

Main Street 4-6pm

	Temple St.**	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
1977-80 Avg***	--	3756	3650	2172	3680	3454	3037*	2692	2273	2073

Weighted Average Volume (sum divided by 8)=3348

Main Street 24 hour

	Temple St.**	First St.	Second St.	Third St.	Fourth St.	Fifth St.	Sixth St.	Seventh St.	Eighth St.	Ninth St.
1977-81 Avg***	--	15574	15179	16194	18091	14695	13330	11966	11087	10124

Weighted Average Volume (sum divided by 8)=15,780

*Estimated
**Not Needed with Available Data
***Individual intersection data is an average of all survey counts taken for that intersection from 1977 to 1980 or 1981.

SOURCE: LADOT Traffic Survey Counts, 1977-1981.

APPENDIX VIII

ACCIDENT RATE FORMULA

[# Accidents/Year ÷ (# Trips/Weekday X 1 Mile X 255 Weekdays/Year)] X 1,000,000 Miles = Accident Rate/Million Vehicle Miles (MVM)

Accidents/Year was obtained from either Los Angeles Department of Transportation data or Southern California Rapid Transit District Data depending on the comparison being made.

Trips/Weekday was obtained from Southern California Rapid Transit District Time Tables for buses and Los Angeles Department of Transportation Traffic Survey Counts or S.S. Taylor's Spring Street Contra-flow Bus Lane Operational Evaluation Study (LA.A Dept. of Traffic) for traffic volumes.

SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT

ACCIDENT CLASSIFICATIONS

TRAFFIC ACCIDENTS
COLLISIONS WITH OTHER VEHICLES (Types 1-48)

Collisions with other vehicles

Code	INTERSECTIONS
1	Straight ahead - other vehicle from LEFT
2	Straight ahead - other vehicle from RIGHT
3	Turning right - other vehicle from AHEAD
4	Turning right - other vehicle from LEFT
5	Straight ahead - other vehicle from opp. dir. turns LEFT
6	Turing right - other vehicle from REAR
7	Turning left - other vehicle from AHEAD
8	Turning left - other vehicle from LEFT
9	Turning left - other vehicle from RIGHT
10	Turning left - other vehicle from REAR
11	Vehicle turns RIGHT in front of bus (Incl. bus leaving/standing in nrside. zone)
12	All other intersection collisions (Alleged, etc.)
	BETWEEN INTERSECTIONS
13	Head-on - vehicles from OPPOSITE direction
14	Sideswipe - while PASSING other veh. (Incl. veh. stndng in traf/dbl parked)
15	Sideswipe - other veh. frm OPPOSITE dir. (Incl. stndng in traf/dbl parked)
16	Sideswipe - other veh. PASSING our veh. (Incl. bus movng/stndng in traf)
17	Cutting in - by OTHER vehicle (Except #11)
18	Pulling FROM or TO curb or driveway
19	Collision with vehicles PARKED at curb. (Incl. opened doors)
22	All other accidents between intersections, U-turns, alleys, alleged
	REAR END
23	Bus hit vehicle (Including drifting back or backing)
24	Other vehicle hit bus (Including drifting back or backing)
	LOADING ZONES
25	Bus pulling into zone involved with STANDING vehicle
26	Bus pulling from zone involved with STANDING vehicle
27	Bus pulling from zone involved with MOVING vehicle
28	Other vehicle involved with bus STANDING in zone
29	Bus pulling into zone involved with MOVING vehicle
	MISCELLANEOUS
30	All other collisions with other vehicles, bikes, (including alleged), that do not fit above types

Collisions with other vehicles

Code	COLLISIONS BETWEEN CO. PASS. VEHICLES
31	Scrapes at corners, intersection sideswipes
32	Sideswipes between intersections other than opposite direction
33	Opposite way sideswipes between intersections
34	End to End - in loading zones
35	End to End - other than loading zones
36	On Company property, yards, terminal company parking
37	All other collisions between Company passenger vehicles

	PEDESTRIANS
39	Intersections/Crosswalks (Except #41)
40	Loading zones (Except #41)
41	Hit by overhang - (Bus turning)
42	Between intersections (Jay-walking)
43	All others

	MISCELLANEOUS COLLISIONS
44	Alleged - Location - Division or department unknown
45	Collision with (fixed) stationary object
46	Due to mechanical failure
47	Leaving road (Except #46)
48	Collisions not otherwise classified

PASSENGER ACCIDENTS (Types 50-68)

	BOARDING
50	Fell boarding (standing bus)
51	Door - struck while boarding
52	Miscellaneous boarding

	ALIGHTING
53	Falls alighting - Front door
55	Falls alighting - Rear door (treadle)
56	Falls alighting - Rear door (Pushout)
57	Falls alighting not otherwise classified
58	Struck by front door - Alighting
59	Struck by rear door (Treadle)
60	Struck by rear door (Pushout)
61	Struck by door not otherwise classified (Except #66)

	ON BOARD
62	Starting (falls, bumps, etc.)
63	Stopping (falls, bumps, etc.)
64	At curves or bus turning (falls, bumps, etc.)
65	Running straight (falls, bumps, etc.)
66	Caught/struck by doors. (Not boarding or alighting)
67	Injuries from arms, heads, etc. out of window
68	On board accidents not otherwise classified

MISCELLANEOUS INCIDENTS (Types 70-78)

Code	MISCELLANEOUS INCIDENTS
70	Property damage caused by defective equipment
71	Injuries caused by defective equipment
72	Disturbances, ejectments, fainting sickness, fits, deaths on vehicle, etc.
73	Injuries or property damage caused by other passengers
74	Falls - approaching to board/after alighting
75	Clothing soiled off bus (splashed water etc.)
76	Thrown missiles. Injuries/damage
77	Thrown missiles. No injuries/damages.
78	Incidents not otherwise classified
	OTHER REPORTS
79	Observation or witness reports. (Operator's vehicle not involved)
80	Non-operating vehicle accidents. (Includes accidents of supervisory cars, company trucks, and buses/cars operated by mechanics)
90	Employee accidents
99	Public accidents on Company property
81	Bus Fire

PREPARED BY: S.C.R.T.D.
Safety Department

APPENDIX IX

Special Operational Studies

Special operational studies directed toward automobile drivers and contra-flow lane bus drivers were conducted on Spring Street. These studies were in the form of attitude surveys and were intended to extract driver reaction and perception of impact with regards to the contra-flow lane. Forms used in both surveys are included in the Appendicea.

Roadside Survey - A roadside, mail-in survey was conducted on Spring Street June 9, 1975 during the hours of 7 A.M. to 6 P.M. A total of 1,443 forms were given to Spring Street drivers representing 12 per cent of the total number drivers that normally use Spring Street during this time period. Survey returns totaled 389 representing 27 per cent of the surveys handed out. This return relates to a 3 per cent sample of all drivers.

The survey questions were directed to trip purpose and frequency, perception of delays, off-street parking on Spring Street, general operating conditions, and adequacy of signing. Additionally, drivers were requested to provide general comments.

Survey Results - Following are the survey questions and the percentage breakdown of survey returns:

1. For what purpose did you drive on Spring Street?

Work	85.6
Shopping	2.1
Commercial Business	6.9
Personal Business	3.9
Social	-
Other	1.5

2. How often do you drive on Spring Street?

Daily	72.5
2-4 Times a week	11.1
Weekly	7.7
Less than weekly	8.0
No Answer	0.7

✓ 3. Have you noticed any increased congestion or encountered any additional delays since the implementation of the contra-flow bus lane?

Yes	22.6
No	76.1
No Answer	1.3

4. "f, in the past, you have used off-street parking facilities on Spring Street, have you had any difficulties entering or exiting these facilities because of the contra-flow lane?

Yes	17.0
No	65.8
No Answer	17.2

5. Do you find that driving on Spring Street with the contra-flow lane produces more undesirable operating conditions as compared to driving on other streets in Downtown Los Angeles?

Yes	20.1
No	78.1
No Answer	1.8

6. Do you find the traffic signing of the contra-flow lane on Spring Street to be adequate?

Yes	79.7
No	17.5
No Answer	2.8

7. Comments:

Favorable or Neutral	81.2
Unfavorable	18.8

Bus Driver Survey - Surveys were conducted of all bus drivers who use the contra-flow lane. Of the 300 forms handed out, 94 completed survey forms were returned. This represents a 31.3 per cent sample.

Questions in the survey were directed toward bus operations in the lane, bus-automobile interreaction, passenger acceptance, and the lane's physical form. Additionally, general comments regarding the contra-flow lane were solicited.

Survey Results - Following are the survey questions and the percentage breakdown of survey returns:

1. Do you think the contra-flow lane has affected your operating speed or schedule adherence?

Yes	63.8
No	36.2

2. Have you noticed any confusion on the part of automobile drivers travelling in the opposite direction?

Yes	37.2
No	62.8

3. To what extent has there been any satisfaction of displeasure expressed by bus passengers with regard to the contra-flow lane?

Many favorable comments	40.4
Some favorable comments	26.6
Few comments	30.8
Some negative comments	1.1
Many negative comments	0.0
No Answer	1.1

4. Have you experienced excessive delays while traveling in the contra-flow lane due to buses lining up at bus stops or bus-breakdowns?

Yes	28.7
No	69.2
No Answer	2.1

5. Have you experienced excessive delays while travelling in the contra-flow lane due to pedestrians, parked ehicles, or traffic?

Yes	14.9
No	85.1

6. Has the geometrics and channelization of the contra-flow lane caused any operational problems that are not apparent on other streets in the Downtown area?

Yes	13.8
No	84.1
No Answer	2.1

7. Comments: Please provide any other comments, favorable and/or unfavorable with regards to the "contra-flow" lane.

Favorable	58.5
Unfavorable	4.3
No Answer	37.2

Passenger Attitude Survey

A passenger survey was conducted by the Southern California Rapid Transit District on June 10, 1974. The survey was conducted by giving passengers that boarded each bus operating via the contra-flow lane a postage paid postcard asking several questions. A total of 1,463 completed survey forms were returned. It is estimated that this return represents at least a 10 per cent sample of daily transit patrons.

Survey Results - Following are the survey questions and the percentage breakdwon of survey returns:

1. Did you use the bus regularly prior to the contra-flow

Yes	93.0

or did you start using the bus after the contra-flow lane was introduced?

Yes	6.5
No Answer	0.5

2. Since contra-flow, do you find that the bus now gets you out of the downtown area?

Faster	56.2
More slowly	11.3
About the same as before	31.0
No Answer	1.5

3. Do you find that since contra-flow was started, major delays - that is when the bus is 10 or more minutes late - are:

Less frequent	46.3
More frequent	15.3
About the same	32.2
No Answer	6.2

4. As compared to the former bus stops on Main Street, are the new bus stop locations on Spring Street:

More convenient	71.7
Less convenient	10.3
No difference	15.0
No Answer	3.0

5. If you drive an automobile as well as take the bus, would you find any difficulty understanding how you may drive on Spring Street?

Yes	7.3
No	92.7

6. What is your opinion as to the adequacy of the signs erected in connection with the contra-flow lane?

<u>Bus Stop Signs</u>:

Good	75.7
Adequate	17.3
Inadequate	5.0
No Answer	2.0

<u>Pedestrian Signs</u>:

Good	60.1
Adequate	30.2
Inadequate	4.5
No Answer	5.2

<u>Traffic Control Signs</u>:

Good	60.8
Adequate	28.8
Inadequate	4.4
No Answer	6.0

7. <u>Comments</u>:

Favorable	28.0
Unfavorable	10.4
No Comments	61.6

Abutting Property Owner's Survey

A businessman's survey was conducted at each commercial facility located along Spring Street between Ninth Street on the south and Macy Street on the north. Commercial offices and governmental type land uses were excluded from the survey.

The intent of the survey was to determine the attitude of businessmen with regards to the contra-flow lane and the affect it has had upon the conduct of their business. Questions in the survey were directed to four basic areas: customer acceptance, commercial loading, impact on business, and off-street parking access. Additionally, businessmen were asked to provide general comments on the good and/or bad points of the contra-flow lane.

Survey Results - Following are the survey results and the percentage breakdown of survey returns:

1. Have customers or visitors to your business voiced displeasure or inconvenience because of the contra-flow lane?

	West Side	East Side	Total
Yes	12.5	45.2	29.3
Major	(7.5)	(23.8)	(15.8)
Minor	(5.0)	(21.4)	(13.4)
No	87.5	54.8	70.7

2. Does your business have access to an off-street loading area?

	West Side	East Side	Total
Yes	50.0	59.5	54.9
No	50.0	40.5	45.1

3. Has the contra-flow lane impeded commercial loading and unloading of materials that are necessary to the conduct of your business?

	West Side	East Side	Total
Yes	5.0	48.8	27.2
Major	(2.5)	(31.7)	(17.3)
Minor	(2.5)	(17.1)	(9.9)
No	95.0	51.2	72.8

4. Have you noticed any increase or decrease in pedestrian activity since the implementation of the contra-flow lane?

	West Side	East Side	Total
Increase	22.5	7.3	14.8
Decrease	10.0	29.3	19.8
No Change	67.5	63.4	65.4

a) How has this affected yout business?

	West Side	East Side	Total
Advantageous	27.5	9.8	18.5
Disadvantageous	7.5	31.7	19.8
No Affect	65.0	58.5	61.7

5. Has access to off-street parking facilities serving your business been impeded by operation of the contra-flow?

	West Side	East Side	Total
Yes	25.0	56.1	40.7
Major	(7.5)	(31.7)	(19.7)
Minor	(17.5)	(24.4)	(21.0)
No	75.0	43.9	59.3

6. Please comment on the good and/or bad points of the contra-flow lane.

	West Side	East Side	Total
Strongly favorable	35.0	24.4	29.6
Mildly favorable	20.0	12.2	16.1
Neutral	35.0	19.5	27.2
Mildly opposed	2.5	19.5	11.1
Strongly opposed	7.5	24.4	16.0

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SOURCE: Evaluation of the Spring Street Contraflow Bus Lane, Wilbur Smith & Associates, 1975.

APPENDIX X

ETHNIC GROUPS
1981 Service Awareness
and Transit Ridership Study

Prepared by
SCRTD Market Research
January, 1982

SURVEY METHODOLOGY

A total of 1,134 personal, in-home interviews and self-administered mail return questionnaires were completed in a randomly selected sample of households, distributed throughout Los Angeles County in proportion to the population. To qualify for interviewing, respondents had to be a resident of the County, 12 years of age or older, and have made at least two round trips greater than walking distance away from home during the past week.

As with the 1978 survey, both English and Spanish versions of the questionnaire were used, and respondents were offered an incentive of $1.00 for each additional questionnaire filled-in and returned by mail by other household members not present at the time of the personal interview. A supplemental sample of 320 transit dependent persons was also selected from each of the RTD service sectors, and was reported in a separate special report.

Field data collection was completed between January 15th and March 5th, 1981. All data collection, editing, coding, keypunching and computer analysis tasks were done by the independent market research firm of Data Sciences, Inc.

Data Sciences, Inc., prepared the following reports, copies of which are available through SCRTD Market Research:

Summary Report

Sector Report

Transit Dependent vs Transit Discretionary Riders' Report

A report of the Non-User Market, prepared by SCRTD Market Research, is also available.

THERE IS A HIGH LEVEL OF AGREEMENT THAT "BUS ONLY" LANES ARE A GOOD IDEA.

Hispanics are most likely to agree that special lanes for buses are a good idea. They are also most likely to agree that "Diamond Lanes" are a good idea. However, as with the other ethnic groups, fewer Hispanics consider "Diamond Lanes" a good idea vs the concept of special lanes for buses.

The Other group is the least likely to agree about special bus lanes in general, or "Diamond Lanes" in particular.

Interestingly, on the "Diamond Lane" statement, there has been a significant positive increase since 1978 among all groups but Others.

TABLE 28

PERCENT STRONGLY/VERY STRONGLY AGREE

	Caucasian	Black	Hispanic	Other
Special traffic lanes for buses on the freeways and downtown surface streets are a good idea and there should be more of them.	57%	61%	72%	49%
The "Diamond Lanes" for buses are a good idea because they help to get people out of their smog-producing cars	40	50	55	33

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