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GEORGE WASHINGTON BRIDGE

BUS-CARPOOL LANE

ONE YEAR OPERATIONAL REPORT

By

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NEW JERSEY DEPT. OF TRANSPORTATION

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16. Abstract

A reserved lane was established on the New Jersey approaches to the George Washington Bridge to provide a time savings of up to 10 minutes for buses and carpools in the peak am commuter hours. It began operation in October 1986. In addition to being Interstate 95, the bridge provides access to Manhattan for much of northeastern New Jersey via six other major routes which all converge within a mile of the bridge.

This report reviews the basic design and operational data taken during the first twelve months of the operation of the reserved lane. Included are carpool, bus and violator volumes and trends; carpool, violator and utilization percentages of total traffic; and enforcement activities. Also presented are long term trends based on data from the three years preceding the lane's operational start up and a review of potential for further preferential treatments.

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The contributors to this project are many and varied. Essential in a thirteen year process from conception to full operation is unwavering support from management and co-workers; this project was certainly blessed in that regard. But for the understanding, cooperation and belief in eventual success by the Department's Design and Traffic Engineering staff, the complexity of this effort would have been it's downfall. FHWA funding and participation by NJ State Police and numerous people within the Port Authority of New York and New Jersey were also important to the planning and operation of the reserved lane. Neither the need or success of the operation could be understood, however, without the dedicated support of those who put up with the long and often difficult hours and work conditions involved in providing vehicle occupancy data. Last but not least are those who assisted in the preparation of this report.

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SUMMARY AND CONCLUSIONS

Operational data for the reserved Bus-Carpool Lane collected between the hours of 7 and 9 am from November 1986 to October 1987 indicates that:

- On average, 120 buses gain a time savings at the toll plazas; 70 receive up to 7 minutes savings when unreserved lane flows are congested;
- An average of 430 carpools (of a total of 580 on I-95) use the lane;
- Core hour (7:15 to 8:45) violators average 150, about 30% of lane usage, while 330 violators,(about 40%), used the lane in the entire 7 to 9 period;
- Utilization of the lane averaged about 5000 people (21.5% of Main and Lower Plaza) while an additional 2500 bus riders (11%) made use of only the preferential bus booth.

The reserved lane has achieved its operating goals.

The carpool capture rate of 65% of users is in accord with pre-opening estimates. The other 35% are Rt 46 and local street carpools who have no practical way to divert to use the lane. The lane also operates without congestion, thus providing a travel time savings equal to the delay encountered by traffic in the unreserved lanes. This delay ranges up to 7 minutes. Buses which can't take advantage of the mile long reserved lane (due to routing) continue to enjoy the

preferential treatment at the toll plaza which existed prior to the advent of this operation. Traffic on the approaches is not negatively affected by the presence of the lane operation.

The presence of the Bus-Carpool Lane has had a favorable affect on carpool formation.

Pre-opening data clearly indicates that the percent of autos that carpools (vehicles with 3 or more people) represent was declining. A reversal of this trend was evident in the data for the first year of operation. At the same time, the carpool totals remained about constant, due to an increase in the total commuter volumes. Toll increases instituted during the first year do not appear to have had an affect on carpool formation at the Palisades Interstate Parkway (PIP) plaza and is therefore not likely to have caused the increase observed at the Main and Lower plazas.

Continued daily presence of Port Authority of New York and New Jersey (PANYNJ) police should be adequate for effective enforcement.

Violations rates did not threaten the viability of the lane as the violators occupied less than 10% of the capacity of the lane in core hours. Violation rates held constant throughout the first year, despite declining summons activity. Operational Hours of 7 to 9 am are the most appropriate.

Delays are minor before 7 am. While delays often last well beyond 9 am in some months, carpool volumes peak at 8 am and cease to be substantial around 9 am.

The eligibility of motorcycles for reserved lane use is not well understood. Added promotional efforts by the PANYNJ are in order.

Only one motorcycle regularly uses the reserved lane while as many as 42 have been observed on the I-95 approaches. A complaint about apparent non-eligibility was received from a motorcyclist organization.

Operational data contained in this report should be used to review the possibility of re-opening the mid level Hudson Terrace toll booth for carpools only.

Both PIP and local access carpools could benefit from such an operation. Estimates of use in a previous study of such an operation can be updated to better define the benefits and local impacts. No other carpool oriented preferential treatment opportunity for PIP and local access carpools is apparent.

BACKGROUND

A feasibility study was undertaken in 1975 to identify opportunities in the I-80/95 corridor for instituting Bus-Carpool Lanes. The study, entitled "Route 80/95 Bus-Carpool Lane Feasibility Study", had the objective of identifying locations for lanes which had the capability of "increasing the person-moving capacity of existing highways."

Reserving mainline lanes of Route I-80 and 95 for "High Occupancy Vehicles" (HOV's) was a major focus of the study. While this was found to be not feasible, the study recognized that improving the "bus only" reserved lane at the George Washington Bridge (GWB) was appropriate. According to the 1975 study a time savings of 1 to 10 minutes for buses and carpools (vehicles with 3 or more persons) would be possible for reserved lane users, although design of the lane would be complicated because of the existing design of the approach roadways. However, the lane could operate without affecting non-users because the reserved lane would exist on the shoulder of the express lanes where the road is narrowest. Design of the complex project was initiated in 1979 and construction began in 1985.

Specifically, the GWB serves as a major link between northeastern NJ and Manhattan. In addition to local street access, five separate roadways come together on the bridge's NJ approaches. As shown in Figure 1, these roads provide access for vehicles travelling on Interstate Routes 80 and 95; US Routes 1 & 9 and 46; State Route 4; and The Palisades Interstate Parkway (PIP), each a major corridor for NY bound commuters. Three separate toll plazas funnel this traffic to the bridge's 7 Eastbound lanes, four on the upper level and three on the lower level. Westbound lanes are similar although no tolls are collected in keeping with the policy for all Hudson River crossings run by the PANYNJ.

Route I-95 forms the central focus of the Eastbound Bridge approaches. The three outer lanes of this dual roadway are the "local" lanes while the two inner lanes are "express" in design.

Interstate Route 80, itself a three + two lane dual roadway, ends about 4 miles to the West near the northern terminus of the NJ Turnpike. Within about a mile of the Bridge, the I-95 roadways are joined by the 2 eastbound lanes of State Route 4 which has ramps to both express and local roadways. Further to the East, a two lane roadway carrying northbound US Routes 1 & 9 and eastbound US Route 46 enters the local lanes, adding a fourth lane.

These four lanes then expand into the 11 lane toll plaza for the bridge's lower level. The two express lanes become three at Route 4 and eventually expand into the 13 lane "main" toll plaza which serves the bridge's upper level. The PIP, with its own toll plaza, accesses the upper level of the Bridge at a point downstream of the main toll plaza.

INTRODUCTION

It is the I-95 corridor that formed the eventual focus of the previously described feasibility study begun in 1975. These studies evolved, in combination with an existing Bus-Only Lane operated by the Port Authority of New York an New Jersey (PANYNJ), into the reserved lane of Figure 2. Termed a Bus-Carpool Lane (BCPL) to distinguish it from it's predecessor, it was inaugurated in October of 1986. Lane use restrictions exist from 7 to 9 AM weekdays. They provide a path for buses and cars with 3 or more persons to bypass congestion generated by the confluence of 23,000 peak period commuters. This congestion typically extends as far westward as the intersection of Route 4, a mile from the toll plazas. As a result,

reserved lane users save up to 8 minutes each.

While describing the path of the reserved lane is complicated by the profusion of roads and interconnecting ramps, access to the lane is actually relatively simple since the lane has no entrances per se. Standard lane striping separates it from adjacent concurrent flow lanes. The reserved aspect of the lane is emphasized by standard HOV Lane diamond symbols (◊) which are repeated on all signing.

The reserved lane can be entered from Rt I-95 express lanes by keeping to the right. Since the lane starts just downstream of the Rt 4 on-ramp in the Express lanes, Rt 4 users also keep right at the base of their on-ramp in order to enter the reserved lane. On the local roadway, another portion of the lane exists to the driver's left. Just east of Rt 4, a crossover ramp brings the local portion of the reserved lane onto the express roadway where these two portions merge into a single lane. Cars and buses must be on the I-95 express roadway by this point to take advantage of the reserved lane as there are no other ramps to the express roadway before the plaza. As a result, carpools on Rts 1 & 9 as well as Rt 46 are unable to use the lane without a route change. The PIP accesses the upper level of the bridge at a point downstream of the toll plaza and carpools there are also unable to use the reserved lane.

As with the reserved lane's routing, describing the signing for the reserved lane is complicated although the signs themselves are quite standard in order to be easily understood. The dual roadways and toll plazas combine with multiple routes and access points to form a complex situation. Further complications include the need to

alternate black on white regulatory sign displays with white on green guide signs and a limited number of possible sign locations. As a result, the use of changeable message signs worth almost a million dollars was required.

Constructing these signs involved long delays and it became desirable to begin operation of the reserved lane prior to their completion. A series of fixed message signs were designed to serve in the interim. Figure 3 shows the two most common signs used to regulate the lane. The reserved lane messages are the same as the changeable signs will display. Remote dynamic control of alternate routing and Bridge plaza closing messages, secondary but important functions, must await completion of the changeable message signs.

OPERATIONAL DATA

Data was collected throughout the 6:30 - 10:00 am peak period on a regular basis during the first year of operation. Observers sampled auto occupants, vehicle use of the reserved lane and total auto and bus volume at the three toll plazas. Supplementary counts were made on several occasions to determine motorcycle use of the lane and to identify the commuter bus portion of the total bus volumes. Data was collected in each month except February and August when the weather interfered. The results of the on-site observations follow.

Buses

Figure 4 illustrates the split between BCPL Bus use and total Bus volume on the upper plaza. (Buses do not use the lower level as

a rule.) The total number of busses averaged 120 during the 7 to 9 AM operational period. On average, 70 buses were "in the lane", virtually all the buses on I-95. The remaining 50 buses also received some time savings because they access the bus stop area and the toll booth for buses via local streets. There is no similar preference offered to local origin carpools due to physical constraints at the plazas.

Carpools

Total carpool volumes at the upper and lower plazas are somewhat greater than the totals for I-95 because of access to the upper plaza via local streets. Figure 5 illustrates BCPL, non-BCPL and local access carpools. All totalled, carpools averaged 730 while the carpools on I-95 averaged 580. Reserved lane users averaged 430, lower because not all I-95 carpools can access the lane.

Violations and Violation Rates

In addition to the intended users, reserved lanes always attract a degree of improper users, commonly referred to as violators. Figure 6 illustrates the violators observed using the BCPL and Figure 7 the percent of lane volume they represented. This violator percentage is the violation rate.

Each figure illustrates that the first and last 15 minutes of operation comprise a substantial portion of the violations for the full 7 to 9 AM period. For this reason the 7:15 - 8:45 AM time period is considered more representative of violation trends in the peak. The substantial disregard for the rules which often occurs

during the first and last few minutes of the reserved lane is because drivers sense that police are less likely to issue summonses. This effect is quite typical of reserved lanes invoked during limited hours. During the core 1.5 hour period violations averaged 150, a rate of about 30%. Total violations increase to an average of 330, a rate of more than 40%, with the first and last few minutes included.

DISCUSSION

The operational measures reported above became input for further review. Of specific concern were measures of utilization, trends within the data, impacts of the reserved lane's presence on carpooling, and potential for expanding the operation.

Person Utilization

Table 1 shows estimates of the total persons benefiting from the lane in comparison with vehicle use. An average of 430 carpools representing 3.5 % of main and lower plaza autos use the lane. The carpools carry about 1500 persons, (6.5 % of the persons using the main and lower plazas).

In addition, 70 buses use the reserved lane. At up to 50 persons per bus, they carry as many as 3500 persons, 15 % of the total. Another 50 buses with about 2500 more persons use just the preferential booths and thus the persons receiving a time savings is about 7500, about a third of the approximately 23,000 persons which cross the bridge between 7 and 9 AM in autos and buses. Trucks account for another 5 to 10 % of the volume using the Bridge.

TABLE 1

PERSON UTILIZATION

	Vehicles	%	People	%
RESERVED LANE AND BOOTH USERS				
Pools	430	3.5	1500	6.5
Buses	70	0.5	3500	15
RESERVED BOOTH ONLY				
Buses	50	0.5	2500	11
TOTAL	550	4.5	7500	32.5
All Autos and Buses	12,700		23,000	

Commuter Bus Volumes

The totals for all buses showed a fair degree of variability from month to month despite rather stable commuter schedules. For example, bus totals for all approaches combined were as low as 101 in January and as high as 140 in April. Figure 4 illustrates this variability. Calls to New Jersey Transit revealed that few variations occur day to day in the operation of the commuter lines serving the Bridge and the bus terminal in NY.

On-site counts revealed that only about 57% of buses observed using the lane were commuter buses. The remainder of the buses served a variety of purposes such as school trips and charters.

Non-commuter buses also show up on the PIP averaging 18 in June and July.

Non-commuter trips do not need access to the Lemoine Avenue bus stop and can proceed directly to the toll booths. Not surprisingly then, the data reflects that the "Plaza Direct" I-95 user totals is quite volatile. This plaza direct group varied from as low as 6 in the dead of winter to more than 30 in the spring. Another 10 or so drive through the bus stop even though they are not stopping. Less familiar with the area, they tend to follow the commuter busses.

Since no prequalification of drivers is required to for lane use and it is quite accessible, all buses on I-95 will tend to use the reserved lane. In summary, commuter buses comprise the stable portion of the daily peak period reserved lane users at about 40 and the I-95 volume ranged from about 60 to more than 80. Total volumes were as high as 140 at the main (or upper) plaza.

Motorcycles

The use of federal funds requires that motorcycles be allowed in the reserved lane, despite their inability to carry 3 persons (legally). However, the word "Motorcycles" is too long to be easily accomodated on the already complex signing. As a result, the PANYNJ had to rely on promotional and news media to notify probable users about their ability to use the lane.

In order to decide how well motorcyclists understand their eligibility, several motorcycles specific counts were made. These counts identified that only 1 motorcycle was a regular user of the lane while as many as 42 were observed on the upper and lower plazas

between 7 and 9 AM. Clearly then, motorcycles are not generally aware of their ability to use the lane. Although it is not obvious that they would in fact use it, a contact with a motorcycle organization confirmed that motorcyclists are not generally aware that the reserved lane use rules permit motorcycles.

User Potential

Buses and carpools using the reserved lane receive a time advantage of up to 8 minutes depending on where the lane is entered and the existing congestion level. While virtually all I-95 busses use the lane, not all carpools do as was seen in Fig. 4 & 5. Figure 8a & b reflect that data in terms of percentages. Figure 8a illustrates that non-user carpools ranged up to 25% of the plaza totals during the first year although this group steadily declined to about 120 or about 15% in the latter months. This remaining 15 % is the portion that pre-opening counts indicated should exist, based on ramp access habits. Specifically, this percentage represents the portion of Bridge bound carpools then on Rt 46 and local streets, neither of which have access to the reserved lane.

From the data in the early months, as many as 230 I-95 carpools were non-users, considerably above the non-user prediction. The most recent total, essentially what pre-opening counts predicted, indicates a learning and that targeting the remaining non-users for promotion of the lane is not appropriate.

The other source of carpools that reach the plazas without access to the reserved lane is the local street system. This group uses several ramps to access the Bridge. On average, about 145

carpools (another 20% of the plazas) fit this category. During December the volume of this group was only 25, more than 100 less than any other month and suggesting that many of these carpools experimented with adjusting their route in order to take advantage of the reserved lane. This is deduced from the concurrent increase of reserved lane volumes, also illustrated in Figure 5. Such a shift probably occurred in only December because the diversion involved to gain access to the lane is circuitous and undoubtedly offsets any time savings to be gained.

The implications of these non-user experiences are that, at most, about 65% of carpools at the I-95 plazas will be able to use the reserved lane. Also, an understanding of the lane use rules exists even among carpools not in the primary target group. As a result, further non-user decreases seem unlikely. If so, the "good news" is that the signing and promotion of the lane have been effective with carpoolers. The "bad news" is that potential users are about 35% less than the plaza total.

Enforcement

If extreme, the quantity and rates that violators use the reserved lane can be detrimental to the operation of the lane. Violators have been substantial as shown on Figure 6 and 7. To date, they have not interfered with the viability of the lane. This has been because the total lane users (400-500) have been well below the capacity of the lane. The remaining concern is whether continued disregard for lane rules will result in escalated violations to the point where they will inhibit operations at current use levels and

what level of enforcement may be necessary to avoid such an event.

Since large increases in carpool use of the lane are not expected, maintaining violations at or near the current levels should be adequate to ensure continued proper operation of the lane. To get an idea of what level of continued enforcement may be appropriate, summonses on selected days during the first year have been summarized on Figure 14. As is often the case, heavier summonses in the early months of the lane's operation has been followed by gradual reductions since, despite virtually daily presence of personnel throughout the first year.

Notably, the rates of violation, previously presented on Figure 7, have been roughly stable at about 30% throughout the first year. Violations are averaging about 150 although varying from about 100 to 200. The implication from the experience with enforcement during the first year is that violations are manageable in the 100 to 200 per day range and continuing regular presence of enforcement personnel will be more important than the actual level of summonses activity.

Operational Hours

Despite a fully functional lane throughout the 7 to 9 am peak period, Figure 9 illustrates that the percent of the carpools that use the reserved lane is quite dynamic. Use typically approaches 90% of I-95 carpools at the main and lower plazas during the first half hour of the lane's operation and runs above the peak period average of 65% for the entire first hour. Figure 10 shows this same data in terms of BCPL users and non-users by 15 minute time period. It can be seen then that both the carpool totals and the portion that use

the lane peak during the first hour. In fact, the data suggests that on a typical day as much as 80% of the reserved lane use occurs by 8 am. Why then continue the lane operation beyond 8 or 8:30 am?

Figure 11 illustrates the range of delay commonly encountered during the peak period. Separate lines delineate upper and lower bounds for the delay observed on typical days. The right vertical axis indicates the scale for minutes of delay which is the same as time savings available to reserved lane users. The range of delay is drawn from data taken during the four years preceding the lane's initiation and emphasizes the need for 7 to 9 am as a minimum operational period.

Reserved lane users are also displayed in Figure 11 with the left vertical axis indicating carpool use by 15 minute period. As can be seen, carpool use of the reserved lane varies directly with the delay. While lane users decline after 8 am, it is clear that the 8 to 9 am totals remain substantial at a time when delays are still significant.

Based on this data, 7 to 9 am appears to be a proper operational period. Despite the fair amount of carpools present before 7 am congestion is not great and carpool totals fall off greatly after 9 am. For these reasons, extending lane operation because congestion is present at times until 10 am is not justified. While not shown, bus use is also greatest in the 7 to 9 am period. Should congestion increase before 7 am, some reconsideration could be given to opening the lane earlier.

Carpool Trends

The past history of the quantity of carpools and their respective percentage of the autos in the peak period can be clearly seen from the data of Table 3 as presented in Figures 12 and 13. The graphical presentation also emphasizes the seasonal nature of carpooling. After March of 1984, the end of the first year of data collection, four months of the year were chosen to represent the "summer" months and four additional months represented "winter". November through January are termed "winter" as they were found to best represent the lowest carpooling months and April through July are termed "summer" as they best represent the highest carpooling months. Data taken on freeways in other states shows similar trends.

As can be seen, the total number of carpools on all approaches is now at about 1100, including the 400 carpools using the Palisades Interstate Parkway (PIP). There is no convenient way for these PIP carpools to divert to the reserved lane so they were observed and tallied independently. In this way, current trends in PIP carpool behavior can be used as a control measure to compare against changes in I-95 origin carpooling. Seasonal trends observable in the PIP have been in evidence at the Main and Lower plazas in past years. Further, yearly declines have occurred at both, the major difference being that quantitative losses in carpools and the percent of autos that they represent has been consistently greater at the PIP. Interestingly, the yearly and seasonal trends have all but disappeared on the main and lower plazas since 1985. As a result, carpools in the range of about 6 percent seems to be a baseline condition. Recent data shows PIP carpooling has reached this

watershed. The implication of the Main & Lower plaza data is that the PIP rates will not continue to decline.

In fact, the Main & Lower plaza data shows an apparent increase in the percent carpools at the main and lower plazas. If true, such increases during the first year of operation is certainly a desirable result implying the lane's existence has had some positive influence. This increase is also of interest because the PANYNJ raised the toll charges dramatically for non-carpoolers during the study period. The increase is small, about .5%, and because of declines in total auto volumes, carpool volumes remain virtually constant. However, the apparent carpool rate increase is a clear departure from the recent trends.

Toll Rate Changes

On April 12, 1987 daily commuter toll rates increased from $1 to $2 dollars and non-commuter rates increased from $2 to $3 while carpool rates remained at $.50 a trip. Thus the above described trend to increased carpooling observed in the summer '87 data might be attributed to this new rate structure. However, effects of an increase in toll fees on carpooling, if present, should be observable at all plazas. It was not.

In fact, rather than increasing, the trend at the PIP is quite the opposite as previously discussed. On examination, this is not surprising as most of the autos present during the peak hours carry daily commuters to whom toll fee increases of a dollar a day ($250 per year) can be considered minor, particularly in light of substantial employer subsidies as documented by the PANYNJ. In

summary then the toll increases which took effect on April 12, 1987 do not appear to have effected carpooling rates.

BCPL Impacts on Carpooling

Increases in the carpool percents at the I-95 plazas, although small, may then be reasonably attributed to the presence of the reserved lane. Trends observed at other reserved lane facilities during the first year of operation indicate that initial increases in carpooling are not uncommon. Whether they are followed by lower long term increases is more complex issue which the current data cannot be expected to resolve.

It is interesting to note, however, that the previous trend of declining carpool percents suggest that there may be many previous carpoolers present who have fallen out of the habit for one reason or another. Establishing a reserved lane could be just enough incentive for ex-poolers who are still commuting here to return to carpooling. Besides, a time savings is something an employer can not offer as subsidy.

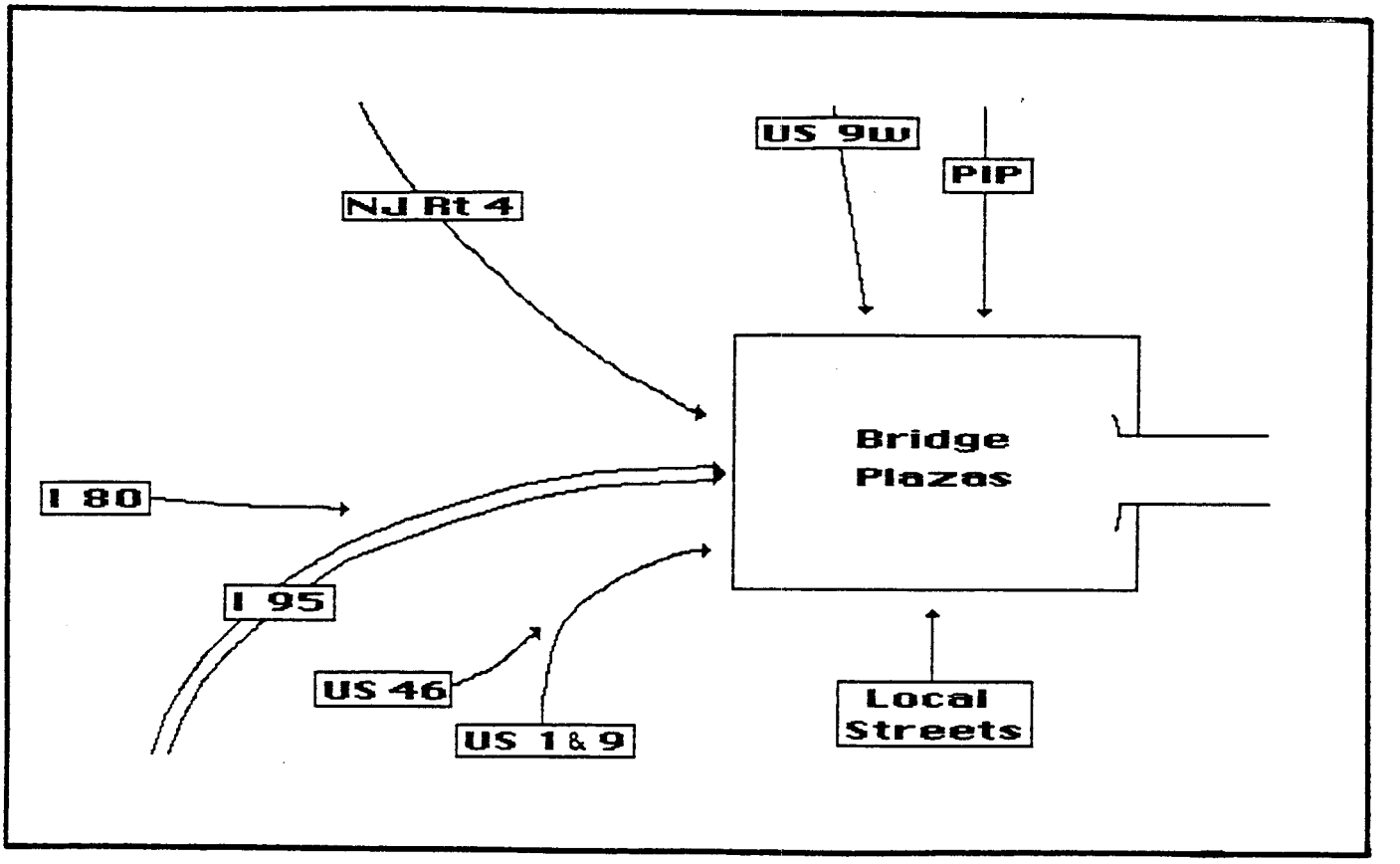
PALISADES INTERSTATE PARKWAY (PIP)

The dramatic and apparently continued dropping of carpools on the PIP seen in Figures 12 and 13 is disturbing. In particular, the summer '87 dropoff to less than 6% carpools is unprecedented in that it fell below the average at the I-95 plazas. A similarly large non-seasonal drop in PIP carpooling was previously observed in the summer '84 data making this effect less likely to be an anomaly in the long term sense.

Attempting to reverse this trend by providing preferential treatment for carpools on the two lane approaches to the PIP plaza is not feasible, due to physical constraints. The only reasonable alternative, a preferential toll plaza at the mid level Hudson Terrace location, was ruled out several years ago by a study sponsored by the Port Authority of New York and New Jersey (PANYNJ). This booth is currently used only for permit operations to allow access for high-wide loads. Since much of the data on carpools for that previous PANYNJ study can now be updated, revisiting the study might lead to a different conclusion as to the viability of a Hudson Terrace carpool booth.

An additional benefit of such a booth operation would be that carpools now accessing the main plaza via the local streets could reroute easily to take advantage of such an operation. Certainly any resulting impacts on traffic patterns on the local street system would need to be ameliorated. Local buses, which cannot use the lane, would not need this booth since PANYNJ police give all buses leaving the bus stop priority at one toll booth at the main (upper level Plaza). Similar treatment of local carpools at the toll plaza is not feasible, however, thus the need for a Hudson Terrace carpool booth.

LIST OF FIGURES AND TABLES


US 9W
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I 95
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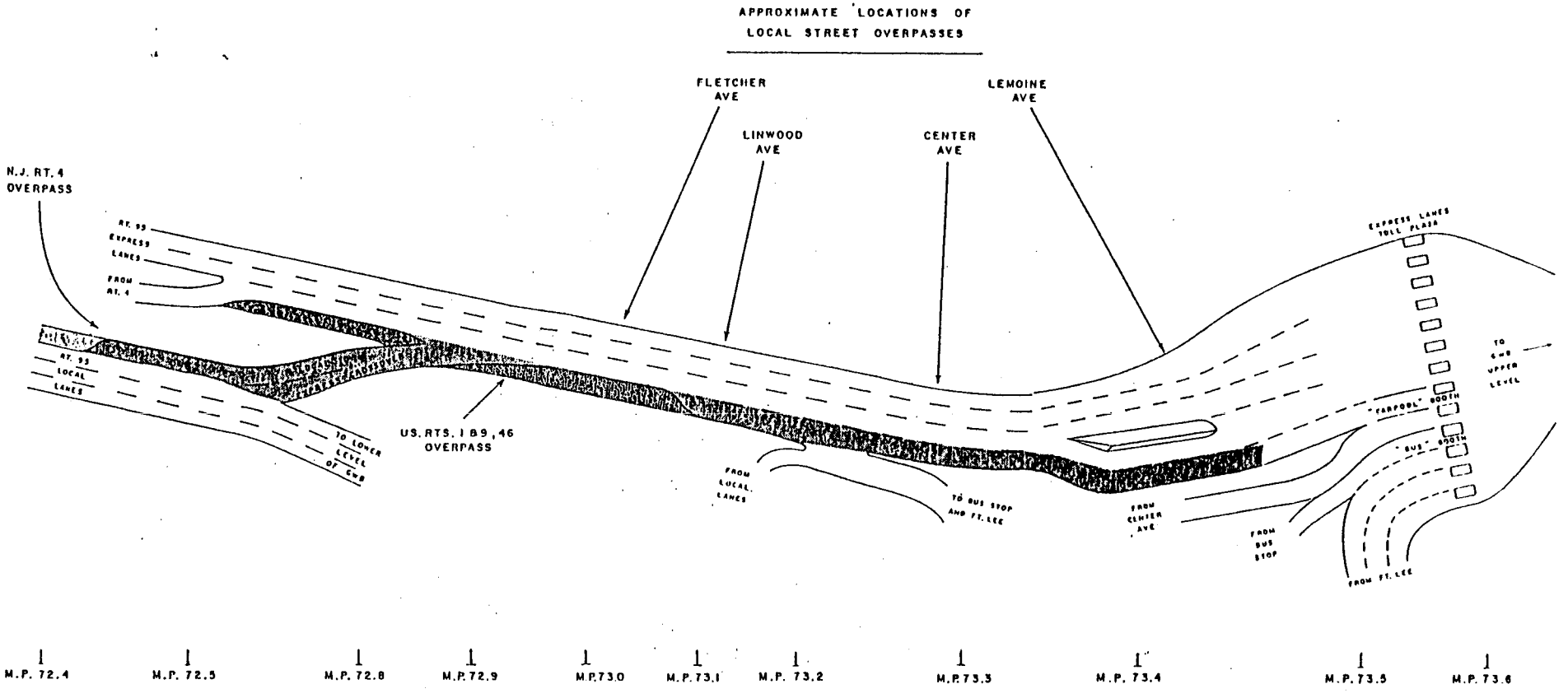
US 1&9
Local
Streets

FIGURE 1

FIGURE 2



AREAS RESERVED FOR BUSES & CARPOOLS
7 – 9 A.M., Weekdays

NEW JERSEY DEPT. OF TRANSPORTATION DIV. OF RESEARCH AND DEMONSTRATION	
GEORGE WASHINGTON BRIDGE BUS CARPOOL LANE LOCATION, NJAC REG. 16:30 – 3.5	
DRAWN BY: W. Crowell	SCALE: VARIABLE
DATE: 9/86	SHT. 1 of 1

TYPICAL SIGNS

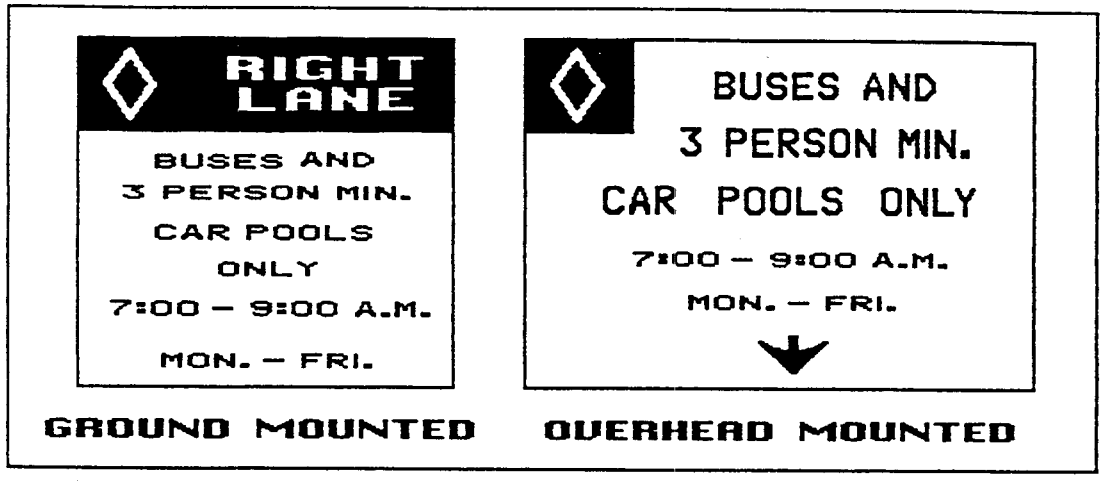
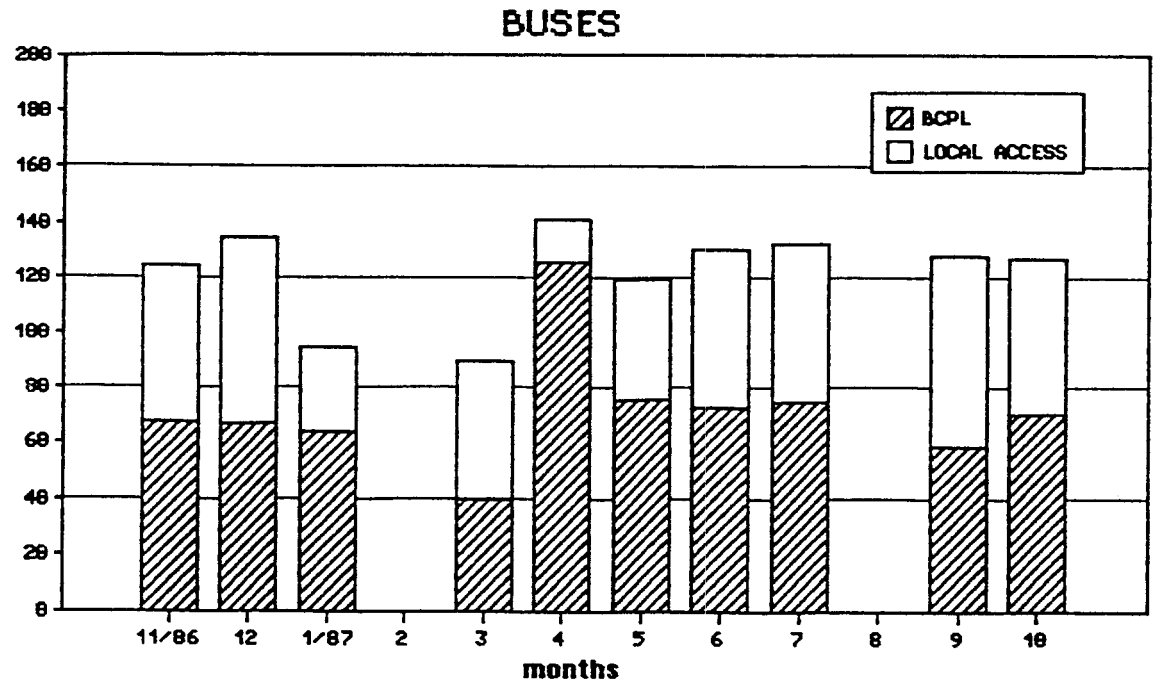


FIGURE 3



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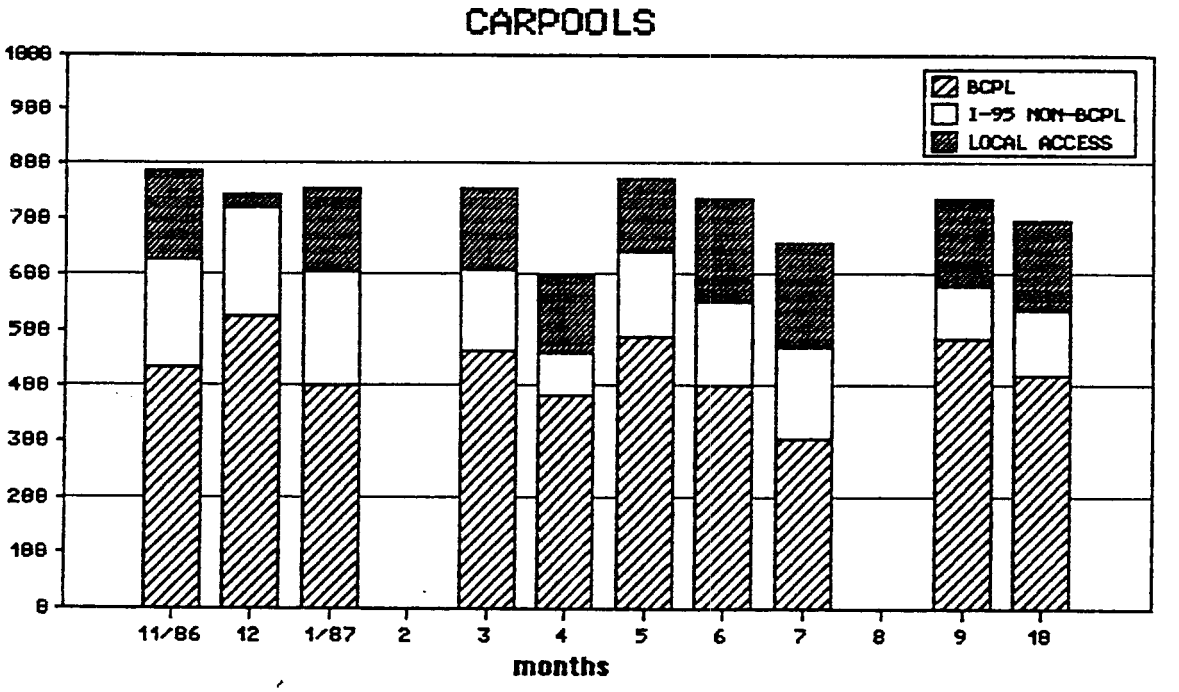

FIGURE 5

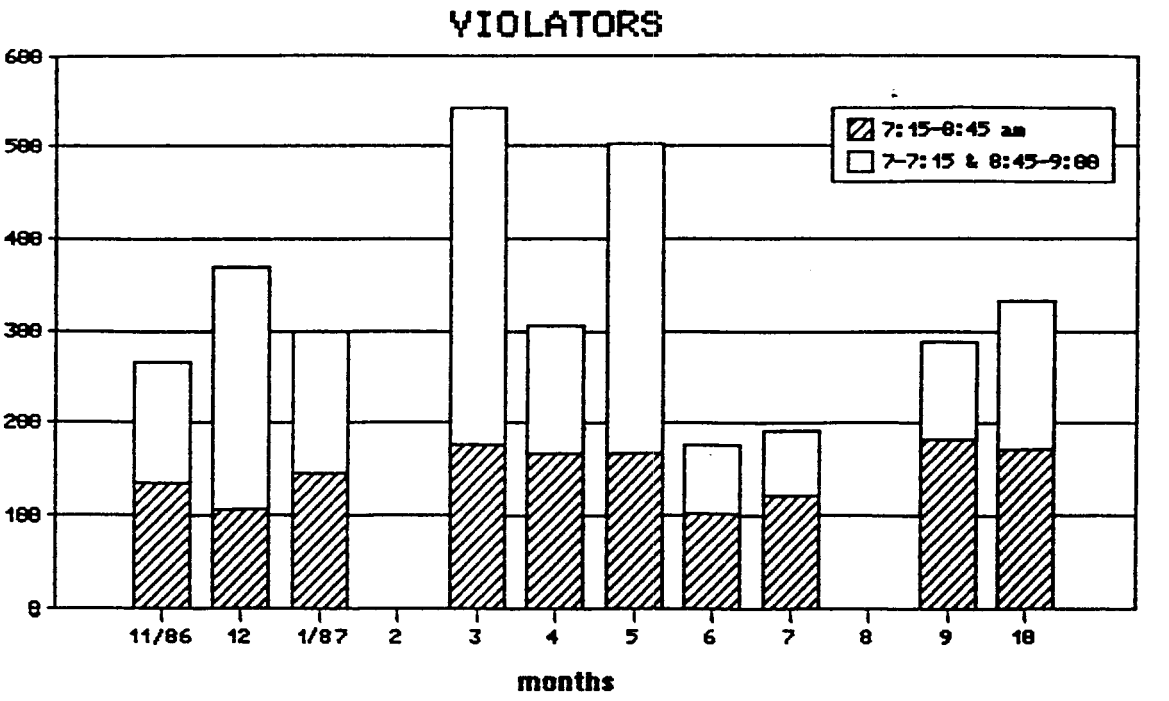

FIGURE 6

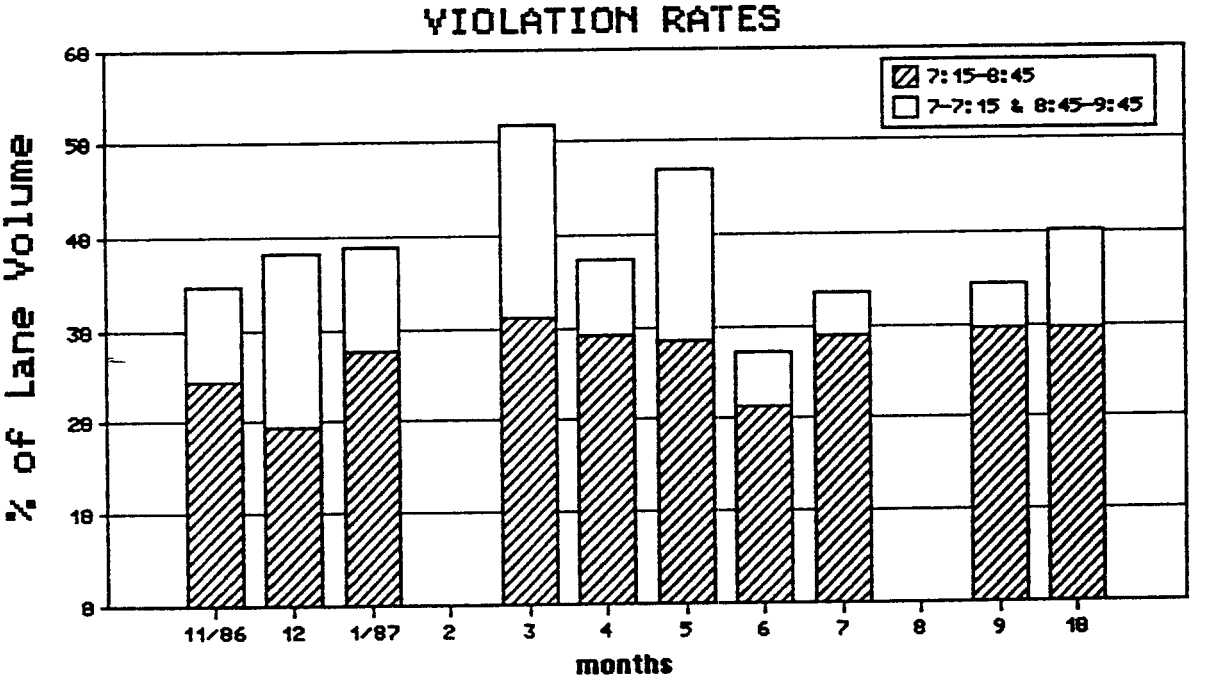

FIGURE 7

TABLE 2
10/20/87

George Washington Bridge Bus-Carpool Lane
7 - 9 AM Peak Period Use

HOV GROUP	11-1/87 Ave HOV'S Pools	Buses	Total	4-7/87 Ave HOV'S Pools	Buses	Total
Bus-Carpool Lane (BCPL-I/95)						
I/95: Plaza Direct	424	13	437	363	30	394
: Bus Stop	0	54	54		57	57
: Local Exit	30	0	30	32	0	32
BCPL Total	454	66	521	395	88	483
Upper Plaza Access						
I/95: Direct	424	13	437	363	30	394
: Bus Stop	0	54	54		57	57
Local: Direct	111	53	164	161	44	205
Main Total	535	119	655	525	131	656
Lower Plaza Access						
I/95: Direct	228	1	229	168	1	169
I/95 To Bridge						
Upper: Dir+Bus Stop	424	66	491	363	88	451
Lower: Direct	228	1	229	168	1	169
I/95 Bridge Total	652	67	719	531	89	619
Non Bus-Carpool Lane (Non-BCPL)						
Main: Local Direct	111	53	164	161	44	205
Lower: Direct	228	1	229	168	1	169
Non BCPL Total	339	54	393	329	45	374
Bridge Plazas						
Main: Total	535	119	655	525	131	656
Lower: Direct	230	0	230	168	1	169
PIP *: Direct	337	2	338	320	14	334
Bridge Total	1102	121	1223	1012	146	1158
% Bridge BCPL/I95	65	99	68	68	99	73
% BCPL/(Main+Lower)	59	56	59	57	66	59
% Bridge BCPL/Main	79	56	75	69	67	69

* Palisades Interstate Parkway

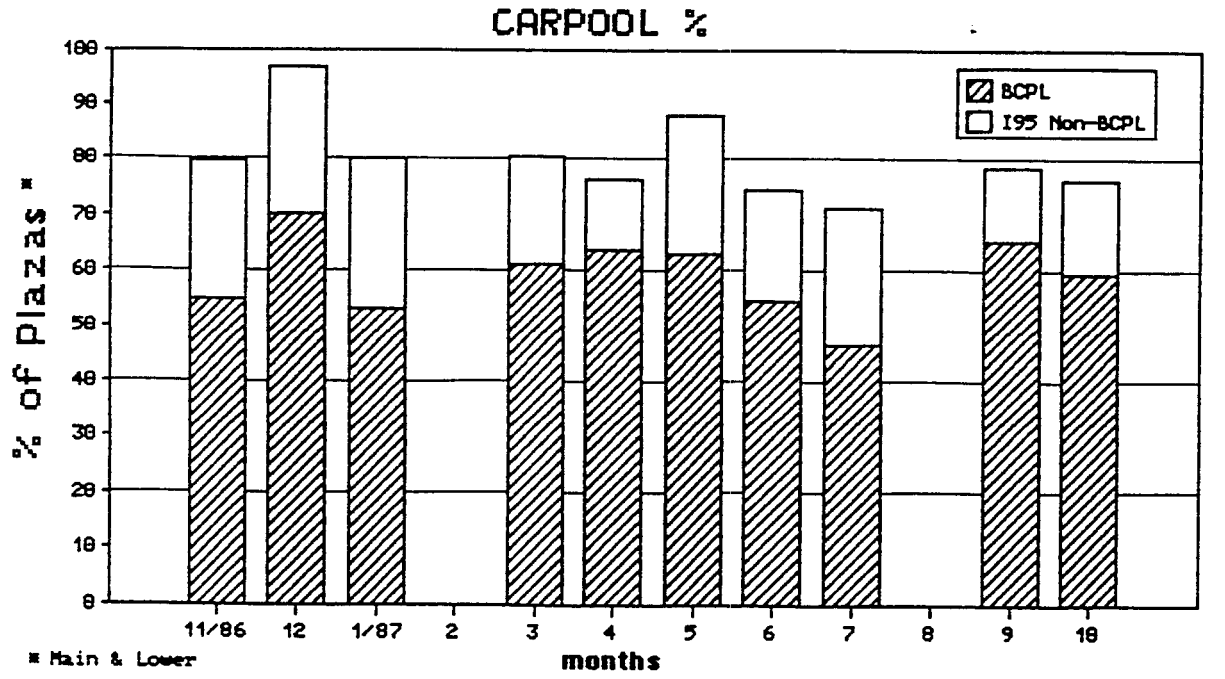

FIGURE 8a

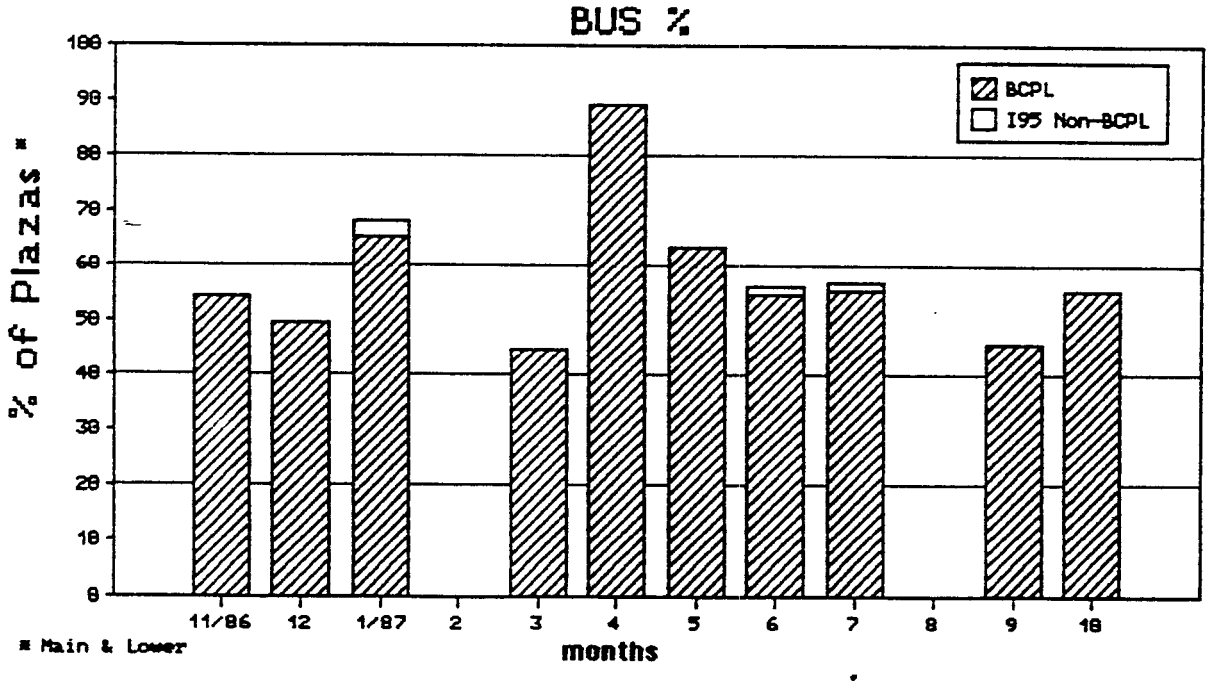

FIGURE 8b

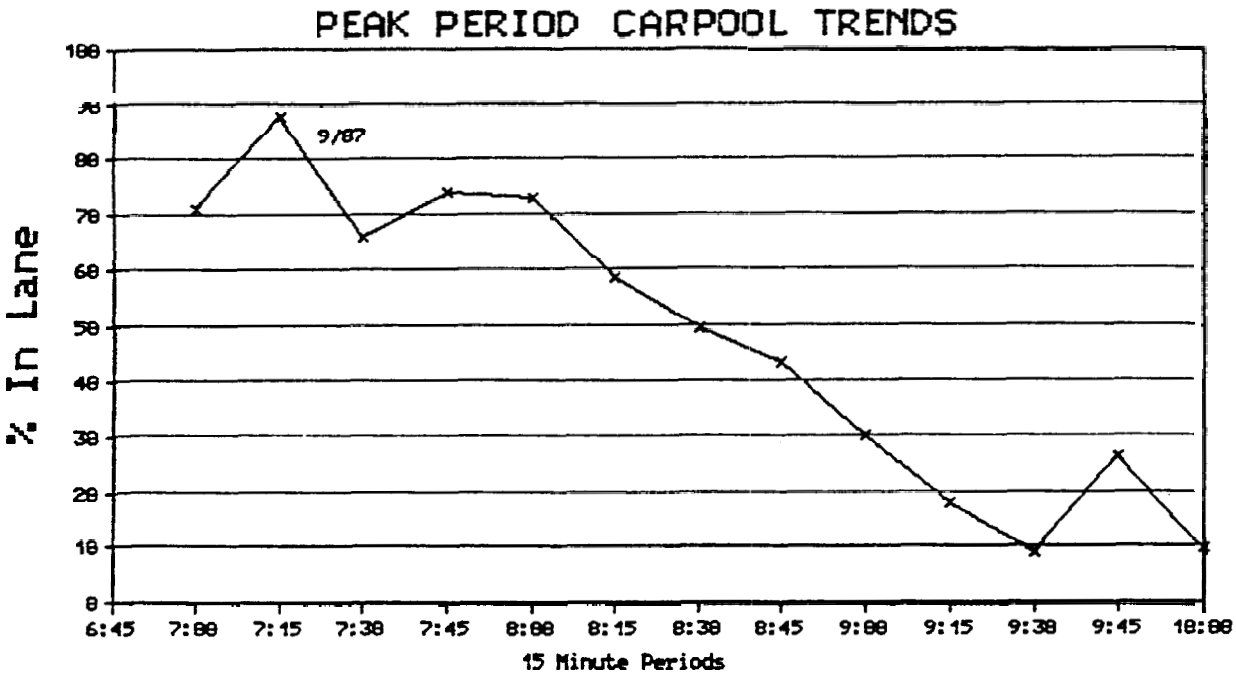

FIGURE 9

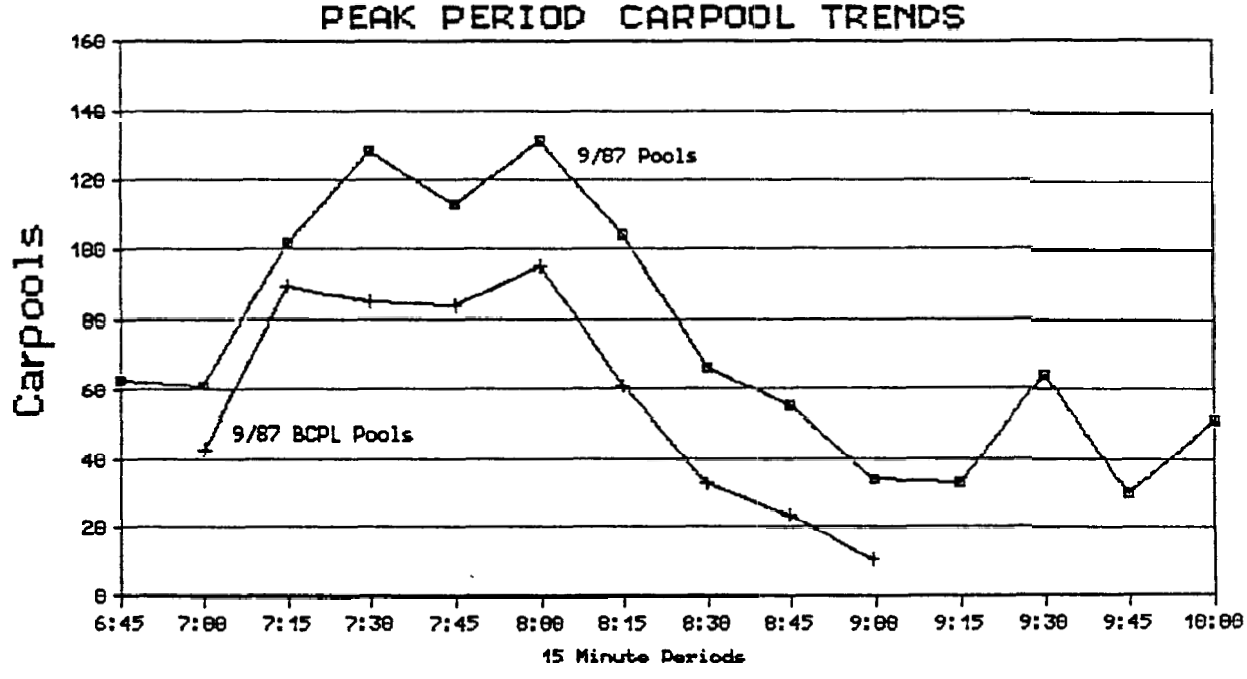

FIGURE 10

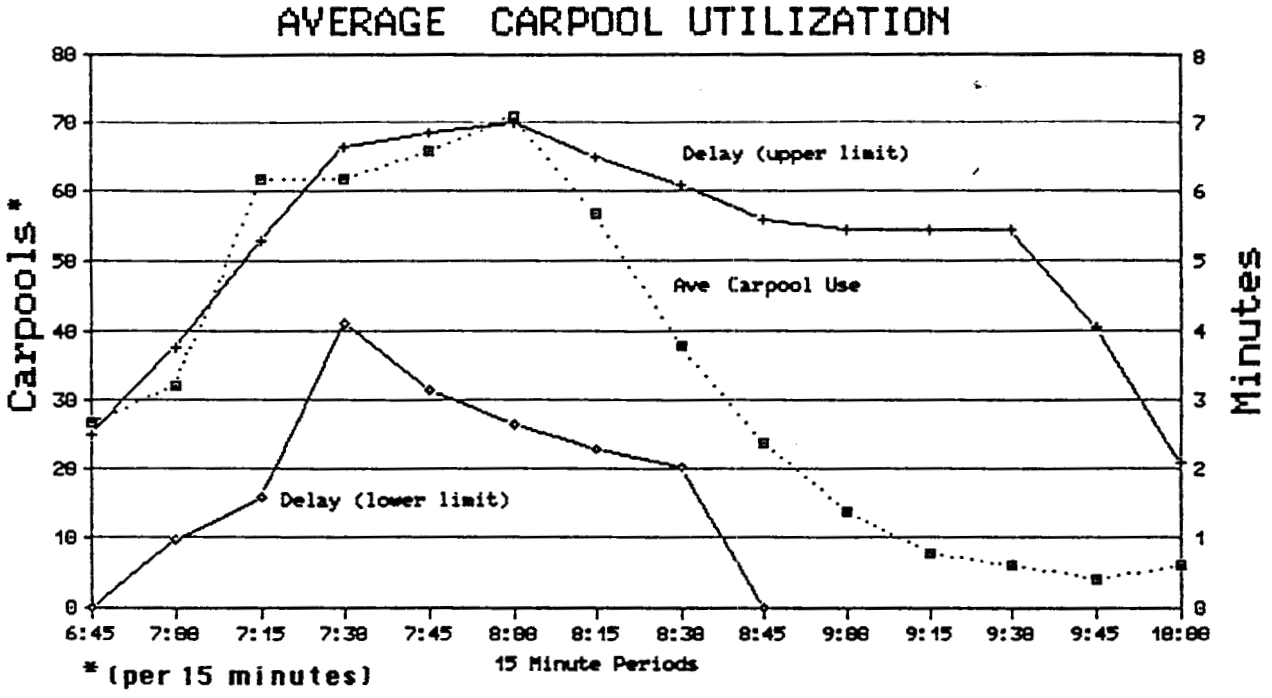

FIGURE 11

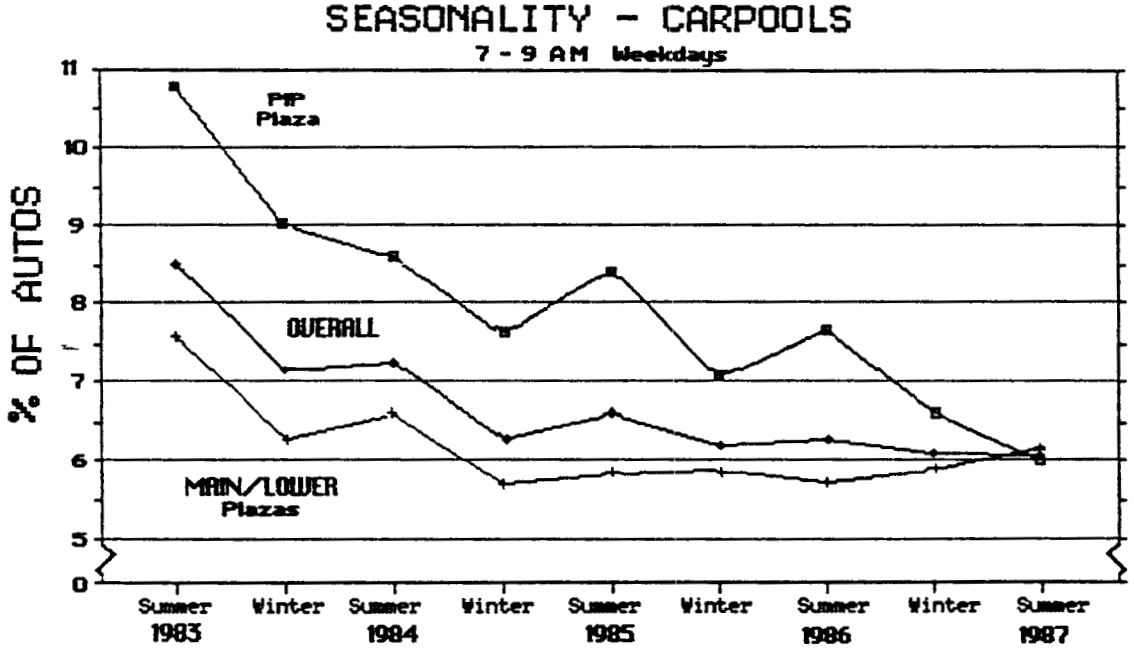

FIGURE 12

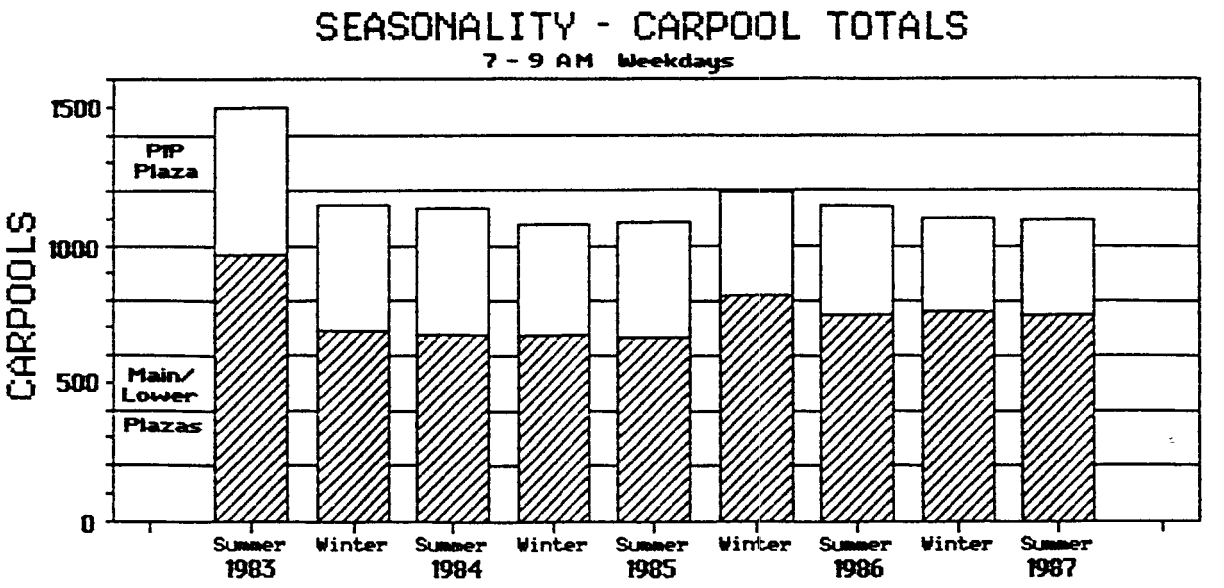

FIGURE 13

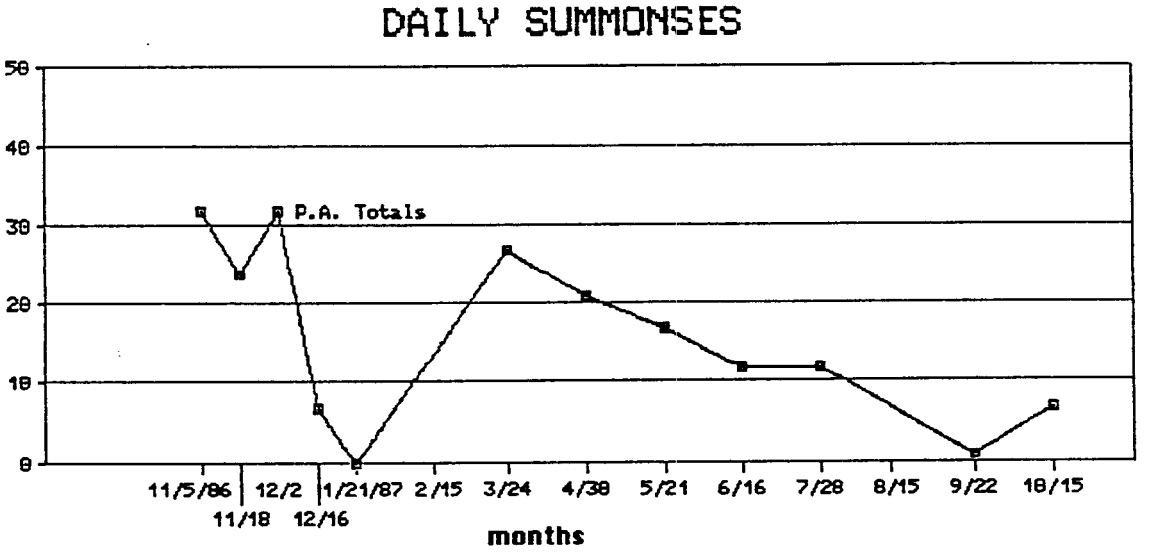

FIGURE 14