Policy Study No. 241

A Transit Plan for Hillsborough County: A Reality Check

By Peter Gordon

Executive Summary

Transportation planners in the greater Tampa/Hillsborough County metro area propose to spend $2.5 billion over the next 15 years on an expanded mass-transit system. The transit component of the Locally Preferred Strategy (LPS) calls for the addition of buses and the construction and operation of a 71-mile light-rail system. This study concludes that the case for such a transit system is very weak. Based on the experience of other cities that have added rail transit over the past 20 years, the proposed system is likely to cost more than expected and to deliver far less than projected. At best, taxpayers will have spent $2.5 billion for a system that has very little impact on traffic or air quality. At worst, taxpayers could be spending even more than that for a system that ends up carrying fewer passengers than today's transit system.

The experience of other cities is chilling. By 1995, after 30 years of federal, state, and local expenditure of $340 billion in transit subsidies, transit trips per capita reached a new all-time low. Adding rail systems has not reversed this decline; all 10 cities that invested in rail during the 1980s *lost transit market share* to cars between 1980 and 1990. Most rail systems have cost far more than projected, both to build and to operate. And rail has *not* gotten people out of their cars, has *not* increased property values, and has *not* re-shaped land-use patterns.

There is no reason to believe that rail would fare any better in the Tampa/Hillsborough County metro area. The 1990 census found that just *two percent* of local commuters use transit—the same proportion as walked or worked at home. The LPS assumes that the proposed rail and bus system would increase transit use by between *221 percent* and *342 percent* by 2015—an unprecedented increase far beyond what any other city has achieved. If that growth could somehow be achieved, what would each new

transit trip cost? Using LPS figures, this study computed the proposed system's annualized capital costs and annual operating costs, and divided this total by the number of new riders. The total cost of each new round-trip works out to be $32.24. Assuming a round-trip fare of $3.00, this means taxpayers would be paying 91 percent of the cost of every trip.

Since no U.S. metro area has achieved more than *50 percent* growth in ridership from such a strategy (compared with the assumed 221 to 342 percent growth), our analysis then calculated the costs of the LPS plan based on the percentage ridership increase and cost growth actually experienced over a 15-year period by the highly touted Portland transit system. Using Portland's ridership percentage increase, the Tampa-area cost per round trip would be $147. If the Tampa-area system also suffered from Portland-equivalent cost overruns, each round trip would cost $223 (of which the rider, remember, would be paying only $3).

Even if the LPS system did achieve its highly optimistic growth in ridership, would this produce benefits (reduced congestion and air pollution) worth the $2.5 billion cost? The LPS projects that if its ridership target is achieved, transit use would account for less than five percent of the expected growth in vehicle miles traveled in the region. That small impact would have little or no measurable effect on either congestion or emissions. And if spending $2.5 billion on transit meant that other, more cost-effective transportation investments could not take place, overall congestion and emissions might actually be worsened by this choice.

Several alternative transportation approaches would be more cost-effective than the LPS rail plan. Among these are (1) expanding and improving the bus system, as Houston has done; (2) improving transportation management in the region; (3) adding transitways on freeways and arterials; (4) expanding the use of competitive contracting for bus service; (5) expanding the role of private transit, such as shuttle vans and jitneys, and (6) adding tolled express lanes (HOT Lanes) on congested freeways.

Part 1

Introduction

As in other U.S. metropolitan areas, citizens and civic leaders of the greater Tampa /Hillsborough County area are actively engaged in discussions over the their region's future.[1] These deliberations include the evaluation of transportation options. A series of recent transportation planning studies has culminated in a Local Preferred Vision (LPV) and Locally Preferred Strategy (LPS). The LPS includes those parts of the LPV that are thought to be implementable by 2015, including a substantial commitment to new light rail transit.

The LPS transit component requires $1.47 billion of capital expenditures, a major portion of which would produce a 71-mile rail transit system. More specifically, the transit elements of LPS are:

1. An enhanced bus system of almost 400 vehicles with an expanded service area, expanded service hours, greater service frequency, neighborhood circulators, upgraded operation, and maintenance facilities.

2. A light rail transit system using small diesel trains (Diesel Multiple Units) capable of 10-minute headways connecting existing major activity centers:

    - USF Area/Downtown Tampa
    - Downtown Tampa/InterBay-Port Tampa
    - Airport to HCC to Downtown
    - Brandon Town Center to Downtown
    - Extension to Citrus Park Mall and Bears Avenue
    - Commuter Rail Service during peak periods between downtown Tampa and Lakeland also using small diesel trains.[2]

This paper's analysis focuses on the transit portion of the relatively near-term (through 2015) LPS rather than the more speculative LPV. At this writing, however, it is far from clear where the $1.47 billion for LPS transit capital costs plus the associated operating costs would come from. The cumulative operating costs are $1.039 billion, for a total additional cost of $2.5 billion.[3]

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[1] "Tampa, Hillsobrough County-Lakeland, Polk County" is the name that has been used to designate the study area. Hillsborough County is its overwhelming component.

[2] Report to the Board of County Commissioners, March 11, 1998.

[3] Figures 4-2 and 4-3, draft Financial Plan: Locally Preferred Strategy, March 13, 1998.

The sheer size of this proposed investment invites scrutiny. And the experience of the other U.S. cities that have added or significantly augmented their rail transit systems in recent years suggests great caution. The particulars of the Tampa situation add to the case for caution. Tampa is smaller, less dense, and has a smaller central business district than most cities that have recently added light rail with disappointing results. Tampa currently has significantly lower transit ridership than these other cities. Tampa's parking supply and costs, its congestion levels, and its trip lengths all suggest that significant growth in transit ridership is improbable. In addition, the proposed schedule for rail implementation significantly outpaces that of other rail starts. These are just some of the warning signs. Much of the proposed light rail would be on existing rail rights-of-way that will probably remain available for some time. Hence, there is no need to rush into a rail progam without very careful scrutiny.

With all this in mind, this report offers a reality check. Given what we know about modern American cities, about the recent history of the U.S. transit industry, and about the greater Tampa area, what can we say about the LPS transit proposals? Our analysis concludes that the proposed rail-based transit plan is ill- conceived. Its costs will be high while its benefits will be very low. Even if the proposed system were completed as planned, its projected ridership would represent an unprecedented change in Americans' travel behavior. Yet even that major shift from cars to transit use would have virtually no impact on highway congestion or air quality. On the other hand, if our more cautious assessment of costs and ridership is correct, Hillsborough County taxpayers would be stuck with a huge negative financial burden for a system offering no real benefits. More-promising alternatives exist and should be studied.

Part 2

Recent U.S. Experience

For the past 30 years, rail transit (and especially light-rail transit) has been the great hope of transit planners across the country. It was expected that by investing heavily in modern rail systems, urban areas would be able to tempt middle-class commuters out of their cars for their ride to work, thereby unclogging the freeways and helping clean up the air. It was even believed that rail transit was the key to reversing the postwar trend toward "urban sprawl," revitalizing the fortunes of America's fading downtowns.

Thirty years later, the results of these efforts are becoming clear. Since 1964, taxpayers at federal, state, and local levels have put $340 billion into transit systems, a major fraction of which has gone to build and operate rail. Yet today's urban transit systems have failed to accomplish any of the planners' objectives. Here are some of the major lessons learned:

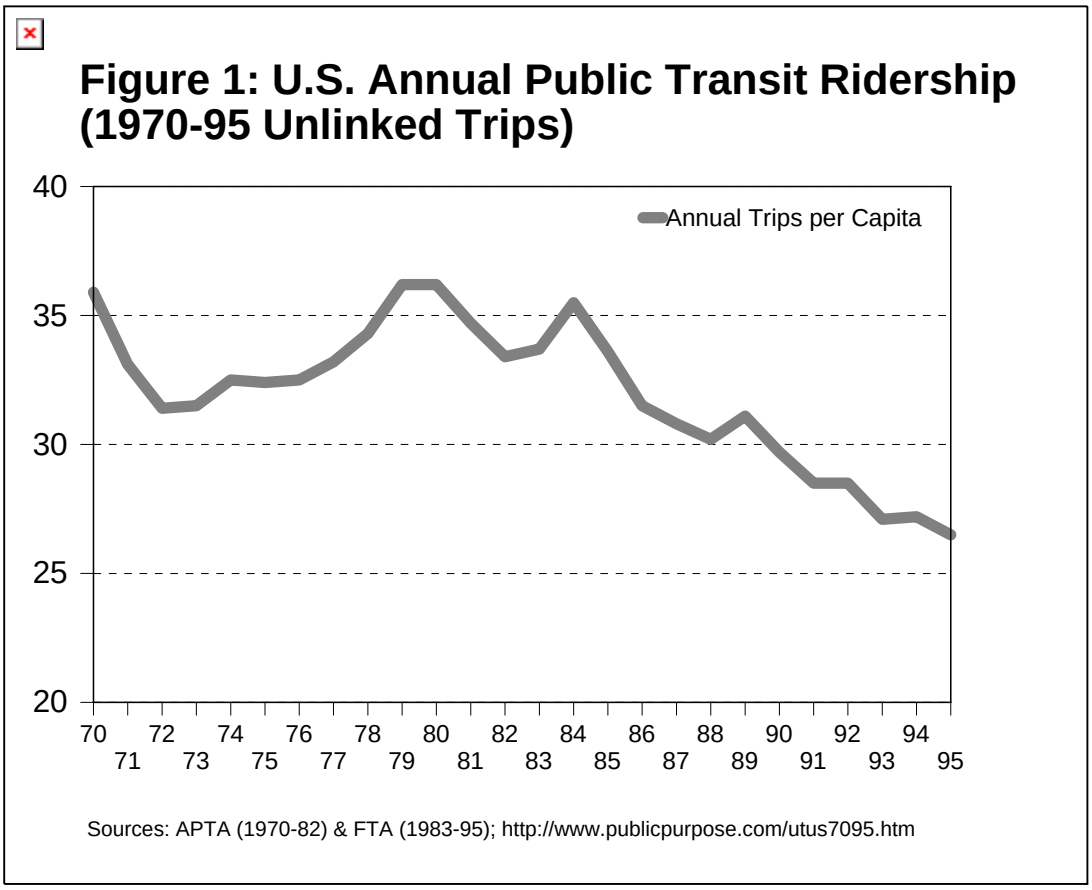
A. Expenditures Keep Rising, But Ridership Keeps Falling

In the years 1980-94, total transit boardings decreased by over 10 percent while costs per boarding soared by over 95 percent (in constant dollars). Subsidies per boarding grew by almost 120 percent in constant dollars (Table 1). By 1995, transit trips per capita across the United States had reached a historic low — in spite of ever-increasing subsidies (Figure 1).

Table 1: U.S. National Urban Public Transport Financial Performance: 1980–1994
Financial Data Inflation Adjusted (1997 $Billions)

Year	Expenditures	Revenues	Subsidies	Revenue Ratio	Boardings (billion)	Cost per Boarding	Subsidy per Boarding
1980	$13.8	$4.7	$9.1	34.0%	8.6	$1.61	$1.06
1985	$18.5	$5.7	$12.9	30.6%	8.4	$2.21	$1.53
1990	$21.1	$5.9	$15.2	27.8%	8.0	$2.65	$1.91
1994	$24.2	$6.3	$18.0	25.8%	7.7	$3.14	$2.33
Change	75.5%	33.4%	97.1%	-24.0%	-10.1%	95.2%	119.2%

Expenditure & revenue data from US Department of Commerce
Ridership from Federal Transit Administration and the American Public Transit Association
Source: http://www.publicpurpose.com/ut-doc94.htm



B. Adding Rail Has Not Reversed The Ridership Decline

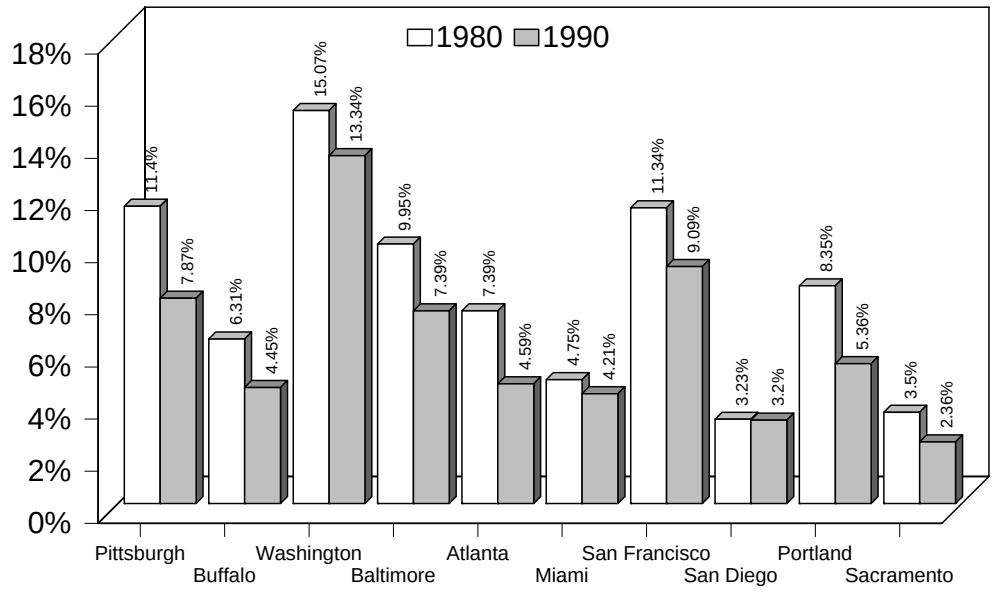
The lion's share of transit funding has gone to new rail systems. All of this added capacity has not generated the hoped-for new ridership. All ten of the U.S. cities that added or expanded rail during the 1980s lost transit market share to other modes between the most recent census years (Figure 2)[4]. Data for the most recent five years confirm the trend. Looking at just the 22 Sunbelt metro areas with population over 1 million in 1995, overall transit use over those five years fell by 0.3 percent; the per capita drop was even greater, 11 percent (see Table A-1, in the Appendix). The eight Sunbelt metro areas with rail also suffered a decline in overall transit use (-0.9 percent) and also a significant per capita loss (-7.3 percent).

C. Rail Transit Cost Overruns Have Been Widespread and Substantial

A U.S. DOT study of eight recent rail transit projects (both heavy and light-rail) found that construction cost overruns averaged 50 percent and operating cost overruns averaged 80 percent. The combination of disappointing ridership and cost overruns mean that operating costs per boarding have been 250

[4] Most of these data are easily accessible from the U.S. Department of Transportation's Section 15 studies. The data are also conveniently summarized at www.publicpurpose.com.

Figure 2: Falling Market Share: Fraction of Commuters Using Public Transportation in New Rail Cities



Source: 1980 and 1990 U.S. Census

percent over what was forecast.[5] For the four new light-rail systems that were examined in a landmark U.S. DOT study, the actual full cost of a round-trip was $18.87.[6]

D. Rail Has Not Gotten People Out Of Their Cars

Most riders on new rail systems have not come from private autos. At best, 35-40 percent of new-rail users came from private autos. In Washington DC and San Diego, only 20-25 percent of the rail users are former car users. These include former bus riders whose routes have been abolished or become feeder routes. And this is 20–25 percent of what have been disappointingly small numbers of total rail riders. As a result, there have been no discernable impacts on auto traffic. This means that none of the promised benefits for non-users, including air quality improvements, congestion relief (aggregate time savings), better mobility, or new patterns of development have been achieved. It has been estimated that attracting a single auto user has cost between $5,000 (Portland) and $15,000 (Atlanta) per year.[7] When and where overall transit use actually fell after building rail, such as in Los Angeles, the outcomes have not even been that "good." Over a 10-year period, about $7 billion was spent on rail in Los Angeles, during which time about one billion transit boardings were lost. Taxpayers paid

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5 Wendell Cox, "Light Rail in Milwaukee," Wisconsin Policy Research Institute, 1998.

6 Updated to 1992 dollars in Thomas A. Rubin and James E. Moore II, "Ten Transit Myths: Misperceptions About Rail Transit in Los Angeles and the Nation," Policy Study No. 218, Los Angeles: RPPI, November 1996.

7 See www.publicpurpose.com/pp-rail.htm.

approximately $7 per transit ride eliminated. Regardless of outrageous claims made by defenders, there is no good news to be found in any of these episodes.

E. Rail Has Not Increased Property Values

Low rail transit ridership explains the absence of land-use impacts. That, in turn, undermines any plan to "capture" land value appreciations. There simply are no value increments to tax. One of the few formal studies of this problem is for Atlanta's MARTA system. The authors report, "The results indicated that MARTA has had no discernable impact on total population and employment in station areas …."[8]

F. Rail Has Not Re-Shaped Land-Use Patterns

Transit advocates usually assert that rail stations will attract development, making the investment a way to "shape development." There are three problems with this view:

a) most people prefer low residential densities and spacious living;
b) low levels of transit use undermine the attractiveness of stations as sites for commercial development; and
c) it is a means-ends confusion to assert that cities should be rebuilt so that the trains are more fully used.

Another way to make the same point is to note that the suburbanization of jobs has continued throughout the new-rail metropolitan areas. Every multi-county sunbelt metro area with rail transit shows a trend towards jobs dispersion into the peripheral counties (see Table A-2 in the Appendix).

How did things go so wrong for the planners' vision of what rail could do? Rail transit was appropriate to the highly concentrated and dense cities of the 19th and early 20th centuries. As cities spread out and as downtowns became less prominent, rail transit's traditional markets nearly disappeared. Lifestyles have changed in many ways. More women are now in the labor force, requiring more cars and more diverse travel patterns. More trips are multi-purpose and multi-stop, including errands and drop-offs to and from work. Transit has been losing market share because it is ill-suited to these patterns.

In the information age, the suburbanization of jobs and housing is ever accelerating, strongly suggesting that there are no prospects for a return to 19th century conditions. Most commuting is now suburb-to-suburb (see Table A-3, Appendix). In fact, suburbanization has pulled so much traffic away from concentrated areas that average traffic speeds have been going up, confounding the forecasts of "impending gridlock" (Table 2). The Census Bureau reports that, nationwide, the average one-way journey-to-work trip duration was 22.4 minutes in 1990. Just 30 percent traveled more than 30 minutes.[9] Hillsborough County commuting is slightly better than nationwide figures. The average journey-to-work here in 1990 was 21.7 minutes; only 32 percent of commuters traveled longer than 30 minutes and just 13 percent took more than 40 minutes (Table A-4).[10]

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[8] Christopher R. Bollinger and Keith R. Ihlandfeldt, "The Impact of Rapid Rail Transit on Economic Development: The Case of Atlanta's MARTA," *Journal of Urban Economics*, Vol. 42, 1997, pp. 179–204.

[9] Alan E. Pisarski, *Commuting in America II: The Second National Report on Commuting Patterns and Trends* (Washington, D.C.: Eno Transportation Foundation, 1996).

[10] Center for Urban Transportation Research, *Florida Demographics and Journey to Work: A County Data Book* (Tampa: University of South Florida College of Engineering, 1993), p. 81.

Table 2: U.S. Commuting Trends (all modes)

	1983	1990	1995	1983-95
Mean Travel Time (minutes, one-way)	18.2	19.7	20.7	13.7
Mean Trip Length (miles, one-way)	8.5	10.6	11.6	36.5
Mean Speed (MPH)	28.0	32.3	33.6	20.0

Source: *Our Nation's Travel*, 1997, U.S. Department of Transportation.

Both nationally and locally, the longest-duration trips are disproportionately by transit users. Transit trips tend to take longer than driving because most require waiting time as well as transfers and/or other access to and from stations. This has often been referred to as transit's "Achilles' heel." As metropolitan decentralization continues, ever more people live and work further from transit stations, considerably increasing transit riders' dependence on some sort of "feeder" transportation. Rail line-haul speeds may be faster than that of buses, but rail is more dependent on feeders. Buses on freeways can also achieve high line-haul speeds but become their own feeders when off the freeways (thereby giving riders one-vehicle service). Bus routings are also more flexible.

While traffic "doomsday" predictions have been around for a long time, they have always been wrong. Jobs and people continue to fan out into less crowded areas, avoiding (and thinning) much of the congestion. Average trip times have remained remarkably stable over the years. Where they have gone up it has been by small increments. In those cases, most Americans have willingly traded off small increases in commuting duration for better access to amenities, cheaper land, open space, and better schools, etc. Average work-trip distances may be up but these increases have, for the most part, been offset by higher commuting speeds.

Many planners and other commentators have criticized this trend as "sprawl" that eats up valuable wetlands and open space. What they fail to acknowledge is that suburban development is much more than one uninterrupted large-lot sprawl. Almost one-half of the nation's attached and multiple dwelling unit structures are outside of central cities (39.9 percent in the suburbs and 9.7 percent outside metropolitan areas).[11] Sensitive areas near metropolitan areas can be protected without drastic steps that cost billions. The case for supposed infrastructure savings of compact development is also weak. New technologies (including on-site gas-powered power generation) all point to efficient smaller scales.

Part 3

[11] *American Housing Survey for the United States in 1995*, Current Housing Reports H150/95RV (Washington, D.C.: U.S. Department of Commerce, 1997), Table 2-1.

Today's Tampa /Hillsborough County Transit System

Tampa is Hillsborough County's and the Tampa-St. Petersburg-Clearwater Metropolitan Statistical Area's (MSA) major central city. The MSA's population in 1996 was estimated to be 2.2 million. Hillsborough County's population for the same year was 898,000; Tampa's was 285,286. Most recent population and job growth has been away from the center. The MSA is growing faster than the county, and the county is growing faster than the city.

The Hillsborough Area Regional Transit authority (HART) directly operates the 66th largest transit system in the United States, a 144-bus system, and ranks 70th in terms of ridership. As in many other U.S. cities, ridership has been falling in recent years. HART reports that some of the decline is accounted for by "service modifications which resulted in a nine percent reduction in total mileage" and from some shifting to contracted transit service. HART's bus service in 1991 provided 8.3 million trips. This rose to 10.0 million in 1995 but fell to 8.4 million in 1996, including purchased (contracted) service.

In evaluating transit service, it is important to be aware of the difference between two different measures of activity. Most transit systems report the number of "boardings," since this number is required on their federal Form 406 (which must be filed by all systems which receive federal funds). A boarding is an "unlinked" transit trip. In other words, if a patron gets on a bus, rides it to a transfer point and transfers to another bus or a rail car, that journey counts as two "boardings," even though both are part of a single one-way trip and probably involve only a single fare. The two combined segments, from origin to destination, constitute a single "linked" transit trip.

HART's Form 406 reports approximately 8.4 million unlinked trips (boardings) for 1996. Transit planners often use a 305-day year to account for lower weekend use. By that standard, HART's average daily transit boardings were approximately 27,500. HART's linked trips are somewhat less—20,875 (constituting 0.6 percent of all regional trips).[12] The ratio of linked to unlinked transit trips is approximately 0.75—a figure we will need for subsequent analysis.

Census data show that in 1990 just two percent of Hillsborough County commuters used public transit— the same proportion as walked or worked at home. Some 79 percent of commuters drove alone while 14 percent carpooled.

Part 4

[12] March 9, 1998 memorandum from Lucilla L. Ayer, Metropolitan Planning Organization Executive Director to MPO Commissioner Chris Hart.

Hillsborough County's Locally Preferred Strategy (LPS)

Given the specifics summarized in Part 3, the LPS is highly optimistic, to put it mildly. Planners project 67,100 daily linked transit trips by 2015 and 121,500 daily unlinked transit trips for the same year. This represents a 342 percent increase in unlinked trips and a 221 percent increase in linked trips over the 15-18-year period. The decline in the ratio of linked-to-unlinked trips (from today's 0.75 down to 0.55) reflects increased transfers, because rail use would require extensive transfers from feeder buses. As already suggested, this exacerbates transit's weakness. Sticking with the unlinked trips (for ease of comparison) and using a 305-day year, this amounts to the addition of 28.67 million unlinked transit (bus and rail) trips per year. Transit growth of this magnitude via a rail-dominated plan is contrary to the experience of every U.S. metro area (as we saw in Figure 2 and Table A-1).

What would all this cost? The LPS Major Investment Study estimates capital costs for the transit component to be $1.47 billion (in 1997 dollars; $299 million for bus, $1,090 million for rail and $80.2 million for streetcar). Corresponding 1996-2015 operating costs are $1.039 billion. The detailed LPS cost table lists incremental annual operating costs as approximately $65.6 million (growing from $25.8 million in 1998 to $91.4 million by 2015; all in 1997 dollars).[13]

Capital costs can be converted to an annual basis in standard fashion. The opportunity cost of capital can be calculated using the federally mandated 7 percent. This means that the annual equivalent of $1.47 billion is $102.9 million. Depreciating new transit equipment over 25 years, adds an additional annual charge of $58.8 million. Total annualized capital costs are, therefore, $161.7 million (see Table 3). Adding $65.6 million per year for new operating cost, we reach a total annual cost of $227.3 million. This is the incremental annual cost of the additions proposed in the LPS. If it takes that many dollars to buy 28.7 million new unlinked transit trips per year, then each additional trip costs $7.92. If fares are $1.50 per unlinked trip, then taxpayers would subsidize each of these trips with $6.42.

Table 3: LPS Costs Worksheet

	1997 $millions		
LPS incremental capital cost	1,470.0	HART base-year unlinked trips	8.4 m
7% capital cost	102.9	LPS percent change	342%
25-year depreciation	58.8	LPS incremental unlinked transit trips per year	28.7 m

[13] Figure 3-2 of Financial Plan Part 1: Overview of Costs, February 6, 1998.

LPS annual capital cost	161.7	LPS cost per incremental unlinked transit trip	$7.92
LPS incremental operating cost per year	65.6	HART base-year linked trips	6.4 m
LPS total incremental annual cost	227.3	LPS percent change	221%
		LPS incremental linked trips per year	14.1 m
		LPS cost per incremental linked trip	$16.12

Source: Calculations by the author.

But most transit systems do not charge a normal fare for each unlinked trip. Rather, they charge a fare for the initial boarding and provide a transfer for the subsequent boarding linked to the initial one. Hence, a more realistic basis for assessment of cost per trip in relation to the fare charged must make use of linked trips. Applying the LPS's 221 percent increase to the 6.4 million baseline linked trips gives us 14.1 million added linked trips due to the transit expansion. Dividing the same $227.3 million annualized cost by the 14.1 million new trips yields a cost of $16.12 for each new linked trip. If we now subtract from that a typical $1.50 fare, we can see that the taxpayers must cover 91 percent of the cost of each trip, while the rider pays only 9 percent.

Note also that the $16.12 total cost for each new trip is for each one-way trip. Presumably, the same commuter that takes transit to work in the morning also uses it to return home each day. Thus, the total cost of each new round-trip made on the transit system is $32.24, of which the taxpayers will be contributing $29.24 and the commuter just $3.00.

Alternate assumptions about depreciation or the annual opportunity cost of capital can be tested but would not change the result by much. In fact, the result depends critically on the spectacular projection of 342 percent transit growth of unlinked trips (or 221 percent increase in linked trips). If actual transit growth falls far short of these highly unlikely projections, the costs per new trip would be considerably worse. Section V will include tests of alternative scenarios.

Supporters of huge transit subsidies usually advance two arguments: 1) auto travel is subsidized, so why not transit? and 2) substantial non-user ("external") benefits such as improved air quality and reduced traffic congestion justify transit costs that exceed fares. Unfortunately for their case, both arguments are wrong.

Let's first consider subsidies. Federal, state, and local transit expenditures in 1991 were $20.8 billion. Transit revenues were $8.8 billion in these years. The difference of $12 billion came from taxpayers. What did this subsidy buy? Transit passenger-miles in 1991 totaled 40.84 billion. Hence, the 1991 subsidy per transit passenger-mile was 29.42 cents.

In 1991 highway expenditures were $66.5 billion, while highway revenues from user-taxes were $52.9 billion. The difference was $13.6 billion, a large number. However, 1991 auto passenger-miles were 2.5 trillion. Thus, the subsidy per auto passenger-mile was 0.54 cents. In other words, transit's 29.42 cents per passenger-mile was 54 times the auto subsidy. Making the same calculation for 1981, transit's subsidy was "only" 30 times the auto subsidy.[14] The gap is still widening. Using a slightly more complex methodology, the Federal Highway Administration estimates that almost 90 percent of total

[14] Bureau of Transportation Statistics, *Transportation Statistics Annual Report* (Washington, D.C.: U.S. Department of Transportation, 1994).

estimated highway costs were borne by highway users in the form of user taxes.[15] In fact, a significant portion of the gasoline taxes that motorists pay are currently shifted to transit.

What about the negative side-effects of auto use? Many observers suggest that because autos generate pollution and congestion, drivers are receiving an implicit subsidy that ought to be included in these calculations. This must be qualified by the fact that internal combustion engines have been getting dramatically cleaner over the years. Nevertheless, it is one thing to suggest that existing user fees ought to be corrected so that each mode bears its full weight; it is quite another to use the existence of one subsidy to argue for more of them.

Transit's supposed external benefits depend on large numbers of trips being diverted from private auto use. Yet it is clear that most passengers on new rail transit systems are former bus users. At most, 35-40 percent come from private autos (many from carpools). But even if all of the LPS projected new transit users were former drivers and if 342 percent ridership growth somehow actually occurred, local planners admit that this transit use would account for just 4.6 percent of the expected growth in vehicle miles traveled.[16] Yet to achieve this very small impact, the LPS would devote $2.5 billion to transit. At substantial cost, transit's projected traffic impacts will be virtually negligible according to local planners' own reports. But of course no metro area has achieved even a 50 percent increase in transit ridership thanks to rail, let alone several hundred percent, and some have experienced net ridership losses. And if adding a rail system diverts significant resources away from more productive transportation improvements, doing so would probably add to highway congestion.

In any case, traffic "doomsday" forecasts have overwhelmingly been wrong. There are, to be sure, pockets of congestion for the simple reason that most highway access is not priced. Free access requires rationing by queuing in lieu of pricing. We might, then, ask: Why is there nevertheless so little congestion? The answer lies in the continued process of metropolitan suburbanization (Part 2). Most commuting is now suburb-to-suburb on faster and less-congested roads. Consider, again, the findings from the last three Nationwide Personal Transportation Surveys (Table 2). Average commuting speeds keep going up. This is anything but gridlock.

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[15] Federal Highway Administration, *1997 Federal Highway Cost Allocation Study* (Washington, D.C.: U.S. Department of Transportation, 1997).

[16] Lucilla L. Ayer memorandum (note 12), p. 6.

Part 5

Testing The LPS Transit Projections

What if highly unlikely 342 percent transit ridership growth fails to occur? All sorts of scenarios are possible. Just six possibilities are summarized in Table 4 which shows three alternative cost scenarios and two alternative ridership scenarios. Local area planners have evoked casual comparisons to several other U.S. cities. Many are especially fond of Portland as an exemplar of successful light-rail transit (even though virtually all of Portland's transit gains have been on its bus system expansions). Let us consider a systematic comparison. Both Tampa and Portland shared steeply declining central city population densities in the 1980s (-15.3 percent and -12.1 percent, respectively). This partly explains why Portland's rail transit system has been a disappointment, falling substantially short of expectations. Yet, Portland's entire transit system did show a modest increase in transit boardings in recent years (Table A-1).

But note that most such data are for boardings rather than for linked trips. In his analysis of Atlanta's transit performance in the 1980s, John Kain reminds his readers that, "... widespread claims that MARTA achieved large increases in transit ridership by building rail are incorrect and result from the mistaken use of boardings rather than linked trips to measure system ridership."[17]

Table 4: Nine Scenarios

		Change in Ridership (Unlinked Trips)	
		LPS	Portland
		342%	36.7%
Change Annual Cost	$Millions/Year	28.7 m	3.1 m
• LPS	$227.3	$7.92	$73.32
• Portland	345.7	$12.05	$111.52
• DOT 4	286.2	$9.97	$92.33

Note: Hillsburgh County's 2015 population assumed to be 1,103,600.
Source: Calculations by the author

[17] John F. Kain, "Cost-Effective Alternatives to Atlanta's Costly Rapid Transit System," *Journal of Transport Economics and Policy*, Vol. 31, 1998, pp. 25–50.

Even so, being careful to compare apples-to-apples, we can see what would happen if Portland's growth in boardings over 15 years were used instead of the 342 percent LPS projection. In Portland, over 15 years total transit boardings grew 36.7 percent. Using this growth instead of the LPS's 342 percent, there would be 3.1-million incremental annual transit trips in Hillsborough County, rather than 28.7 million. Since the costs would still be the same $227.3 million, the cost per incremental unlinked transit trip would be $73.32 instead of the LPS-projected $7.92. (And, of course, the round-trip cost would then be $146.64 per trip.)

But what if the cost of the system were more than LPS projects? What if Portland's cost overruns were experienced in Hillsborough County? The U.S. DOT has found that in Portland capital costs were 55 percent higher than projected and operating costs were 45 percent higher. On this basis, total annual incremental transit costs in Tampa would be over $345 million instead of $227 million. And that, in turn, would increase the cost per boarding. Costs per passenger-boarding would be $12.05 if the 342 percent growth of boardings were attained. But if the Portland ridership growth experience is combined with Portland's cost-overrun experience, the cost per passenger-boarding would be $111.52 (and the round trip cost would be $223.04). The widespread experience of cost overruns means that taxpayers in most cities ended up paying far more for rail than they had been led to believe.

Other plausible scenarios fall within the same range. A major 1990 U.S. Department of Transportation study remains the definitive comparison of what was promised versus what actually occurred.[18] Four light-rail systems were studied: Buffalo, Pittsburgh, Portland, and Sacramento. Some of these results have been refigured in today's dollars and other cities have since begun operations, making possible broader comparisons—and making the results even more disappointing. To keep it simple, we used the original four-city weighted averages of cost forecasting errors. The weighted-average capital cost overrun was 27 percent; the weighted-average operating cost overrun was 23 percent (Table 5). Applying these cost overrun rates to the Hillsborough data, total annual cost becomes $286 million. Cost per transit passenger-boarding would be in the range $9.97 (assuming 342-percent boardings growth) to $92.33 (using Portland's 15-year growth in transit boardings) per one-way trip.

Table 5: Light Rail Performance

	Actual Daily Ridership (weights)	% Capital Cost Overrun	% Operating Cost Overrun	% Change System Riders
Buffalo	29.2	55	12	-0.4
Pittsburgh	30.6	-11	n/a	6.3
Portland	19.7	55	45	11.5
Sacramento	14.4	13	-10	-4.2
Weighted Average		27.05	23.25	3.70

Source: U.S. Department of Transportation, 1990.

No one knows which of these scenarios will come to pass. It is virtually certain, however, that 342 percent transit patronage growth will not happen. As a restraint on making such incredible forecasts, Prof. Charles Lave of the University of California at Irvine has suggested that consultants who predict wildly optimistic scenarios make their fees contingent on these implausible outcomes actually

[18] Don H. Pickrell, *Urban Rail Transit Projects: Forecast Versus Actual Ridership and Costs* (Washington, D.C.: U.S. Department of Transportation, 1990).

occurring, "... if they are wrong by more than X percent, they have to give back their fees."[19] If they are wrong, outcomes as "good" as $16.12 per new linked one-way transit trip (from Table 3) will not be achieved. All the alternatives look much worse. We should be especially cautious when we recall that some new-rail cities have experienced net transit ridership losses. The eight sunbelt new-rail cities, as a group, did show negative growth in transit boardings over the last five years (Table A-1). In cases like Los Angeles, we would have to calculate dollars spent per transit-trip eliminated, rather than added. This would truly be "lose-lose" for Hillsborough County.

Cross-city comparisons are not perfect. But a consistent record of disappointment in city after city with new rail systems is a clarion call for caution. When the (wildly optimistic) best-case scenario yields a total cost of $16.12 per one-way new trip, and more realistic projections are far worse, there is a very real case for going back to the drawing board. Any other such reality check (in addition to the ones described here) using real performance data will be troubling to LPS supporters. The usual second line of defense—comparisons with highway expenditures—is specious, as we have discussed. People actually use highways in large numbers. There is considerable bang-for-the-buck from investment in highway improvements.

[19] Charles Lave, "Playing the Rail Forecasting Game," *Transportation Research News*, Vol. 156, 1991, pp. 10–12.

Part 6

Conclusions and Recommendations

The LPS's rail emphasis is cause for serious concern. Based on the experience of other U.S. cities, it is very likely that the LPS's costs will be higher than projected while any beneficial impacts will be negligible. Spending billions of dollars only to reduce transit use is rail transit's legacy in many U.S. cities.[20] Transit use per capita is now at a historic low in the United States. Yet this result occurs after more than $340 billion in public subsidies.[21] Prescriptions for more of the same must be regarded with the greatest suspicion. What, then, can Hillsborough planners do?

The following list is only suggestive. There remains much work to be done by Hillsborough area citizens and their leaders to study and fully weigh alternatives, such as:

A. Improve and Expand Bus Service

Some of the work done for the LPS suggests that bus system improvements would produce ridership gains at far lower cost than adding rail—but these alternatives were never clearly spelled out, with valid numbers, in the final documents.[22]

Recent events in two sunbelt cities, Houston and San Diego, have shown that lower fares and improved service (including transitways, in the case of Houston) can help to stabilize and even increase

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[20] John F. Kain, "Choosing the Wrong Technology: Or, How to Spend Billions and Reduce Transit Use," *Journal of Advanced Transportation*, Vol. 21, 1988, pp. 197–213.

[21] www.publicpurpose.com/ut-ussby.htm.

[22] The March 9 memo to Commissioner Hart reveals that 300+ buses for 2015 would accommodate 49,400 daily linked transit trips, just 17,700 less than LPS. What are the costs of this increment? None of the documents make this clear, revealing that apparently no attempts were made to take the "better bus" alternative seriously. It appears that 300+ buses is represented by scenario MS-F of the various consultants' reports (according to the MPO's R. Clarendon). The "incremental to baseline" costs of MS-F are shown in Table 4-15 of the "Screen 3 Evaluation" (Feb. 6, 1998). These cannot be compared to the incremental costs of LPS over 1997 as calculated in Section IV. The LPS Financial Plan (March 13, 1998) uses an odd accounting practice. The costs of the LPS are compared to those of the Long-Range Plan (LRP, the baseline) via 20-year "average annual cost" comparisons; capital costs are simply divided by 20 and added to annual operating costs. Using this non-standard approach, the LPS transit's average annual incremental costs over baseline are $39.3 million. Likewise, MS-F's average annual incremental cost over baseline is $16.6 million. This suggests that comparing LPS to this version of "better bus," and accepting consultants' data and accounting methods, it costs $22.7 million per year to gain 5.4 million daily linked transit trips (17,700 daily linked transit trips for 305 days) or $4.20 per trip. The point is that comparisons like this need to be sharpened and made explicit by normal evaluation and accounting practices, such as those used in Section IV.

ridership.[23] Houston's 10-year ridership growth was 85 percent; San Diego's was 49.1 percent. The two cities' successes came at a substantial cost —but less was spent than in most of the new-rail cities. Houston deliberately avoided building rail. San Diego did add rail but most of its ridership growth is not attributable to that system. In addition, that city's initial light rail line was built without federal funds, allowing it to avoid costly federal requirements and lowering construction costs substantially.

Complicating the comparisons to Tampa, however, is the fact that both Houston and San Diego have substantially larger central business districts. Houston's accounted for more than 83,000 jobs in 1994; San Diego's accounted for almost 66,000 jobs in the same year.[24] Claims that Tampa's 28,000-job CBD (comparably defined) will grow to a similar size cannot be taken seriously. Other research has found that 90 percent of any metro area's transit commuting is explained by the level of its downtown employment.[25] Most U.S. CBDs have not grown at all in recent years (Table A-5). Tampa's central city job growth is slower than that of the surrounding county and its share of county employment is falling (Table A-6). That suburbanizing trend will not reverse. It never has, certainly not in the Sunbelt new-rail cities (Table A-2).

B. Put Greater Emphasis on Transportation Management Systems

Good cost-effectiveness ratios are often available from improved traffic light synchronization, additional bus-stop turn-outs (where feasible) to avoid slowing auto traffic, quick-response to remove stalled or disabled cars and trucks, parking enforcement, and reversible lanes on major thoroughfares. There is also significant potential in providing travelers and system operators with better, real-time information via a set of technologies generally identified as intelligent transportation systems (ITS).

C. Consider Adding Transitways on Freeways and Major Arterials

Physically separated transitways for express buses and carpools can dramatically increase throughput of a traffic lane, compared with normal "mixed flow." John Kain and colleagues report that HOV lanes with express buses are five times as cost-effective as light rail. Higher speeds than light rail can be achieved at a fraction of the cost.[26]

D. Expand the Use of Transit Contracting

Putting transit routes out to competitive bid appears to be the only way that transit agencies have found for producing significant cost savings. Wendell Cox and coauthors summarize the experience of a

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[23] John F. Kain and Zhi Liu, "Secrets of Success: How Houston and San Diego Transit Providers Achieved Large Increases in Transit Ridership" (Washington, D.C.: Office of Planning, Federal Transit Administration, U.S. Department of Transportation, 1995).

[24] Peter Gordon and Harry W. Richardson, "The Destiny of Downtowns: Doom or Dazzle?" *Lusk Review*, Vol. 3, 1997, pp. 63–76.

[25] Chris Hendrickson, "A Note on Trends in Transit Commuting in the U.S. Relating to Employment in the Central Business District," *Transportation Research*, A, 20A, 1986, pp. 33–37.

[26] John F. Kain, et al., *Increasing the Productivity of the Nation's Urban Transportation Infrastructure* (Washington, D.C.: Office of Planning, Federal Transit Administration, U.S. Department of Transportation, 1992).

number of U.S. and overseas cities that have contracted out between 25 and 100 percent of their transit service (see Table 6).[27] All of these cities have experienced significant reductions in transit costs.

Table 6: Competition in Public Transport: International State of the Art: Summary of Competitive Tendering Results

System	Period	% Converted	Total Costs	Service Level	Unit Costs	Annual Unit Cost Change
Auckland	1990-96	100%	-21.2%	16.5%	-33.5%	-7.6%
Denver	1988-95	25%	3.0%	25.6%	-18.0%	-2.8%
Indianapolis	1994-96	70%	8.5%	38.4%	25.9%	-13.9%
Copenhagen	1989-96	56%	-18.5%	5.0%	-22.3%	-3.5%
Las Vegas	1993-94	100%	135.0%	243.0%	-33.3%	-33.3%
London	1985-96	57%	-30.0%	28.7%	-45.7%	-5.4%
San Diego	1970-96	37%	2.7%	46.6%	-30.0%	-2.1%
Stockholm	1992-95	59%	-18.5%	2.8%	-20.3%	-7.3%

All costs inflation adjusted

E. Investigate Greater Roles For Private Transit

Airport shuttle vans in many cities are an example. If regulations were eased, what other parts of the metropolitan area could such vans serve? How would service like this improve the prospects of transitways? In turn, how would transitways boost the effectiveness of private transit? Jitney vans run by owner-drivers offer low-cost transit (priced at rates comparable to bus service) in Miami and New York without public subsidy. Legalizing such operations—and enforcing basic safety and insurance requirements—could expand the supply of services for the transit-dependent while providing jobs for the owner-drivers.

F. Consider Adding Tolled Express Lanes on Congested Freeways

Time-of-day pricing (as in long-distance telephony) is the best way to allocate scarce peak-hour road space. Instead of creating traditional high-occupancy vehicle (HOV) lanes, a number of metro areas are creating high-occupancy/toll (HOT) lanes, which permit non-car-poolers to buy access to uncongested lanes.[28] Two such HOT lanes are in operation in California: San Diego has converted an under-utilized HOV lane on I-15 to a HOT lane, and a private firm has added HOT lanes in the wide median of the highly congested Riverside (Rt. 91) Freeway in Orange County. Fifteen other HOT lane projects are on the drawing boards in metro areas around the country, including Dallas, Denver, Houston, and Phoenix.

* * *

[27] Wendell Cox, Jean Love, and Nick Newton, "Competition in Public Transport: International State of the Art," presented at the Fifth International Conference on Competition and Ownership in Passenger Transport, Leeds, England, May 29, 1997 (available at www.publicpurpose.com).

[28] Kenneth Orski, "High Occupancy Toll (HOT) Lanes Revisited," *Innovation Briefs* (Urban Mobility Corporation), Vol. 8, No. 3, May/June 1997.

An analysis of the real trade-offs is missing from the available planning documents. As demographics, economics, federal funding commitments (including ISTEA II, not yet considered in LPS planning) change, how do the alternatives look? What size of investment in the various alternatives would yield the same benefits? Or, how much benefit would flow from a given sum spent on any of the alternatives? As the discussion of the better bus alternative (above and in footnote 22) shows, it is almost impossible to make clear comparisons from the available planning reports. Why aren't bottom-line rankings made clear and easy to grasp? Why, for example, is there not a simple explanation of what it will cost to move from the 300+ bus scenario to the LPS - what it will cost to garner just 17,700 extra transit riders?

The six policy proposals suggested above are not as glamorous as a new rail system. Yet that should not be a criterion. Besides, there is nothing glamorous about the waste and squandered opportunities that most of the new-rail cities have had to contend with. The experience of the new-rail cities is very clear. Rail transit plans drawn up in the late 1990s can only be made to look good if a substantial accumulated and well-documented record of performance is ignored and if highly implausible forecasts are believed instead. The taxpayers of Hillsborough County deserve better than that.

Part 7

About the Author

Peter Gordon is a Professor of Urban Planning and Development and Economics at the University of Southern California. He has conducted research on urban transportation policy and related matters for more than 25 years. Gordon's findings have been published in the major urban and regional planning journals. He has consulted for various private groups and government agencies as well as the World Bank and the UN. Gordon received the PhD from the University of Pennsylvania in 1971.

Author's Note

This study has evaluated Stage I of an ambitious and expensive rail-dominated plan. It is based on a review of a variety of draft planning documents, a site visit, discussions with some of the parties involved in the planning effort and numerous other data sources. The findings are based on materials available as of early 1998. Yet, absent radical changes in the final versions of these reports, the findings of this analysis are unlikely to be affected.

Part 8

Appendix

Table A-1: Comparative Transit Performance (Sunbelt MSAs (1 million+))

	1990 pop	1995 pop	% change	1990 transit boardings	1995 transit boardings	% change	1990 annual brdgs/pop	1995 annual brdgs/pop	% change
Atlanta (rail)	2,960	3,432	15.9%	149,527	146,366	-2.1%	50.5	42.6	-15.6%
Austin	846	1,000	18.2%	32,046	27,324	-14.7%	37.9	27.3	-27.9%
Charlotte	1,162	1,289	10.9%	11,681	11,798	1.0%	10.1	9.2	-9.0%
Dallas (rail)	4,037	4,450	10.2%	55,539	56,573	1.9%	13.8	12.7	-7.6%
Greensboro	1,050	1,124	7.0%	4,144	4,194	1.2%	3.9	3.7	-5.5%
Houston	3,731	4,164	11.6%	91,070	80,769	-11.3%	24.4	19.4	-20.5%
Las Vegas	853	1,139	33.5%	7,360	28,538	287.8%	8.6	25.1	190.4 %
Los Angeles (rail)	14,532	15,362	5.7%	521,831	500,552	-4.1%	35.9	32.6	-9.3%
Memphis	1,007	1,069	6.2%	13,859	14,392	3.8%	13.8	13.5	-2.2%
Miami (rail)	3,193	3,444	7.9%	90,746	103,165	13.7%	28.4	30	5.4%
Nashville	985	1,094	11.1%	8,621	6,603	-23.4%	8.8	6	-31.0%
New Orleans	1,285	1,315	2.3%	82,183	74,954	-8.8%	64	57	-10.9%
Norfolk	1,443	1,540	6.7%	13,536	13,659	0.9%	9.4	8.9	-5.5%
Oklahoma C	959	1,015	5.8%	3,530	3,674	4.1%	3.7	3.6	-1.7%
Orlando	1,225	1,391	13.6%	8,027	13,452	67.6%	6.6	9.7	47.6%
Phoenix	2,238	2,564	14.6%	32,399	36,894	13.9%	14.5	14.4	-0.6%
Portland (rail)	1,793	2,022	12.8%	60,875	72,138	18.5%	34	35.7	5.1%
Sacramento (rail)	1,481	1,605	8.4%	20,315	23,729	16.8%	13.7	14.8	7.8%
San Antonio	1,324	1,461	10.3%	41,909	47,306	12.9%	31.7	32.4	2.3%
San Diego (rail)	2,498	2,644	5.8%	67,143	70,122	4.4%	26.9	26.5	-1.3%
San Francisco (rail)	6,253	6,540	4.6%	453,198	441,290	-2.6%	72.5	67.5	-6.9%
Tampa	2,068	2,180	5.4%	19,652	18,151	-7.6%	9.5	8.3	-12.4%
All Sunbelt	56,923	61,844	8.5%	1,789,191	1,795,643	-0.3%	31.3	28.2	-11.0%
8 Sunbelt Rail	33,995	36,364	7.0%	1,445,818	1,432,316	-0.9%	42.5	39.4	-7.3%
All Metro 1M+	136,553	144,159	5.6%	7,282,039	6,747,602	-7.3%	53.3	46.8	-12.2%
All other	112,850	118,596	5.1%	452,961	558,398	23.2%	4	4.7	17.3%
United States	249,403	262,755	5.4%	7,735,000	7,306,000	-5.5%	31	27.8	-10.3%

Note: Transit ridership data refer to all transit systems operating in each of the metropolitan areas

Source: www.publicpurpose.com

Table A-2: Employment Suburbanization in Sunbelt Rail Transit Cities 1989–1995 Core County vs Surrounding Counties

	Employment		Employment Shares (%)	
	1989	1995	1989	1995
Atlanta MSA	1632392	1967770		
Fulton Co.	614336	668973	37.6	34.0
Rest of MSA	1018056	1298797	62.4	66.0
Los Angeles - Riverside - Orange CMSA	7190433	7074438		
Los Angeles Co.	4747305	4454594	66.0	63.0
Rest of CMSA	2443128	2619884	34.0	37.0
Miami - Ft. Lauderdale CMSA	1487139	1645365		
Dade Co.	932509	980972	62.7	59.6
Rest of CMSA	554630	664393	37.3	40.4
New Orleans MSA	569099	616410		
Orleans Parish	266895	263253	46.9	42.7
Rest of MSA	302204	353157	53.1	57.3
Sacramento - Yolo CMSA	590960	665135		
Sacramento Co.	425548	456244	72.0	68.6
Rest of CMSA	165412	208891	28.0	31.4
San Francisco - Oakland - San Jose CMSA	3365957	3519704		
San Francisco Co.	608012	579981	18.1	16.5
Rest of CMSA	2757945	2939723	81.9	83.5

Source: Bureau of Economic Analysis, Regional Economic Information System, 1997

Table A-3: Summary of Commuting Flows (in millions), 1990

To:	Own Metropolitan Area		Other Metropolitan Area			
From:	Central City	Suburb	Other Central City	Suburbs	Non-Metropolitan Area	All Locations
Central City	24.3	5.9	0.6	1.0	0.3	32.2
Suburbs	15.2	35.4	2.3	3.4	1.1	57.4
Non-Metropolitan Area	- -	- -	1.4	2.0	22.0	25.4
Total	39.5	41.3	4.3	6.4	23.4	115.0

Source: *Commuting in America II,* (1996).

Table A-4: Travel Time Distribution by Area, 1990

	Commuters (%)		
Minutes to Work	U.S.	Florida	Hillsborough County
Less than 10	16	13	13
10 to 19	32	33	31
20 to 29	19	21	23
30 to 39	15	17	19
40 to 59	9	9	9
60 to 89	4	3	3
90 or more	2	1	1
Work at home	3	2	2
Total	100	100	100
Average time (minutes)	22.4	21.4	21.7

Source*: Florida Demographics & Journey to Work*.

Table A-5: Central Business District Job Growth: 1987-92 (Average Annual Rates)

	Retail	Services
Atlanta	-0.01615	-0.00979
Baltimore	-0.02958	0.00099
Boston	-0.01537	0.03752
Chicago	0.02471	-0.00876
Cincinnati	0.00445	0.01136
Cleveland	0.02255	0.01023
Dallas	0.01541	0.01628
Denver	-0.02696	0.01987
Detroit	0.01094	-0.02882
Houston	-0.03326	-0.00059
Indianapolis	-0.03421	0.02766
Kansas City	-0.00763	0.00463
Los Angeles	-0.04381	-0.00420
Miami	-0.03033	0.02792
Milwaukee	-0.03245	0.00433
Minneapolis	0.00825	0.00202
New York	-0.3817	-0.02805
Philadelphia	-0.11717	-0.02244
Phoenix	-0.00494	-0.01131
Portland	0.00142	0.00673
St. Louis	-0.02989	-0.00314
San Diego	0.00121	0.02598
San Francisco	-0.05039	-0.00775
Seattle	-0.00054	0.00346
Washington, DC	-0.00980	0.01864
25 CBDs	0.0196	0.0007
U.S.	0.6800	3.7400

Source: Calculated from 1987 and 1992 Economic Census data.

Table A-6: Employment Shares Tampa vs Hillsborough County, 1987 and 1992 (four major industrial sectors)

Tampa	MFG	(share of county)	RETAIL	(share of county)	WHLSLE	(share of county)	SERVICES	(share of county)
1987	22,900	63.4%	35,927	52.6%	21,781	65.7%	58,394	70.1%
1992	20,100	55.1%	33,652	48.1%	16,971	52.6%	72,631	53.9%
Hillsborough	MFG		RETAIL		WHLSLE		SERVICES	
1987	36,100		68,343		33,148		83,310	
1992	36,500		69,955		32,277		134,843	

Sources: 1987 and 1992 Economic Census.

Part 9

Other Related RPPI Studies

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