When Finances Leads Planning: Urban Planning, Highway Planning, and Metropolitan Freeways in California

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Freeways are catalysts in shaping the land-use patterns within the modern metropolis, and exert a positive influence on land uses: they stimulate new, carefully planned developments; they stabilize land uses by delimiting basic long-range patterns, and by giving an aspect of permanence to new freeway-oriented developments. In built-up areas, they effectively aid community development by containing residential units, and serving as buffers between conflicting land uses. Freeways also improve accessibility, and hence the competitive position of the central business district.

—Wilbur Smith and Associates (1961, 35)

Our great urban centers have been subjected to the busy concrete mixers and asphalt rollers in the guise of progress, where ribbons of highway they create are further strangling automobile traffic, adding to the already dangerous air pollution levels and displacing the city's residents with still more cars while transportation daily becomes more difficult. . . . Freeways do the most damage to these cities.

—Helen Leavitt (1970, 3, 4)

▶ Overview

Freeways are the centerpiece of most metropolitan transportation systems, a feature that distinguishes American cities from those in other nations. Most cities around the globe have some grade-separated, limited-access roadways, but none rely on these roadways for a significant proportion of metropolitan travel (Jones 1989). As such, metropolitan freeways in the United States have been embraced by some observers as a foundation of suburban living favored by most Americans and vilified by others as a prime cause of urban decay, air pollution, and auto dependence. Whether embracing or vilifying them, no one dismisses the enormous role freeways have played in shaping cities.

This article explores the planning and development of metropolitan freeway systems in U.S. cities during the middle third of this century. Drawing on plans for and studies of highway development in the United States and on a case study of Los Angeles, this analysis shows that local and regional planning played a distinctly peripheral role in

Abstract

Freeways have profoundly influenced the form and function of U.S. cities, yet urban planners generally played only a peripheral role in their development. This article traces the history of freeway development in California to show how political negotiations between local and state governments over street and highway finance resulted in urban freeways financed, designed, and built by the state highway department. To fund their ambitious transportation plans, local officials and planners in cities like Los Angeles turned over control of the planning and development of urban freeways in the 1940s and 1950s to state departments of transportation. This shift in control led to, among other things, the construction of freeways too large to fit easily into cities and freeway networks too sparse to adequately disperse urban traffic. While federal surface transportation legislation returned significant control over metropolitan freeways to regions and planners in the 1990s, the influence of modern freeways on urban life endures.

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this most critical chapter of urban history. Specifically, this article shows how the crafting of a highway finance program in Sacramento and Washington, D.C. following World War II indirectly, though decisively, determined the scale, routing, and influence of freeways in California cities. To secure funding for their ambitious metropolitan highway plans to accommodate burgeoning automobile use, cities like Los Angeles ceded control over the planning, development, and operation of urban freeways to state departments of transportation. As a result, the freeways ultimately built in Los Angeles and many other cities bear little resemblance to the facilities and networks contemplated in early metropolitan transportation plans for cities around the country—and this general omission of local planning considerations in early metropolitan freeway development continues to shape cities and travel in them to the present day.

The goal here is not to vilify state highway engineers or to romanticize early local expressway planners but to show how the shift in authority over metropolitan freeways altered their form and function: from planned networks intended to ameliorate worsening surface street congestion and uneven urban development to the construction of facilities designed to attract and concentrate high-speed, longer distance travel. In particular, this article argues that many of the most salient features of modern metropolitan freeways—their scale, routing, and network density—were shaped more by the weeks and months of negotiations to secure funding for freeways in the Federal Highway Act of 1956 than by the years and decades of freeway planning that preceded and followed these negotiations. In other words, the politics of highway finance distinctly shaped the planning and deployment of modern metropolitan freeways.

► The Role of Freeways in Cities

Though most freeways in the United States were developed as part of a national, interstate system, the most profound effects of freeways have been in cities. Comprising only a tiny fraction (0.5 percent) of urban street and road mileage, freeways nationally carry about one-third (32 percent) of all urban vehicle travel. Interestingly, freeways actually play a smaller role outside of cities: about one-quarter of all rural vehicle travel (23 percent) is on freeways (U.S. Federal Highway Administration 1991, VM-1). The importance of freeways in American cities has prompted numerous histories and critiques over the years.

The two most prominent histories of the Interstate Highway System have focused principally on the political evolution of the federal highway program, the collaboration between states and the federal government in highway development, the significant figures of the freeway era, and how the culture of civil engineering shaped early highway policy (Seely 1987; Rose 1990). With respect to metropolitan freeways, most writers on the subject have tended to treat freeways in cities as the inevitable outcome of past conditions and events—either the inevitable result of automobility (Brodsly 1981; Foster 1981), auto conspiracy (Mowbray 1969; Leavitt 1970; Burby 1971; Kelly 1971; Lupo, Colcord, and Fowler 1971; Schneider 1971; Buel 1972; Hebert 1972; Kay 1997), or both (Lewis 1997). Others, notably Schwartz (1976) and Foster (1981), have argued that urban freeways are the products of urban planning: "Since urban freeways then carried the city planners' collective seal of approval, there is little merit in the idea that the 1956 Act subverted the planners' collective wisdom" (Schwartz 1976, 512).[1]

But the freeway networks eventually constructed in most U.S. cities were generally not products of planners' collective wisdom. On the contrary, urban planners and urban planning played a distinctly peripheral role in the development of today's metropolitan freeways. While it is true that many local planners and elected officials actively supported express highway development in cities early on (Schwartz 1976; Foster 1981; Rose and Seely 1990), this support was often the result of coercion by state officials. In his study of freeway development in Minneapolis–St. Paul during the 1950s and 1960s, for example, Altshuler (1965) argues that city planners and local officials were essentially given the choice of accepting state highway department plans for metropolitan freeways or foregoing local freeway development altogether. Furthermore, Rose and Seely (1990) note that state highway departments typically worked hard to restrain local influence on local routing and facility design.

To illustrate the role of local and regional planning vis-à-vis state and federal planning in the development of metropolitan freeways, this article examines the case of Los Angeles—the second largest American metropolitan area with the largest and most heavily used freeway system. This case study shows that the freeways eventually built in Los Angeles bear little resemblance to the facilities and networks originally planned. This is because early metropolitan expressway plans in California were obviated by funding negotiations in Sacramento and Washington during the 1930s, 1940s, and 1950s that profoundly altered the course of metropolitan freeway planning and development. These negotiations did the following:

1. largely cut local government officials and urban planners out of freeway planning and development by making state highway departments responsible for all metropolitan freeway development;
2. led to the construction of freeways too large to fit easily into cities and freeway networks too sparse to adequately disperse urban traffic;
3. resulted in a finance program unrelated to property values or property taxes, which meant that revenues could not keep pace with rapidly appreciating urban land costs for right-of-way;
4. created a finance program primarily dependent on the gas tax revenues, which could not match rising construction costs without frequent, politically unpopular tax increases;
5. abandoned the traditional one-to-one federal:state fund matching ratio in favor of a nine-to-one ratio, which dramatically skewed highway investment decisions in favor of Interstate Freeways.

► Early Plans for Freeways

In the 1930s, both urban and rural roadway planners were refining plans for hierarchical, interconnected networks of grade-separated, limited-access roadways. However, the scale of the new road networks and the priorities given to different trip types varied substantially between the plans prepared for major cities and the plans prepared for rural areas by state highway departments and the federal Bureau of Public Roads. In cities, the planned systems and facilities reflected the prevalent concerns with reducing traffic congestion and improving local automobile and transit vehicle circulation. State and federal highway engineers, on the other hand, were designing new facilities for high-speed intercity travel and improved safety. These differences were widely acknowledged at the time, and it was generally agreed that the construction of expressways in cities was largely an exercise in urban planning that required careful attention to scale, routing, and land use (Fairbank 1937; Purcell 1940a, 1940b; Interregional Highway Committee 1944; MacDonald 1954).

Urban Expressway Plans

During the 1920s and 1930s, cities like Detroit, Boston, New York, San Francisco, Chicago, and Los Angeles all prepared metropolitan expressway plans for metropolitan scale networks to serve primarily intrametropolitan trips (Foster 1981; Whitten 1930; Bartholomew and Associates 1932; McClintock 1937; DeLeuw 1939; Transportation Engineering Board 1939). Although the facilities contemplated in these plans varied from one another, compared to modern urban freeways, they (1) had less capacity, lower design speeds, and simpler interchanges; (2) were in denser networks that were closely tied to existing boulevards and arterials; (3) were often closely tied to adjacent land uses and in a few cases included plans for redevelopment and new development; and (4) were in many cases multimodal—in addition to passenger autos, they included special facilities (such as separate rights-of-way, interchanges, or stations) for trucks, buses, or trains.[2] Collectively, these features sought to serve short urban trips, disperse vehicular traffic, and increase the speed of transit vehicles (Jones 1989). Given the widespread interest in traffic calming, multimodal planning, boulevard revitalization, exclusive roadway freight facilities, and investing in transportation facilities as part of redevelopment efforts, many of these plans appear surprisingly relevant today.

The goal of these plans was to facilitate local travel by reducing traffic congestion for both autos and transit, especially in downtowns. With the advent of the automobile, traffic congestion was a serious problem in all major cities, particularly in the central business districts; a primary cause was the at-grade mixing of autos, trucks, streetcars, and pedestrians.[3] In addition, traffic was exacerbated by growing building heights, inadequate off-street parking, antiquated street design, and inconsistent traffic regulations (Bartholomew 1924, 1925; Olmstead, Bartholomew, and Cheney 1924; Chicago Plan Commission 1925; Nolen 1926; McClintock 1927, 1931; Cheney 1928; City Planning Commission 1930).

The early expressway network plans were intended primarily to grade separate major roadways and move streetcars out of mixed traffic; they also limited roadway access between interchanges and prohibited on-street parking. Expressways were universally seen as keeping downtowns viable by connecting them with expanding, largely residential suburbs. Interestingly, it was frequently argued by planners that the new expressways would slow suburban sprawl and encourage more compact urban development, the idea being that commercial and employment growth in the residential suburbs was due to inadequate access to the central business district (Holley 1932; U.S. Bureau of Public Roads 1939).

Perhaps the most important of these metropolitan expressway plans was the 1939 plan developed for Los Angeles, because of its comprehensiveness and because it formed the basis for the first metropolitan freeway network built in the United States (Jones 1989). Prepared by Los Angeles City Engineer Lloyd Aldrich and adopted by the city and county in 1939, the plan called for a 612-mile network of expressways to blanket Los Angeles County by 1954 (Transportation Engineering Board 1939). While the plan borrowed much from earlier metropolitan expressway plans, it was unique in its comprehensiveness, scope, and scale.

The focus of the plan was a regional expressway and transit system that integrated the congested downtown with the many sprawling suburbs. The expressways were intended to serve all types of intrametropolitan travel in a growing region, "radial, circumferential, direct interdistrict, and bypass traffic" (Transportation Engineering Board 1939, 11) (see Figure 1).

In addition, the plan was explicitly multimodal. The expressway network was planned in concert with a regional express bus system; the plan included expressway grade crossings, for example, including bus transfer stations. Grade separation of rail transit was included as well, either in separate subways or in median rights-of-way on the expressways. The transit components of the plan were remarkably far sighted as well. Public transit in most cities of this era, including Los Angeles, was privately owned and publicly regulated. In the thirty years after World War II, nearly all private transit companies were converted to public ownership and operation. The 1939 plan, however, called for regional planning and administration of transit, public ownership of vehicles and rights-of-way, and private contract operations and maintenance—an organizational structure argued by many as the most efficient and effective model for public transit in the 1990s (see Figure 2).

Finally, while many cities developed parkway plans for recreational motoring between the World Wars, the Los Angeles plan was distinguished by its relative lack of proposed parallel park development. The plan centered instead on the integration of expressways with both the existing street system and commercial and residential development. The downtown facilities were to be tightly integrated with existing and planned commercial development. A key to financing the system was advance right-of-way acquisition "in order to avoid prohibitive costs" and to minimize commercial or residential displacement. Land would then be developed to fit the capacity and location of the expressways (Transportation Engineering Board 1939, 19).

The financial resources available to Los Angeles in the 1940s, however, could not begin to finance a 612-mile expressway and transit system. Los Angeles had been able to leverage state and federal funding for the Arroyo Seco Parkway in 1937 and the city was proceeding with the land acquisition and design for the Hollywood Freeway, but progress was slow.[4] At existing funding levels, the entire Los Angeles system would take a century to complete, and the opportunity for advance right-of-way acquisition would be lost.

To fund its ambitious plan, Los Angeles turned to the state and federal government for funding. In doing so, it began the process of turning control of metropolitan expressway development over to state highway departments in exchange for funding—a process repeated in metropolitan areas around the country following the passage of the Federal Highway and Highway Revenue Acts of 1956 (Altshuler 1965).

Intercity Freeway Plans

During the 1930s, the Bureau of Public Roads, in cooperation with state highway departments, began planning for a safe, high-speed national network of highways. The focus of this planning, quite naturally, was substantially different from the planning for expressway systems in cities: better intercity highway connections, improved safety, and increased travel speeds, particularly near cities. In contrast with the expressway plans discussed above, these plans, also quite naturally, did not address urban concerns; they did not consider public transit and were much less concerned with land uses adjacent to highways. Local traffic congestion was addressed in the plans but primarily through a concern that local congestion would inhibit the free flow of intercity traffic.

The first national plans, published by the Bureau of Public Roads in 1939 and President Roosevelt's Interregional Highway Committee in 1944, were each a reflection of the "good roads movement" of the Progressive Era. The federal highway program in general and the Bureau of Public Roads in particular were strongly rooted in the Progressive Era goals of bringing science, planning, and objectivity to the routing, design, construction, and operation of rural roads, and both of these plans embodied these goals (Seely 1987). Despite sharing progressive roots with city planning and urban traffic engineering, however, the focus of the highway programs of this era was clearly on travel outside of cities (Schwartz 1976). Concerned primarily with getting "the farmer out of the mud," federal highway efforts during the first two decades of this century focused on improving farm-to-market roads; urban highways were completely excluded (Fairbank 1937, 2). Over time, the focus of federal highway policy shifted from farm-to-market trips to intercity travel, reflecting the growth of intercity passenger and freight movement. This shift in focus, however, did not bring the federal highway program into cities. Urban highways remained into the 1930s ineligible for federal highway funds, and intercity travel was considered only from city-edge to city-edge.

Concerns over the predatory pricing practices of railroads, the growth of intercity vehicular travel, rural underdevelopment, and depression-related unemployment combined in 1937 to motivate President Roosevelt and Congress to direct the Bureau of Public Roads to investigate the feasibility of a national system of toll superhighways.[5] The Bureau reported back in 1939 with *Toll Roads and Free Roads*, an extensively

Figure 1. Countywide view of the 1939 Expressway-Transit Plan for Los Angeles County.
Source: Transportation Engineering Board (1939, 8-9).

Figure 2. Central county view of the 1939 Expressway-Transit Plan for Los Angeles County showing proposed modal integration.
Source: Transportation Engineering Board (1939, 10-11).

researched advocacy piece that "was a minor sensation in its time" (Gifford 1991, 8). The report examined the feasibility of a 14,000–mile system of six transcontinental toll roads and conclusively rejected such a system as unworkable because of insufficient travel demand; barely 1 percent of the system was projected to be self-supporting with tolls (U.S. Bureau of Public Roads 1939). The report drew on recently gathered travel data showing that the vast majority of rural highway traffic was short trips of less than ten miles made to or from cities; only a tiny fraction (1.5 percent) of trips were over one hundred miles (U.S. Bureau of Public Roads 1939).

In estimating the costs of the toll road system, the Bureau assumed that the entire system would be built to a uniform high standard—wide rights-of-way, full access control and grade separation, high design speeds, and so forth—regardless of whether projected demand warranted such a facility. The uniform high standards were thought necessary to attract travelers away from adjacent free roads (most of whom were projected to remain on the free system). Of particular importance to cities was the report's recommendation that the highways penetrate metropolitan areas to serve the central business district in each city served by the system. This recommendation was based on travel survey evidence showing that the vast majority of rural highway traffic was adjacent to cities; this gave the entire proposal a strong urban component, which was a radical departure from longstanding federal highway policy. The recommendation for metropolitan penetration was clearly not based on a particular concern for intracity traffic but by the Bureau's desire to stimulate sufficient intercity movement to justify the scale of the intercity highways proposed.[6]

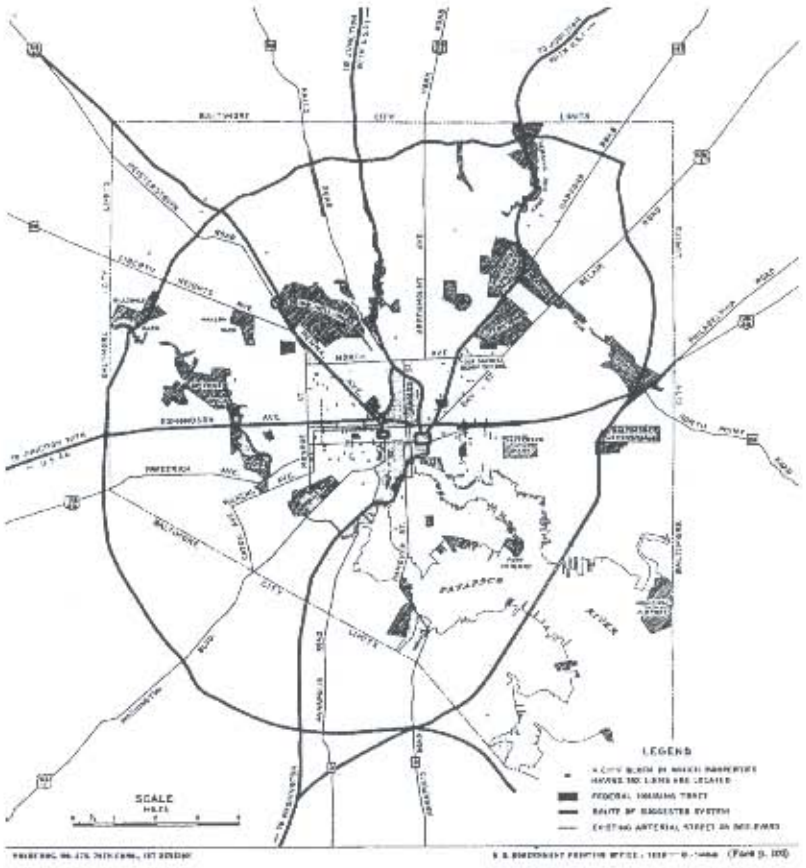

Figure 3. Expressway Plan for Baltimore proposed by the Bureau of Public Roads in 1939. Source: U.S. Bureau of Public Roads (1939, 100).

Herein lies a dramatic contrast between metropolitan expressway planning and intercity highway planning. In cities, traffic congestion was the problem, and metropolitan expressways were proposed as the means to cope with growing travel demand. For the federal highway program, however, an intercity highway system was the desired outcome in search of problems to justify its development. Given the Bureau's own traffic data, a national system of superhighways, toll or free, could not be justified without connecting with the major highway traffic generators: cities. This roundabout logic—constructing a 27,000–mile national intercity highway system to meet largely metropolitan traffic needs—was the essence of *Toll Roads and Free Roads* and the guiding principle in the subsequent development of the Interstate Highway System.

Given the nature of metropolitan traffic, the Bureau was forced to acknowledge that the intercity highways penetrating to the center of large cities would serve large volumes of intracity traffic. In *Toll Roads and Free Roads*, the Bureau conceded that, in addition to intercity traffic,

> there is usually added to these streams in the outer reaches of the city or its immediate suburbs a heavy movement of purely city traffic that mounts to high peaks in the morning and evening rush hours. . . . There are cases in which the daily peak of "in-and-out" city traffic exists without any substantial addition from main rural highways. (U.S. Bureau of Public Roads 1939, 93)

Given the large volumes of local traffic on the intercity highway system, the Bureau concluded (while providing no supporting data) that these intracity "movements . . . largely follow the same lines as the traffic entering the city from main rural highways simply because the peripheral city areas and suburbs in which they are generated have developed along such highways," and therefore the "requisite facility" to adequately serve both intercity and intracity travel was "an express highway . . . in all essentials similar to facilities designed to carry external traffic across the city" (U.S. Bureau of Public Roads 1939, 93).

The Bureau's simple, universal descriptions of local traffic in all cities—"It always is largely a movement from the periphery to the center of the city, and is little concerned with intermediate city sections"—lacked the richness and complexity of supporting travel data found in many of the metropolitan expressway plans described above; public transit and noncentral business district–bound auto trips, for example, were not mentioned (U.S. Bureau of Public Roads 1939, 93). And the metropolitan highway systems proposed—usually a radial highway or highways converging on the city center surrounded by a beltway—reflected the Bureau's simplistic conceptions of urban travel. The report includes a sample ring-radial plan for Baltimore (see Figure 8), which contrasts sharply with the comprehensive proposal for Los Angeles shown earlier.[7]

Two years after the publication of *Toll Roads and Free Roads*, President Roosevelt appointed an Interregional Highway Committee headed by Bureau of Public Roads Commissioner Thomas MacDonald and staffed by Bureau engineers to continue examining the feasibility of a national intercity highway system.[8] The committee's report, published as *Interregional Highways* in 1944, reiterated and expanded the findings in *Toll Roads and Free Roads* regarding the short distances and urban basis of most rural traffic. *Interregional Highways* recommended a 39,000–mile intercity highway system to connect nearly every metropolitan area in the country with a population over 100,000. The proposed system was substantially more ambitious than the 27,000 miles proposed in *Toll Roads and Free Roads* and had an even stronger urban component; nearly one-quarter (9,400 miles) of the system was to be built in metropolitan areas. But unlike the Bureau of Public Roads' *Toll Roads and Free Roads*, the *Interregional Highways* report was much more deferential to cities and planners regarding the routing, design, and operation of the urban segments of the system. While the rural segments of the system were carefully detailed in the plan, over half of the metropolitan mileage (fully 13 percent of the entire system) was left to be determined later, because "the selection of routes for inclusion in the interregional system within and in the vicinity of cities is properly a matter for local study and determination" (Interregional Highway Committee 1944, 56).

The Interregional Highway Committee (1944) was insistent to the point of redundancy that the routing, design, and operation of the metropolitan highways be left to "local planning" authorities and officials.

> Once the routes enter the environs of the city . . . they become a part of the sum total of urban transportation facilities, and as such must bear a proper relation in location and character to other parts of the street system. (P. 56)
> How near they should come to the center of the area, how they should pass it or pass through it, and by what course they should approach it, are matters for particular planning consideration in each city. (P. 61)

In further contrast with *Toll Roads and Free Roads*, the Interregional Highway Committee (1944) was mindful of the complexity of urban travel and deeply concerned with the effects that the interregional highways would have on cities:

> The interregional routes, however they are located, will tend to be a powerful influence in shaping the city . . . improperly located, they will become more and more of an encumbrance to the city's functions and an all too durable reminder of planning that was bad. (P. 71)

And as such, *Interregional Highways* (1944) offered nothing short of a ringing endorsement of city and regional planning and the role planning should play in metropolitan highway development:

> It is very important, therefore, that the interregional routes within cities and their immediate environs shall be made part of the planned development of other city streets and the probable or planned development of the cities themselves. (P. 71)
> By careful and complete functional studies of the city organism, it may be possible to devise a rational plan of future land use. . . . In such a case, the planning of city streets, the interregional routes and other express ways, and all other urban facilities would take the forms and locations necessary to serve the intended land uses, and these facilities would be provided in essential time relationship to the development of the entire plan, and in a manner to bring about its undistorted realization. (P. 70)

With a strong focus on metropolitan highways and an unequivocal position that local planning should play a central role in their development, *Interregional Highways* was submitted to Congress in 1944 and was used as the basis of the establishment of the Interstate Highway System in the 1944 Federal Aid Highway Act. The stage was now set for a national commitment to postwar highway development with a focus on cities and a commitment to urban planning. All that remained, of course, was funding the system. And funding, as the next section will

show, ensured that the metropolitan expressway systems, as envisioned for many cities, would never be built.

► Negotiating a Finance Package for Freeways

Given the number of multimodal, intraurban expressway plans prepared by major cities around the country and the expressed intent in the 1944 plan for the Interstate Highway System to leave urban expressway planning to cities, why were so few of the contextualized, multimodal plans prepared for cities during the 1930s implemented? Why, instead, were the higher design speed, higher capacity, single-mode freeways in sparse ring-radial networks (like the Bureau of Public Roads proposal for Baltimore) built in nearly every major city in the country? The answer lies in funding agreements reached in the 1930s, 1940s, and 1950s to finance freeway development.

1. In the 1930s, the property tax was abandoned in favor of the gas tax as the main source of urban highway funding. As a result, the opportunity to recapture the appreciative effect metropolitan freeway development would have on land values was lost. And this, in turn, prevented highway revenues from pacing increasing metropolitan freeway right-of-way costs over time.
2. In the 1940s, the Interstate system was adopted, but without funding. In California, the state agreed to raise highway user taxes to (among other things) begin construction of the Los Angeles expressway plan. But in doing so, the legislature placed the state highway department in charge of all metropolitan expressway development—contrary to the recommendations of the *Interregional Highways* plan. This precedent-setting move helped separate local planning from metropolitan freeway development for the next quarter century.
3. In the 1950s, the funding of the Interstate program critically shaped metropolitan freeway development. First, to secure the support of urban legislators, the Bureau of Public Roads—again, contrary to the recommendations of *Interregional Highways*—published routing plans for every urban Interstate Highway in the country, which preempted local planning and effectively set the metropolitan freeway planning process into stone. Second, to give priority to the Interstate system, the traditional one-to-one federal:state matching ratio was changed to nine-to-one, which encouraged states to leverage their resources with Interstate construction and discouraged them from developing parallel facilities in cities.

The result of these funding actions was to greatly reduce the role of urban planning in metropolitan expressway development. The major planning decisions—the design, routing, and size of the system—were either specified in advance or delegated to state highway departments (Altshuler 1965). How each of these funding agreements came to be is the subject of the remainder of this section.

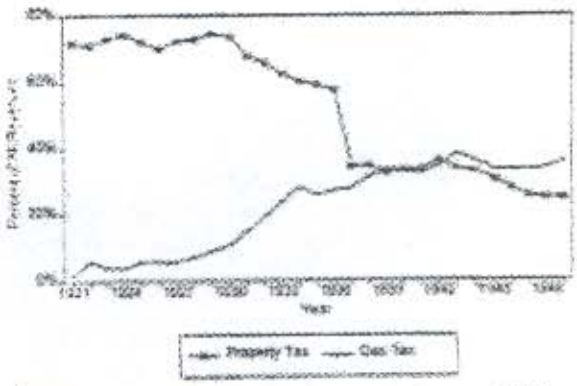

Figure 4. Property and motor fuel taxes in local street and highway finance, 1921-1949.

Early Urban Road Finance

Until the Depression, street and boulevard development in most cities was paid for jointly by cities and counties with property taxes and bonds; special assessment districts were frequently created to tax the property owners benefiting from major boulevard improvements. Nationally, property taxes accounted for over 70 percent of all local government revenues for streets and highways in the 1920s; in many cities, the figure was closer to 100 percent. The logic of property tax funding of streets and highways was straightforward: public investments in road improvements increase the value of adjacent land, and property owners should pay for the private benefits conferred by public road investments. This principle worked best when applied to local street improvements; property owners paid, either through property taxes or special assessments, for street improvements abutting their property. For urban highway improvements benefiting a larger area of property owners, the principle of assessing adjacent property owners broke down, although this was not a major concern during the 1920s because most urban road improvements were of a fairly small scale (Agg and Brindley 1927; Crawford 1932, 1939).

With the Depression came the collapse of the property tax and urban highway finance. Nationally, extraordinary property tax revenue declines were the rule. Property tax revenues to all local governments for streets and highways dropped 72 percent, from $1.2 billion in 1930 to just $330 million in 1939. For municipalities nationally, the collapse in property tax revenues

for roads over the same period was even greater—revenues dropped 83 percent, from $787 million in 1930 to $137 million in 1939 (U.S. Federal Highway Administration 1986, FE-205). Gas tax revenues, on the other hand, fared quite well during the Depression. Gas taxes are fixed per gallon levies on motor fuels, and revenues are based entirely on the gallons of fuel sold. Except for a small dip in fuel consumption at the onset of the Depression, fuel consumption and gas tax revenues increased annually until fuel rationing was adopted during World War II (U.S. Federal Highway Administration 1986, FE-205).

With property tax and special assessment funding for streets and roads drying up in the early 1930s, cities and urban counties began pushing the state to use gas tax revenues to support highway expenditures in cities. In California, the legislature responded to this lobbying pressure in 1931 by expanding the state highway system to include state highways that passed through cities.[5] This legislation was immensely popular with cash-strapped cities; two years later, bowing to the increasingly organized pressure of urban interests, the state agreed to expand the state highway system to include major urban highways and to apportion some gas tax funds for the construction and maintenance of major boulevards and arterials in cities. Two years later, the funding for these urban projects was doubled (Burch 1962; Jones 1989). Figure 4 shows the dramatic shift in the relative roles of property taxes and motor fuel taxes in local street and highway finance between 1921 and 1949.

So with the Depression came a restructuring of urban highway finance that was important in two respects. First, by abandoning property and special assessment finance for the gas tax, any opportunity to recapture the appreciative effect freeways would have on metropolitan land values was foreclosed. And insufficient funding for right-of-way acquisition would later prove a major obstacle in metropolitan freeway development (Taylor 1995). This fact was not lost on highway planners at the time. Concerned that the Depression-era shift from property tax finance to gas tax finance would foreclose the future use of property taxes for urban highways, a Bureau of Public Roads deputy warned, "Property taxes once gone will be difficult to get back" (Fairbank 1937, 2).

Second, where urban roads were once the exclusive financial burden of cities, they were now a significant responsibility of the state and federal governments. And with this shift in funding burden came a gradual shift in planning focus and development control: from congestion relief and multimodal intraurban movement in cities to intercity highway connections and automobile movement on highways. This shift would become more important in the postwar years, when cities turned to the states and federal government to fund urban expressway development.

Evolution of Freeway Finance in California

The federal Defense Highway Acts of 1941 and 1943 called for states to improve intercity highways to support defense industries. Congress recognized that construction materials were in short supply, so funds were made available for right-of-way acquisition and design work. While most states set to work on rural highway improvements, Los Angeles and San Francisco lobbied effectively through the legislature to use the funds for urban land acquisition and freeway design (Jones 1989). This gave California a lead in postwar urban highway development. The state had not only committed to urban expressways but was banking rights-of-way and stockpiling engineering design plans in anticipation of postwar funding.

In 1944, the Federal Aid program was substantially revised to include secondary rural roads and urban extensions of the federal aid system, in addition to the federal aid primary system, which had long been promoted by the Bureau of Public Roads as the centerpiece of the federal highway program (Congressional Quarterly 1964; Seely 1987; U.S. Congressional Budget Office 1978). This new three-part (primary, secondary, and urban) program codified urban highways for the first time as an integral part of the federal highway program. And under this new structure, the urban extensions program received one-quarter of federal aid funding, which amounted to about 22 percent of total annual federal highway appropriations between 1946 and 1948 (Congressional Quarterly 1964).

But while the earmarking of federal aid funds for urban areas was new, the administrative structure of the highway program, developed between 1916 and 1921 to "get the farmer out of the mud," remained unchanged. Of particular importance to cities were the "inviolable doctrines of the federal-aid program" that (1) all federal aid funds be administered by state highway departments and (2) funds be expended only on a limited system of roadways (Gifford 1984, 324). In other words, federal policies developed at the dawn of the automobile era to improve rural farm-to-market roads would guide the development of metropolitan freeways throughout the second half of the twentieth century. And from the outset, the structure of federal urban highway finance ceded control of metropolitan expressway planning to state highway departments.

In 1947, California approved a comprehensive statewide highway package that, among other things: (1) altered the rural focus of the state highway system by adding about half of the Los Angeles expressway plan to the state highway system, (2) increased the state fuel tax by 1.5 cents per gallon to finance highway and expressway construction, and (3) followed the federal model of highway administration by placing the state Division of Highways in charge of all metropolitan expressway development (Collier-Burns Highway Act 1947).

The net financial effect of the 1947 legislation was to increase state highway revenues about 65 percent. By far the largest increase in funding was for urban highways, through increased highway funding for cities and the funding of the new urban freeway segments of the state highway system.

So in separate actions over a three-year period, the federal government (in 1944) and California (in 1947) made substantial commitments to finance metropolitan freeways. But in each case, those commitments required that cities relinquish control over expressway development. With the shift in financial responsibility came a shift in control: from cities and urban planning to states and highway engineering.

Evidence of this shift in control was apparent in the earliest designs by the state Division of Highways for freeways in Los Angeles. The freeways designed by state highway planners for intercity travel differed from urban expressways designed by city planners for intracity traffic in many important respects. The new designs closely resembled the intercity superhighways described in *Toll Roads and Free Roads* and were far different than the facilities envisaged in the cities' plans for Los Angeles and San Francisco. The new freeways were larger, on much wider rights-of-way, and designed for much higher vehicle speeds (60-70 mph instead 40-50 mph).[10] The Division of Highways also adopted a practice of uniform design standards, regardless of location. Thus, the admonition in *Interregional Highways* that metropolitan freeways must vary to "take the forms and locations necessary to serve the intended land uses" (Interregional Highway Committee 1944, 70) was abandoned in favor of the trend in highway engineering toward uniform design standards (Gifford 1984).

Perhaps more significantly, all public transit and joint development components were eliminated; freeways were to be stand-alone facilities. In an update of the Los Angeles expressway plan after the war, a board of consulting engineers recommended that rail transit rights-of-way be reserved on five freeways and special provisions for express bus service be included on seven others (see Figure 2). The state Division of Highways, however, opposed such provisions for mass transit, which was viewed as a competing mode and an inappropriate recipient of highway funds (Jones 1989).

The state gas tax was increased twice more during the early 1950s so that by 1956, when Congress authorized $27.8 billion to fund the 41,000-mile Interstate freeway program, California had already built over 530 miles of freeways (mostly in metropolitan areas) through its state highway department (Zettel 1959). This approach embodied the federalist model originally championed by the Bureau of Public Roads between 1916 and 1921 to improve rural road development, by placing the state highway department in charge of all freeway development—rural and urban. Because California cities led the nation in postwar freeway development, this significant new urban role for the state highway department became a harbinger for what would occur in cities and states around the country following the funding of the Interstate Highway System in 1956.

Funding the Interstate Highway System

While California was actively building freeways in the first ten years after World War II, the national Interstate Highway program received total appropriations of only $50 million in the ten years after its designation by Congress in 1944 (Congressional Quarterly 1964). In the mid-1950s, however, funding for the Interstate System was seriously debated by the Eisenhower administration and Congress, culminating in the Highway Revenue Act of 1956, which raised federal motor fuel taxes and fees and created a Highway Trust Fund.

The funding of the Interstate program, particularly the creation of the Highway Trust Fund outside of the traditional congressional appropriations process, has been extensively chronicled (Schwartz 1976; Seely 1987; Rose 1990). But two aspects of the Interstate funding process have particular importance to urban planning: (1) the abandonment of the traditional one-to-one federal:state fund matching ratio in favor of a nine-to-one ratio, which dramatically skewed metropolitan highway investment decisions, and (2) the fixing of urban route locations by the Bureau of Public Roads in consultation with state highway departments prior to the appropriation of funds.

The requirement that federal highway funds be matched with state funding on a dollar-for-dollar basis was begun with the Federal Highway Act of 1916. The purpose of the matching requirement was to ensure a vested state interest in and commitment to federally funded highway projects (Gifford 1984). The one-to-one matching requirement was successful in that it stimulated the adoption of state motor fuel taxes and substantial highway funding programs in every state, and it remained intact for almost forty years (U.S. Congressional Budget Office 1978).

In 1954, the federal matching requirement was changed—for Interstate Highways only. The rationale for the new matching rules was that, unlike local roads or even the Federal Aid primary system, the Interstates were first and foremost a national system. Despite the urban orientation of the *Interregional Highways* plan outlining the system, the Interstate program was being touted in Congress as a transcontinental system serving interstate commerce and national defense. Anxious that states give the new Interstates a high priority, the 1954 Federal Highway Act established a more attractive three-to-two federal:state match to encourage states to build

Interstates first. This change meant that Interstate projects—from the states' perspective—were 20 percent cheaper than other federally funded projects and 60 percent cheaper than highway projects built without federal funding.

In 1956, the Highway Trust Fund was created and the Interstate System became a national priority. The "national interest" rationale was again used to modify the Interstate matching requirement; this time, the change (to a nine-to-one federal:state ratio) was so radical that it dramatically altered the planning calculus of state highway departments (Altshuler 1965). From the states' perspective, building a metropolitan freeway without Interstate funding was now 900 percent more expensive than building an Interstate freeway; even Federal Aid Urban projects, financed with the traditional one-to-one federal:state match, were 400 percent more expensive than comparable Interstate projects. Since the 10 percent state contribution bought so much highway, the development of complementary facilities was discouraged, especially as highway revenues began drying up in the late 1960s (Taylor 1995).

The effects of this nine-to-one match were even more distorted by the mileage limit of the Interstate system. From the original Bureau of Public Roads' studies of "a very limited mileage of super-service highways," the Interstates had been planned as a fixed system (MacDonald 1936)—fixed in mileage, but not in cost. Beginning in 1960, all Interstate funds were apportioned to states on the basis of each state's estimated cost to complete the system.[11] In concert, the nine-to-one matching ratio and the fixed system length with no cost ceiling had two significant effects on metropolitan freeway planning: first, they encouraged states to design as much capacity as possible—more lanes, more and bigger interchanges—into each mile of Interstate highway. This served to both drive up costs and concentrate very large volumes of traffic on the metropolitan Interstates. From the states' perspective, however, bigger Interstates were still a bargain. And second, they strongly discouraged states (or cities) from developing comparatively expensive (from the states' perspective) companion facilities to the metropolitan Interstates (Gifford 1984). In other words, the structure of the Interstate funding program discouraged the kind of expressways envisioned by the early metropolitan transportation planners to circulate and distribute traffic in cities.

The result, of course, is a dominant role for Interstate freeways in nearly every major metropolitan area in the country—a role that the authors of *Toll Roads and Free Roads* and *Interregional Highways* emphatically advised against. Nationally, over 60 percent of the metropolitan freeways and expressways in the country are on the limited 11,500-mile urban Interstate System, and over 20 percent of all vehicle miles traveled in cities are on these 11,500 miles of urban Interstates (U.S. Federal Highway Administration 1991, FM-11, HM-20, VM-2).[12]

The second action that preempted local planning was the selection of urban route locations prior to the establishment of the Highway Trust Fund. In 1947, the Bureau of Public Roads, in consultation with each of the state highway departments, agreed on locations for all of the rural routes and 3,900 miles of the 9,400 route miles slated for urban areas. The location of the urban mileage was generally for major Interstate routes passing through metropolitan areas; the remaining mileage of urban circumferential routes—as recommended in *Interregional Highways*—were reserved for later designation when better urban traffic data were available (Schwartz 1976).

In 1954, when the administration and Congress began the Interstate financing debate, the remaining urban Interstate routes remained undesignated. Most of the funding debate in the 1955 session centered on whether the system should be financed with bonds or increased highway user fees. The debate was resolved in 1956 with the increase in user fees, including the gas tax, and the creation of the Highway Trust Fund. What is interesting, however, is that a funding proposal, similar to the one that passed almost unanimously in both houses in 1956, was soundly defeated in a nonpartisan House vote of 123-292 at the close of the 1955 session. Rose (1990) attributes this earlier failure to a general discomfort among many members of Congress with the scale of the proposed tax increase. In addition to the organized opposition to increased taxes by the rubber, petroleum, and trucking industries in 1955 (ironically, these industries represented most of what was subsequently labeled the "highway lobby" by critics of the Interstate program), Schwartz (1976) has noted that there was also a lack of interest and support by urban Congress members in what they saw as a primarily rural highway program. Both of these obstacles were addressed by Interstate Highway proponents for the 1956 deliberations.

Concomitant with the 1955 Interstate funding debates, the Bureau of Public Roads began work on identifying the route locations for the remaining undesignated urban route mileage. In June 1955, the Bureau announced the criteria to be used by state highway departments in selecting the final urban route locations, which were essentially guided by rural highway engineering practice. While the document outlining the criteria included a passing reference to the recommendations in *Interregional Highways* that the final urban "routes should be located and designed to be an integral part of the entire urban transportation plan," this statement was essentially obviated by the detailing of the criteria to be used in selecting the routes (Clark 1955, A-10). Again acknowledging that most of the traffic on these routes would be local, the Bureau nevertheless

clearly established that long-distance, intercity traffic would be given priority in determining the location of the urban routes: "The routes . . . should be those which will to the greatest degree provide auxiliary service to the traffic that is interstate in character on the routes of the interstate system as now designated" (Clark 1955, A-1).

Furthermore, the criteria included no requirements that the route selections be made in consultation with local or county governments, nor were they required to be consistent with metropolitan transportation plans. The document was clear that the urban route locations were to be selected jointly by the state highway departments and the Bureau of Public Roads: "[With regard to] the designation of the remaining balance of available mileage the Bureau of Public Roads and the state highway departments are working to accomplish this full objective" (Clark 1955, A-3).

In the process of urban Interstate route selection, Schwartz (1976, 508-9) has noted that "many of the state departments, in making their route selections, did not even bother to confer with elected city officials, let alone with the less politically influential city planners." Breaking with the long-standing tradition of working exclusively with state highway departments would have been both a radical departure for the Bureau and a time-consuming endeavor; interjurisdictional coordination of any kind is a drawn-out process, and time was of the essence in the summer of 1955.[11]

The Bureau wanted the urban routes selected and mapped in time for the 1956 federal highway funding deliberations. Indeed, just three months after the announcement of the route selection criteria, the Bureau published the final route location plan for all urban Interstates (including the previously undesignated urban routes)

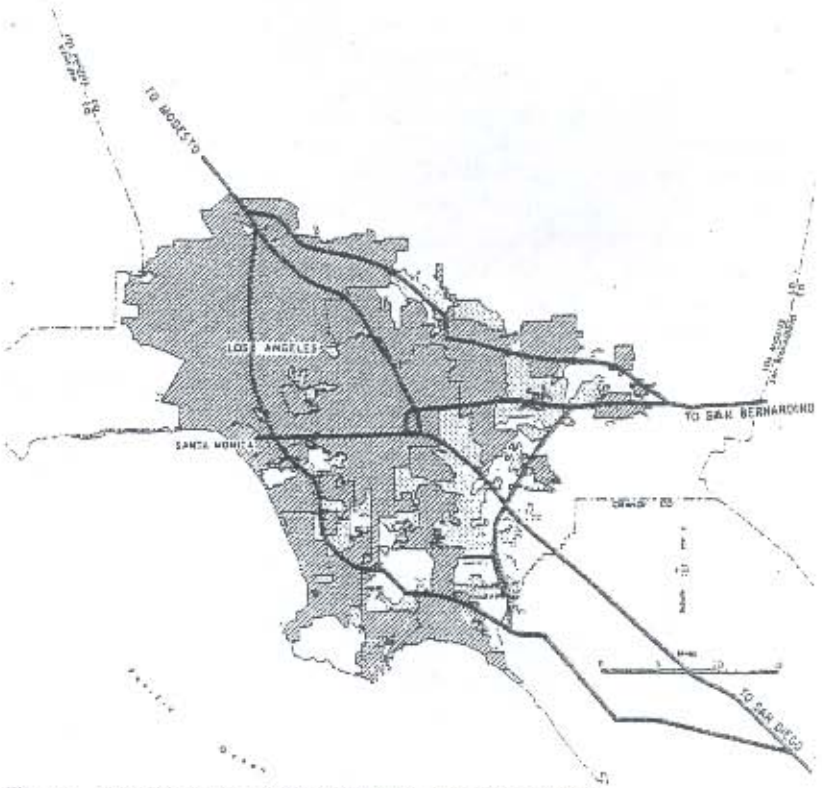

Figure 5. The 1955 Bureau of Public Roads freeway plan for Los Angeles.

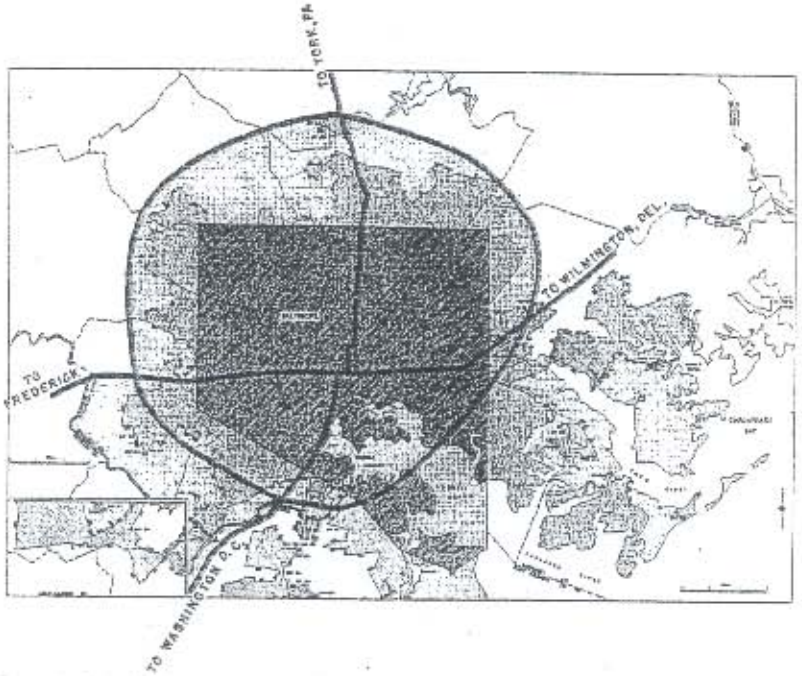

Figure 6. The 1955 Bureau of Public Roads freeway plan for Baltimore.
Source: U.S. Bureau of Public Roads (1955, 36).

for every major city in the country (U.S. Bureau of Public Roads 1955). The yellow-jacketed plan (known as the "Yellow Book") was really just a picture book of urban freeway maps with no accompanying text (see Figures 5 and 6). The entire planning process for the Yellow Book was completed by the Bureau in eight months.[14] The fact that the Yellow Book was published in the wake of the failure to fund the Interstate system in the 1955 legislative session, particularly given the haste with which the plan was assembled, was hardly coincidental. The effect of the Yellow Book on the 1956 Interstate funding deliberations "was to render the Interstate program more attractive to Congress members from urban areas where Interstates were specifically displayed" (Schwartz 1976, 485). With increased interest and support from urban members of Congress (due in part to the urban route designations in the Yellow Book), only modest fee increases for the trucking industry, and heavy lobbying from the construction industry, the tide was turned. Thus, in 1956 the Interstate funding package passed almost unanimously in both houses (Rose 1990).

So with the passage of the 1956 Federal Highway Act, local transportation planning was essentially cut out of urban freeway development. The nine-to-one matching ratio strongly discouraged the development of parallel facilities (arterials, expressways, freeways, and transit) recommended in *Toll Roads and Free Roads*, and the preemptive designation of the urban Interstate routes by the Bureau directly contradicted the recommendations of *Interregional Highways*. Thus, with the funding program in place and control of freeway development with the state highway departments, the stage was now set for the mass production of urban freeways.

▶ State Planning of Urban Freeways in California

The creation of the Highway Trust Fund was the largest part of the significant federal and state financial commitment made to freeways in the late 1950s. Combined state and federal motor fuel tax rates, the principal revenue source for freeway development, increased 72 percent nationally between 1947 and 1959; in California, the increase was 135 percent during the same period. These higher tax rates combined with average annual increases in fuel consumption in excess of 5 percent to dramatically increase highway revenues. Nationally, revenues for highways increased 381 percent between 1947 and 1959; in California, the increase during the same period was much higher—495 percent (U.S. Federal Highway Administration 1969-1960, E-4, E-7). This extraordinary growth in highway revenues radically changed highway planning practice. No longer were scarce resources allocated incrementally to highway projects based on existing demand; new, large-scale freeway networks now were possible. Freeway plans that appeared fanciful in the late 1940s were not only possible but often appeared conservative just ten years later.

Following the funding of the Interstate Highway System, the California Legislature in 1957 instructed the state Division of Highways to prepare a comprehensive plan "for the ultimate freeway and expressway system of the entire State" (Metropolitan Transportation Engineering Board 1958, 13). The Division of Highways returned in 1958 with an ambitious 12,241-mile plan titled simply, *The California Freeway System* (California Division of Highways 1958). The plan called for the extensive development of both urban and rural freeways in networks far more dense than the systems proposed by national highway planners.

In the cities, the freeways were plotted on roughly a four-mile by four-mile grid, which was a substantial departure from the ring-radial networks favored by most early metropolitan expressway planners. The ring-radial freeway plans were based on the existing patterns of roads and rail lines leading to and from city centers. But state freeway planners in 1958 argued that the proportion of trips to and from city centers was dwindling; metropolitan freeway networks, they concluded, should be modeled after urban street grids to better distribute traffic around the region, rather than funneling trips downtown (Jones 1989).

Such a position typifies the contrast between state and local approaches to planning freeways for cities. The early metropolitan expressway plans were motivated in large part by the desire to stem the decline of central business districts and inner-ring residential and manufacturing areas vis-à-vis the suburbs. While the routing and layout of freeways varied from city to city, the philosophical divide between local planners and state highway engineers was more consistent. Local planners frequently saw expressways as a central feature of land use planning in the automobile age, while highway engineers often had little patience for such efforts at social engineering (Altshuler 1965).

Metropolitan land use was mentioned in the 1958 freeway plan for California, but only with respect to the negative effect development adjacent to highways had on traffic flows. The land use planning practiced by state highway engineers was to design facilities that interacted as little as possible with metropolitan land uses; the purpose of grade-separating and limiting access to freeways was to isolate them as much as possible from the tangled city traffic that surrounded them, so that "the new freeway will preserve capacity to move traffic and avoid low-value strip development with consequent deterioration of public investment in highways" (California Division of Highways 1958, 20).

Table 1.
Actual versus projected traffic shares for freeways in California (in percentages).

	Projections for 1980	*Actual in 1980*	*Difference*	*1980 Projections Adjusted to Account for Partial Completion of the System*	*Average Difference*
Planned rural system completed	100	44.0	–56		
Rural travel on rural freeways	60 to 75	20.3	–66 to –73	26 to 35	–35
Planned urban system completed	100	46.0	–54		
Urban travel on urban freeway	52 to 62	47.0	–10 to –24	24 to 29	81

Sources: Adapted from California Division of Highways (1958), California Department of Transportation (1981), and the U.S. Federal Highway Administration (1981).

Despite the major commitment of route mileage to metropolitan areas, only one of the ten explicit criteria used to identify and select freeway routes for the 1958 freeway plan referred to intracity travel; the other nine all concerned intercity travel. Though the plan acknowledged that two-thirds of all vehicle travel in California was in the Los Angeles and San Francisco metropolitan areas and that a "majority of travel [statewide was] local" (California Division of Highways 1958, 10), its authors concluded that "the primary function of a state-wide freeway system is to provide relatively rapid through-traffic service for the longer distance trips in the most direct and economical manner possible" (California Division of Highways 1958, 22).

In the late 1930s, the federal Bureau of Public Roads struggled to identify sufficient travel demand to justify a national interstate highway system. There was broad political support for superhighways, and the Bureau had a strong orientation toward rural highway development, but there was indisputable evidence that most vehicle travel and traffic problems were urban. In its struggle to balance political will and bureaucratic tradition with contrary evidence, the Bureau, in its *Toll Roads and Free Roads* report, concluded that a national superhighway network connecting city centers was the answer.

Twenty years later, the California Division of Highways similarly struggled to accommodate political will, bureaucratic tradition, and travel demand in the preparation of its 1958 freeway plan. To justify the need for a statewide freeway system, the plan focused on the need for improved recreational and commercial intercity travel, presumably because the average lengths of these trips (15.5 miles and 8.5 miles, respectively) were the longest of all trip types. No data were presented in the plan, however, showing that intercity recreational and commercial travel constituted a significant proportion of vehicle travel or that such travel warranted special attention.[15]

The incompatibility between data showing that most travel was urban and local, as well as the Division of Highways' rural highway orientation toward "rapid through-traffic service for longer distance trips," helps to explain why the 1958 plan for California substantially overestimated the role of freeways in rural areas and underestimated their impact in urban areas (California Division of Highways 1958, 22).

Assuming a linear relationship between the size of the freeway system and freeways' share of vehicle travel, one can adjust the Division of Highways' freeway travel share estimates by accounting for the fact that less than half the planned freeway system was completed by 1980.[16] The resulting adjustments in the projections for 1980 freeway traffic shares show that the

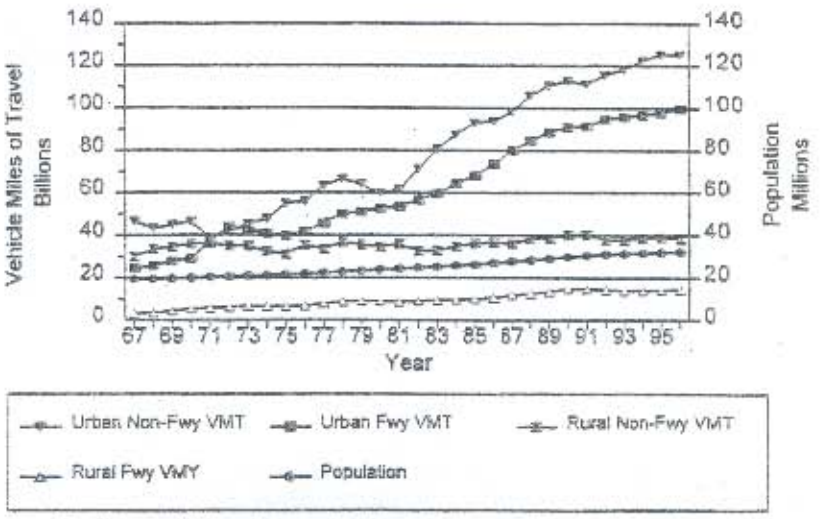

Figure 7. The growth of population and vehicle travel in California.
Sources: U.S. Federal Highway Administration (1968-1997, Table VM-2) and California Department of Finance (1997).

California Division of Highways overestimated the role of freeways in rural areas by about 33 percent and significantly underestimated the role of freeways in metropolitan areas by about 81 percent (see Table 1).[17] In other words, the role of freeways in metropolitan areas in 1980 was nearly double what was anticipated by state highway planners in the 1950s. The intercity focus of state highway plans in the 1950s could not have been more misplaced.

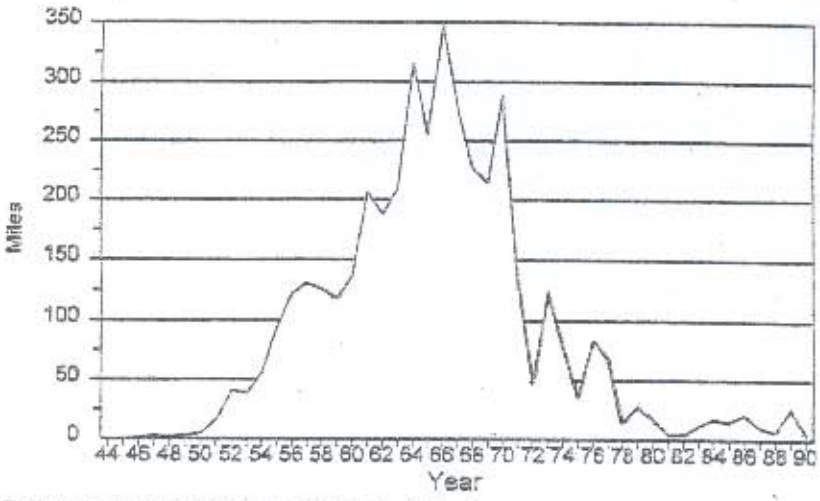

Figure 8. Centerline miles of freeway constructed in California.
Sources: Adapted from Zettel and Shuldiner (1959), Jones (1989), California Department of Public Works (1948-1973), and the California Department of Transportation (1974-1983, 1988-1991).

The California plan was silent on the cost of the freeway system, saying only "that the system herein is economically feasible and can be accomplished within the framework of present highway user finances within a reasonable period of years" (California Division of Highways 1958, 22). In hindsight, such a conclusion might appear naive, but at the time it appeared quite reasonable. Inflation-adjusted highway revenues in California doubled and then doubled again between 1947 and 1959, and there appeared to be no end in sight. Recalls a retired chief engineer at the Division of Highways, "In the late 1950s we couldn't build freeways fast enough. The money was piling up faster than we could spend it" (Schaeffer 1992).

A financial evaluation of the plan was prepared for the legislature, which set the cost of completing the system by 1980 at $10.5 billion dollars; about two-thirds of the projected costs were for metropolitan freeways and one-third for rural freeways (Zettel 1958). The financial evaluation concluded that the freeway system could be built with projected funds from existing highway revenue programs, assuming little cost escalation over the twenty-one-year life of the program.[18] In 1958, $10.5 billion was a staggering sum for a state public works project, equivalent to $60.4 billion today.

At 12,241 miles, the California Freeway System was to be nearly one-third the size of the entire Interstate Highway System and was the largest public works project ever undertaken by a single agency. The plan projected extraordinary growth for the state, even more than the extraordinary growth that actually occurred (see Figure 7). In spite of its ambition, or perhaps because of it, the plan met with almost universal local and legislative support. Most of the debate surrounding the plan was whether the Division of Highway's growth projections were too conservative. After adding an additional 171 miles to the plan, it was adopted almost unanimously by both houses of the legislature in 1959 (Jones 1989).

With the creation of the Highway Trust Fund in 1956 and the adoption of the California Freeway System in 1959, popular and political support for freeways was at an all-time high. Freeway development, in California and around the country, geared up quickly in the late 1950s. In California, more miles of freeways were opened between 1957 and 1959 than had been built up to 1956, and more miles of freeways were opened between 1960 and 1964 than had been built up to 1959 (Zettel and Shuldiner 1959; California Department of Public Works 1948-1965).

Freeway development continued to expand in the 1960s, reaching a peak (both nationally and in California) in 1966; that year, 341 miles of freeway opened in California and 3,608 miles nationally. But just as quickly as it had begun, and long before the planned urban links of the system were completed, freeway development began to decline. Rising opposition to urban freeway development in the 1960s and 1970s eroded political support for new highway taxes and fees, and social and environmental legislation began to reinsert cities and planners into the freeway development process (Taylor 1995). The combined effect of declining funding and increasing local control was to close the urban freeway building era in the United States. Between 1966 and 1976, the number of freeway miles opened nationwide dropped 51 percent in comparison to the previous ten years. In California, the downward trend was even sharper; from the peak of 341 miles opened in 1966,

new freeway mileage dropped to 66 miles in 1972 and to just 17 miles in 1978, a 95 percent drop in 12 years. To date, freeway development has not rebounded appreciably; in California, more miles of new freeway were opened in 1966 than were opened in the fourteen years between 1977 and 1990 (see Figure 8). Though the Interstate System is largely complete, over half of the 1958 California freeway plan remains unbuilt (California Division of Highways 1958; California Department of Transportation 1991). Eighty percent of the current California freeway system and 81 percent of all national freeways were built between 1956 and 1974 (U.S. Federal Highway Administration 1957-1991, FM-11, HM-20). The freeway building era was dramatic but short-lived.

▶ Freeways and Cities

As much as any other public investment, freeways have profoundly influenced the form and function of cities. Yet local planning played a distinctively peripheral role in their development. Retrofitting new freeways into cities was both socially disruptive and expensive, though the levels of disruption and expense were a function of the size and location of the new freeway. The expressways envisaged by most early planners in cities like Los Angeles would have required some displacement of existing homes and businesses, but far less than for the massive freeways eventually built. The freeways built in cities were larger, noisier facilities that concentrated traffic and pollution much more than the expressways envisioned by early planners. The new urban freeways were also very expensive—supported only by highway user fees that did not grow in proportion to rising costs and only partly to increasing travel, they quickly lost ground to inflation and rapidly appreciating urban land values. Urban freeway development, in other words, was destined to a financial breakdown from the start (Taylor 1995).

The modern urban freeway, then, is a hybrid creature that has been distinctly shaped by the funding process. To secure funding for expressway development, cities turned to the states and the federal government for help. During the Depression, there was a shift from property tax financing to the gas tax, which separated urban freeway finance from the enormous impact freeways would have on land use. In California, the state agreed to finance metropolitan freeways under the condition that cities give up control over the planning, design, and operation of freeways to the state highway department. And the financing of the Interstate system both set the location of the urban routes and placed a distorted emphasis on Interstate freeways over other forms of urban transportation—even other freeways.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and its successor, the Transportation Equity Act for the 21st Century (TEA-21), are the latest and most significant efforts to grant cities and regions the kind of role in transportation development envisaged by the architects of the *Interregional Highways* plan in 1944. ISTEA was the policy culmination of a decades-long effort by a cross-section of urban and environmental interests to gradually shift control over metropolitan highway planning and development from state departments of transportation to metropolitan planning organizations. Significant changes have accompanied this shift from state transportation engineering to regional transportation planning, from embracing to tolerating increased auto use, from seeking to circumvent stakeholder objections to facilitating stakeholder input, from facilitating suburban expansion to encouraging less auto-dependent forms of development, from constructing new systems and facilities to mitigating the effects of transportation facilities, and from a focus on metropolitan freeway networks to multimodal planning with an emphasis on developing public transit as an alternative to private vehicles. These changes, along with broader planning movements like smart growth, neotraditional town planning, transit-oriented development, and transportation systems/demand management, bear striking similarity to many of the proposals in transportation plans developed for cities like Detroit, Los Angeles, and New York in the 1920s and 1930s. The plans and proposals—then and today—reflect a wide array of urban concerns, including reducing traffic congestion, preserving central business districts, improving public transit service, and reviving depressed communities. Such concerns stand in stark contrast to the almost single-minded emphasis on traffic service that guided most state highway departments in the development of metropolitan freeways in the third quarter of this century (Rose and Seely 1990; Barrer and Rose 1999). But this increased local authority comes after freeways were made the transportation centerpiece of nearly every American city. A bell cannot be unrung, and freeways built by state highway departments in the 1950s and 1960s will continue, for better or worse, their central role in metropolitan areas for years to come.

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▶ Notes

1. Only a few of the many writers on freeways have focused on how political and bureaucratic institutions shaped freeway development (Gifford 1984, 1991; Seely 1987; Jones 1989; Rose 1990; Rose and Seely 1990), and fewer still have focused specifically on the role planners and urban planning played in the development of metropolitan freeways (Altshuler 1965; Schwartz 1976; Foster 1981).

2. The terms used in the plans for cities—*parkways, motorways, limited ways, throughways, expressways,* and *freeways*—were used interchangeably by early planners. For the sake of consistency, the term *expressways* will be used to describe the facilities envisioned by urban planners and *freeways* to describe the larger facilities conceived by highway engineers.

3. Planners for Los Angeles described such problematic traffic mixing as "promiscuous" (Olmstead, Bartholomew, and Cheney 1924, 11).

4. The Hollywood Freeway, consistent with the design guidelines in the 1939 Los Angeles plan, included rail transit in the median.

5. Congress clearly had some expectation of what such a system might look like in advance of the Bureau's investigation. The 1938 Federal Highway Act specified that the Bureau of Public Roads investigate

> the feasibility of building, and cost of, super-highways not exceeding three in number, running in a general direction from the eastern to the western portion of the United States, and not exceeding three in number, running in a general direction from the northern to the southern portion of the United States, including the feasibility of a toll system on such roads. (U.S. Bureau of Public Roads 1939, 1)

6. While Gifford (1984, 1991) has argued that the decision to penetrate cities reveals a focus on improving urban highways, a careful reading of *Toll Roads and Free Roads* and its successor, *Interregional Highways*, reveals an overriding concern with using urban penetration to generate sufficient traffic to justify a national intercity highway network and not with urban transportation problems per se.

7. In fairness to the Bureau, however, the report did recommend that cities develop parallel facilities to complement the proposed metropolitan ring-radial highway systems. But as the discussion of freeway finance in the following section will show, the structure of state and federal highway programs all but prevented cities from developing such complementary facilities.

8. Interestingly, three of the seven committee members—Harland Bartholomew, Frederic Delano, and Rexford Tugwell—were noted city and regional planners. The strong presence of urban planners on a committee charged with planning a national highway system certainly explains the very different tone than *Toll Roads and Free Roads* with regard to urban highways (Lovelace 1992). The most active planner on the committee was Bartholomew, who (along with highway engineers Kennedy, MacDonald, and Purcell) attended most of the committee meetings and took an active role in writing the final report (Rose 1990, 126ff.).

9. Prior to this time and consistent with prohibitions against spending state and federal highway funds in cities, state highway designations ended at the city limits.

10. The metropolitan expressway plans were proposed to reduce congestion by streamlining traffic movement and eliminating cross-traffic, not by permitting high-speed urban travel. In recommending a 45 mph design speed for the Los Angeles expressway system, the 1939 plan noted that "a road speed of 60 miles-per-hour would, in the Board's opinion, be an inefficient and unsafe use of expensive highway" (Transportation Engineering Board 1939, 18).

11. Each state's share was calculated by dividing the estimated cost of completing the Interstate System in that state by the estimated cost of completing the entire system.

12. The data are reported in centerline miles, though lane mile data are a better indicator of the relative length and scale of roadways. Because Interstates are usually the largest metropolitan freeways, historical lane mile data, if they were available, would almost certainly reveal an even larger role for metropolitan Interstates.

13. In the Bureau's words, "The Bureau plans to make the final location of the entire remaining 2,300 miles shortly" (Clark 1955, B-8).

14. The Bureau first requested that states submit proposals for urban Interstate route locations on 6 January 1955. The document outlining the route selection criteria was circulated to the state highway departments on 9 June 1955. The final Interstate route plan was published on 15 September 1955.

15. Though data from numerous traffic studies over the previous two decades, including the data discussed earlier in *Toll Roads and Free Roads* and *Interregional Highways*, had clearly revealed the small relative role of long-distance, intercity vehicle travel.

16. Which is probably a conservative assumption, given that the freeways built (especially in rural areas) were in the corridors with the highest travel demand (Schaeffer 1992).

17. This is done simply by multiplying the projected freeway traffic share for 1980 by the proportion of the system actually completed in 1980:

projected traffic share	*	proportion of system completed	=	adjusted traffic share projection
High rural estimate:		(75%) * (44%) = 33%		
Low rural estimate:		(60%) * (44%) = 26%		
Composite rural estimate:		(33%) + (26%) / 2 = 30%		
High urban estimate:		(62%) * (46%) = 29%		
Low urban estimate:		(52%) * (46%) = 24%		
Composite urban estimate:		(29%) + (24%) / 2 = 26%		

actual 1980 traffic share	/	adjusted traffic share projection	=	percentage of over- or underestimation of freeway traffic share
Rural freeways:		(20%) / (30%) = -35%		
Urban freeways:		(47%) / (26%) = +81%		

18. The report concluded, however, that subsequent tax increases would likely be required to cover the effects of inflation.

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