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CHAPTER 1

Introduction

In his Grand Plan, President Eisenhower envisioned each level of government contributing to the upgrade of the Nation's entire road network. His goal was the creation of a system to improve safety, reduce traffic jams, increase economic efficiency, and provide for the national defense.—Richard Capka, administrator of the Federal Highway Administration (2006–2008), Remarks to Congress

Like many Americans, I grew up in the distant wake of interstate and other highway construction.* My family slowly moved from an old mill town off Interstate 495 in Massachusetts, to an even older manufacturing town off Route 128, to a town just west of Cambridge, and eventually to an old German brewer's home off a linear park that had been cleared for a federally funded highway through southwest Boston. That

* Throughout this book, I make numerous references to interstate construction, individual interstates, the general interstate construction program, and specific laws and policies. I capitalize the word *interstate* when referring to specific interstates (e.g., Interstate 495), the officially designated Interstate Highway System (Interstate System for short), and legal or document titles. I also default to the capitalization used in quotations from source material, including transcripts of recorded interviews. In these instances, the source materials frequently use *Interstate* to refer to the Interstate Highway System, but also the interstate highway program or interstates more generally.

Interstate 95 and Route 128 were the same road felt like a local quirk. It was no different from the locals knowing that a frappe comes with ice cream but a milkshake does not. Going to the see the Bruins and Celtics, my dad and I would walk under the shadows of the Central Artery, one of the first major elevated expressways in the United States, in an environment that felt like something out of one of the darker versions of Batman's Gotham City. The structures looked old, dark, and eternal.

Staring down at us while sitting in traffic on a highway that erased one neighborhood was a billboard for apartments on the site of another erased neighborhood announcing that if we lived there, we'd be home now. After high school, my closest friends moved into a house together in a neighborhood that was nearly razed to build another urban expressway. A mural by what would become my neighborhood grocery store a decade later showed heroic neighbors and activists facing down federal bulldozers (figure 1-1). At the time, I did not realize that a freeway had been planned to run through the neighborhood. The neighborhood was convenient and filled with a rich diversity of houses and shops. The idea of spending hundreds of millions of dollars to replace it all with just another highway seemed crazy. There already seemed to be plenty of roads and highways to get around.

Not until graduate school did I learn how much damage urban highways had done or the callous disregard with which state and federal highway officials had built them. Class readings and lectures on slum clearance and urban highways played a part in my growing understanding. More than anything, Fred Salvucci, former Massachusetts secretary of transportation and MIT professor, telling the story of how his grandmother's home was taken to build the Mass Turnpike, changed my connection to my built environment. Like so many others during the time, his grandmother, a seventy-year-old widow, was given a dollar and told she had to vacate her house for a highway project.[1] Officials sent a letter assuring her that the government would assess her home's value

Figure 1-1. *Beat the Belt*, 1980 mural by Bernie LaCasse. (Photo by Chris Bell.)

and reimburse her later. The only analysis that had been done to justify her home's taking was a rudimentary traffic flow study predicting how many people were likely to drive on the roadway. These types of stories permeate and linger on the structures, buildings, and monuments of the cities and towns of my childhood and adult life.

Decades of reforms would force the highway builders to treat people and the environment with more respect. Many highway builders resented these new social protections. Some continue to resent them. Most would reflect that the Interstate Highway System could not have been built with today's protections in place. The first Federal Highway administrator, Bertram Tallamy, lamented three decades later, "The only observation that I see and I am sure everybody knows, that the red tape that is involved now by the federal government, by the state government, by the local agencies, hinder actual accomplishment.... We could not build the Interstate today."[2]

The assumption is that all the destruction from building highways—including the disproportionate impact on Black, Brown, immigrant, and low-income communities—was worth it. The Interstate System and the hundreds of thousands of miles of supporting state highways and arterials are frequently hailed as a marvel and triumph of engineering, the world's largest public works investment visible from space, a critical component of the American way of life, and a fundamental component of economic competitiveness.[3] Politicians frequently hail President Dwight Eisenhower's 1956 National Interstate and Defense Highways Act and subsequent highway acts as models of successful bipartisanship. Federal Highway administrator Richard Capka's reference to Eisenhower's *Grand Plan* (capital G, capital P) imbues the highway program with a mythic, near religious status.[4] Some eggs were broken. Society benefits from the omelet.

Conversations about the effects of the original program also ignore that the finance, governance, and construction models established by the 1956 National Interstate and Defense Highways Act continue to influence what gets built today. Of the inflation-adjusted $2.5 trillion spent on highways from the Highway Trust Fund since its inception in 1956, about 60 percent has been spent since completing the last bit of the originally planned Interstate System in 1992.[5] About 75 percent has been spent since the system was supposed to have been completed in 1969. State and local governments have spent trillions more on road investments and repairs over the same period.

Though fewer homes and businesses are destroyed, highway planners are still breaking eggs to make omelets—extremely expensive omelets. There are nearly twice as many lane miles of urban interstate and 55 percent more secondary highways and arterials today as there were in 1990.[6] Few Americans have a sense of how much the government spends on roadways or how, why, or where roads get built. The better informed generally understand that the federal government and states raise dedicated transportation funds through a gas tax. And these funds are primarily spent to build, widen, upgrade, and maintain major highways and arterials.

Many citizens likely understand that highway planners and politicians largely promoted the Interstate System for national defense, interstate commerce, and even abstract concepts like promoting American family life. By contrast, few probably know that the engineers, planners, and administrators who designed and built the system focused on building roads that encouraged more driving to raise additional gas tax revenues. There is a reason highway planners bulldozed their way through cities before focusing on connecting them: those urban highways would carry the most traffic and generate the most revenues. Fewer still probably realize just how unsuccessful highway builders have been at reducing congestion or improving traffic safety, the two primary stated goals of nearly every large federal and state funding package since the National Interstate and Defense Highways Act.

Despite all the spending and stated policy goals, congestion and traffic deaths remain endemic. One popular source indicates that Americans now spend three times as much time in traffic as they did in 1991. The average time spent in traffic per car commuter increased from twenty-nine hours in 1991 to fifty-four hours in 2019.[7] More than a million people have died on US roads since the completion of the Interstate Highway System. The US traffic fatality rate is two to four times higher than in Canada or wealthy European countries and has improved much more slowly over time than in peer countries. At an average economic cost of $1.5 million per fatality, fatal traffic collisions have cost nearly $2 trillion in lost wages and medical expenses since 1991.[8] Millions more crashes involving serious and moderate injuries cost hundreds of billions more. These estimates generally ignore the social and personal costs of millions of shattered lives, lost loved ones, and traumatized families.

Perhaps the biggest effect of highway investments since the 1990s has been to make the United States ever more car dependent. Residents and visitors have driven around ninety trillion miles since 1991, producing more carbon emissions than any other country barring China from the transport sector alone. Outside of a handful of cities, Americans without cars—due to income, health, age, or other reasons—struggle to access employment, shops, hospitals, and other daily needs. Losing a car due to changes in life circumstances, like a crash or mechanical failure, is associated with decreases in income, happiness, health, and employment. As a result, people go to great lengths to maintain access to a personal car, taking on debt, driving without insurance, or purchasing an older poorly maintained vehicle that is not only less safe but contributes substantially to local air pollution. After housing, US households spend more on transportation than any other type of expenditure, including food, health, or education,[9] leaving many families and the overall economy vulnerable to even modest increases in gas prices.

Looking across cities and urban areas, the legacy of the past decades of road investments is unimpressive. The places that seem to be doing best in terms of economic efficiency, traffic safety, social equity, and environmental sustainability are frequently the places with the fewest highways and major arterials per capita. These towns and cities are much likelier to be more densely populated and have grown less around freeways and large auto-oriented arterials than the rest of the country. They are also the places where having a car is less of a prerequisite for everyday access to basic economic and social opportunities. While good accessibility is hardly universal, many more people can and do get to work and other important destinations by bus, train, foot, and bike.

In this book, I argue that the US roadway system is overbuilt. There are so many high-capacity urban interstates, highways, and arterials that the costs of adding new roadway capacity generally outweigh the benefits. This claim is somewhat controversial. Transportation is necessary for a functioning modern society and economy. Without streets and highways, there is severely constrained access to employment, food, and other necessities. Businesses have a difficult time attracting employees and receiving or shipping goods. However, too much roadway is also problematic. The inverse of a dysfunctional place without streets or highways is a somewhat absurd place composed entirely of streets and highways. Roadways connect places but they also replace other land uses, like houses, businesses, parks, and schools. Somewhere between no roadway and only roadway lies some optimum. Below this optimum, a roadway system is underbuilt. New investments in highways and arterials will tend to spur economic activities, improve accessibility, and produce social and economic benefits. The first major roadway connecting through a city, for example, confers enormous benefits. Each new roadway investment will tend to confer smaller and smaller benefits. While there is a fair amount of disagreement over the absolute benefits of highway investments in the United States, there is generally consensus that newer investments produce fewer benefits than the older ones. At a certain point, the fiscal, environmental, and social costs of road investments outweigh the benefits. The road system becomes overbuilt. New investments have smaller benefits and tend to distort and shuffle economic activities rather than produce new ones.

While the optimal amount of roadway will vary by geography, culture, and economy, the US roadway system is well beyond the optimal level of investment. Most national transportation problems stem from having too much road infrastructure rather than too little. The desired increased economic activity or reduced congestion from building more highways or expanding existing ones rarely materialize. More than anything, more highways lead to more driving, which produces more pollution, more traffic fatalities, and more auto-centric cities and towns that require more driving to participate in basic civic, social, and economic activities.

Even narratives about crumbling infrastructure and a diminishing Highway Trust Fund stem from this more fundamental problem. As the national highway system has expanded and aged, the annual costs of repaving, repairing, and rebuilding roads, bridges, and interchanges have also skyrocketed. The original National Interstate and Defense

Highways Act had never envisioned these kinds of ongoing costs. There are more highways and major roads than anyone really cares to pay to maintain or reconstruct. There is also so much road infrastructure that new transit, bicycle, or pedestrian investments do little to shape overall national or even local travel behavior. The 2021 Bipartisan Infrastructure Law announced the largest ever federal spending package on public transportation. While many of these investments may be beneficial, they will do nothing to resolve the fundamental problem of an overbuilt national roadway system. And still, policymakers, planners, and engineers continue to prioritize building and upgrading road infrastructure.

Over the course of this book, readers will learn about how the US roadway system became overbuilt, how public policy continues to encourage overbuilding, what the scale and consequences of overbuilding are, and how policymakers can stop and begin to correct overbuilding. The emphasis is on urban highways. More than half of the initial intestate financing and most of the early construction projects went into cities. Gas tax revenues from urban traffic then financed the rural parts of the system. The largest social, economic, and environmental effects of the highway system, moreover, have happened in cities and their suburbs. Urban areas account for just under half of interstate lane miles but more than two-thirds of interstate vehicle travel. While early arguments for subsidizing highways often emphasized connecting the country and making it easier for farmers to get goods to market, fewer than one in five US residents live in rural areas today. By the time construction began on the first miles of the Interstate System, planners and engineers had abandoned their rural emphasis and instead focused on eliminating urban congestion and facilitating car travel.

The national propensity to build roadways is no longer official or intentional policy. Instead, overbuilding stems from the institutions, finance mechanisms, and evaluation metrics developed in the first half of the twentieth century to finance and build the Interstate System and roughly four million miles of supporting highways, arterials, and secondary roads that make up the Federal-Aid Highway network. In the leadup to the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), the first major federal transportation law focused on transportation policy after completing the Interstate System, policymakers recognized the need for a drastic shift in highway policy. As President George H. W. Bush framed the issue, "We've got to take full advantage of our present opportunity to create a surface transportation program that will meet our present and future needs, not our past problems."[10] Indeed, ISTEA (pronounced like the beverage) opened with lofty statements about economic efficiency, environmental soundness, energy efficiency, fiscal responsibility, multimodality, and the mobility needs of the poor, elderly, and physically disabled.

Despite ISTEA's stated transformative aims, federal and state policies still focus on raising dedicated revenues through gas taxes to fund new highways and major arterials and maintain existing ones. Although more funds are set aside for transit, walking, biking, and beautification, the investment paradigm has not changed. Further, planners and engineers have not adjusted the tools they use to determine which roads should be built, rebuilt, or widened and why. Despite having too much roadway, the United States is still operating in construction mode, using the same basic approach used to finance and build the Interstate System quickly. Contrary to Bush's claim on signing ISTEA, we have yet to create a surface transportation program that addresses present and future needs instead of past problems. The United States is still in desperate need of a national transportation policy that can help address traffic safety, climate change, accessibility, and new forms of economic development. Everyone has eaten. The kitchen is getting more and more expensive. But the restaurant keeps serving omelets.

Over the remaining ten chapters of *Overbuilt*, I explore the history and contemporary role of the federal government in justifying, promoting, and eventually building urban highways; examine the costs of overbuilding; and look at interrelated investment and regulatory approaches to move beyond the legacy of the Interstate Highway System and develop a more financially, environmentally, and socially sustainable transportation system.

In the early chapters, I draw in part on primary planning documents from highway agencies, interviews with highway planners from the Public Works Historical society, several histories of the Interstate System, and personal and ethnographic accounts of citizens interacting and fighting with state and federal highway builders over the siting and construction of urban highways. Whereas the great histories of the interstates, such as Tom Lewis's *Divided Highways* and Mark Rose and Raymond Mohl's *Interstate*, tend to conclude with or shortly after the completion of the Interstate System, *Overbuilt*'s emphasis is on federal policy since system completion. The institutions, policies, finance mechanisms, and evaluation metrics developed since the creation of the Federal Highway Administration's predecessor in 1893 continue to directly influence how, where, and how much states, cities, and towns invest in highways.

These chapters also position the Interstate Highway System more appropriately as a single but important component of the larger and broader system of highways and arterials subsidized and regulated by federal policy. For example, the Federal-Aid Highway Act of 1921, the first to mention a system of connected interstate highways, allocated 40 percent of funds and nearly 60 percent of mileage to secondary highways and arterials. Federal policy currently subsidizes the construction, reconstruction, and maintenance of a wide array of roadways and roadway types. These chapters show how the roughly 40,000 miles of interstate highway are historically, fiscally, and functionally related to the broader 160,000-mile National Highway System and four-million-mile Federal-Aid Highway System. The interstate highways may get the most attention, but they do not function without a much broader system of highways, arterials, and local roads.

In the middle chapters, I draw on contemporary scholarship focused on the costs and benefits of roadbuilding. Somewhere between a city with no roads and a city composed entirely of roadway lies a theoretically optimal amount of roadway for a given city. The field of economics provides a general framework for finding this theoretical optimal: the point at which the additional benefits of a new road investment are equal to the additional costs. If the costs of new investments tend to outweigh the benefits, there is too much roadway. If the benefits tend to outweigh the costs, there is probably not enough. Factoring in external costs, like pollution and traffic fatalities, would tend to move the overall equation in favor of producing less roadway.

In the final chapters, I focus on how changes in finance and transportation evaluation measures can help start to undo the decades of transportation policy that has focused primarily on increasing traffic speeds and roadway capacity. While state and local highway and land use policies will continue to vary from place to place, shifts in federal policy have the potential to reshape urban transportation systems in the coming decades. Unfortunately, there are no silver bullets, and reversing the effects of an overbuilt road system will take decades. Congestion pricing, gas-tax alternatives, vehicle automation, and new transit technologies have a role to play in future urban transportation systems but will do little to nothing to resolve the fundamental problem of an overbuilt transportation system whose expansion state and federal policy continues to subsidize and encourage.

Cars will continue to play the primary role in getting people to and from work, school, church, ball fields, restaurants, and residents' many other destinations throughout the United States. The goal of federal transportation policy should be to help make these trips safer, shorter, and less economically and environmentally damaging. Living without a car—whether due to preference, income, or disability—should not exclude residents from basic social, economic, and recreational activities. Moving slowly in these directions will require moving past the finance and evaluation mechanisms that built the Interstate System. These mechanisms are not just dated and unresponsive to the country's twenty-first-century transportation needs, they are moving the country in the wrong direction. Bush's call to focus on future needs instead of our past problems remains as salient today as it was in 1991. The originally planned Interstate System was completed decades ago. It is time to move on.

CHAPTER 2

Out of the Mud and into the Cities

The urge to have the highways was not matched by an urge to pay for them.
—Senator Daniel Patrick Moynihan, *Urban Roads and Chaos, 1960*

The federal government was slow to take on its role as the driving force in planning and financing a national highway system. Private interests and wealthy motoring enthusiasts did most of the heavy lifting to plan, finance, and build the United States' first cross-country highway, the Lincoln Highway, in the early twentieth century.[1] Early federal involvement focused on conducting research, setting standards, and promoting the benefits of improved roadways, such as helping farmers get goods to market. Between the first map of the system in 1922 and opening of the first official segment of the Interstate System, thirty-five years passed. Over a similar period, federal highway planning shifted focus from getting farmers out of the mud to getting urban motorists out of traffic jams. The estimated price tag of the highway system also increased substantially. Grade-separated limited-access superhighways were much more expensive to construct than two-lane rural highways. The costs of acquiring urban land to demolish buildings for urban highways were also prohibitive without substantial federal and state support.

Despite the tremendous cost and potential socioeconomic impacts, little in the way of economic or social analysis was ever conducted. The main analysis of what would become the core of the Interstate Highway System concluded in 1939 that motorists were unwilling to pay the high and, at the time, substantially underestimated costs of the system. Moreover, this analysis did not include the hundreds of thousands of miles of highways and arterials supported by the federal government but not a part of the proposed interstate highway system.[2]

Instead, highway planners developed an array of moral arguments, technical analyses, and maps to justify the tremendous financial costs and physical destruction that building a national highway system would entail. They argued that acquiring and demolishing urban homes and businesses—despite the protests of affected communities—was beneficial in and of itself. Highways could support slum clearance while also combating the traffic congestion strangling cities. Highway construction, they argued, would create jobs and stimulate the economy. Highways would support military movements and help evacuate cities in the event of a nuclear attack. Most importantly according to General Lucius Clay, the man President Dwight Eisenhower put in charge of developing interstate highway legislation, building a national highway system would support car travel and thus an "essential part of American family life."[3]

Out of the Mud

Federal highway planning started small and with an emphasis on rural roads. The Agricultural Appropriations Act of 1894 established the Federal Highway Administration's predecessor, the Office of Road Inquiry. The act "enable[d] the Secretary of Agriculture to make inquiries in regard to the systems of road management throughout the United States, to make investigation in regard to the best method of road-making, to prepare publications on this subject suitable for distribution, and to enable him to assist the agricultural college and experiment stations in disseminating information on this subject."[4] General Robert Stone was the first head of the federal highway agency.[5] At $10,000 (about $350,000 in 2024 dollars), this first federal highway appropriation was enough to hire a few staff members and begin cooperating with other organizations and state agencies promoting and developing improved roadway systems. Over the next three decades, the federal highway agency would change names and directors several times but remain located in the Department of Agriculture.

In these first decades, most early federal plans, projects, and partnerships focused on helping farmers get out of the mud and get goods to market. An early and widely distributed publication in the *Farmers' Bulletin* described best practices in the building and maintenance of earth roads.[6] Directors' annual reports to the Department of Agriculture generally contained requests for additional funds for staff and publications, descriptions of tests of building materials and construction methods, and accounts of dissemination activities, such as train tours and public lectures. Over time, the reports increasingly detailed activities in partnership with the National Good Roads Association and argued for more direct federal investment in road construction. In 1905, the newly appointed director of the renamed Office of Public Roads presented at major national and local Good Roads conventions in Florida, Oregon, New York, Illinois, and a "number of minor conventions in various parts of the country throughout the year."[7]

Federal funding and responsibilities increased slowly over time. The Agricultural Appropriations Acts of 1912 and 1913 provided the first dedicated revenues to finance and construct public roads, though the focus was on building and maintaining roads and trails in National

Forests.[8] At almost $7 million in 2024 dollars, the funds would barely cover the costs of reconstructing one or two of the country's 107,000 total lane miles of urban interstate.[9] At the time, it nearly doubled the total budget of the Office of Public Roads.

The Federal-Aid Road Act of 1916, the first federal highway law, expanded the federal mandate and funding further. The act provided $75 million of funding over five years to "aid the States in the construction of rural post roads, and for other purposes."[10] Post roads could be any road that carried or might one day carry mail, but the act remained expressly rural and forbade investments in any area with more than twenty-five hundred residents unless houses were more than two hundred feet apart on average. Although small by contemporary standards—around 0.8 percent of the Federal Highway Administration's annual highway spending in 2022—federal funding increased sixtyfold.

This first highway law also set forth two principles that would carry forward through the next century of federal highway policy. First, the federal government would plan and finance roads in partnership with state highway departments and in coordination with the American Association of State Highway Officials (AASHO). The law allowed for a one-to-one financial match up to a maximum $10,000 per mile, around a tenth of the inflation-adjusted cost of a contemporary rural highway on flat ground. Second, the legislation explicitly prohibited spending federal funds on toll roads.

Beyond these principles, little came from the first federal highway act. The United States declared war on Germany just nine months later. In Chicago for a meeting with AASHO's Executive Committee, the federal highway director Logan Page fell ill and died on December 9, 1918, less than a month after the Armistice of Compiègne and six months prior to the Treaty of Versailles.[11] When civil engineer Thomas MacDonald took over the renamed Bureau of Public Roads in 1919, only $500,000 had been spent and only a dozen miles of roadway constructed.[12]

Over MacDonald's thirty-four years in charge of the federal highway program, funding increased substantially, the military began to take a more active role in highway planning, and there was a slow shift away from emphasizing rural needs to emphasizing interstate commerce, national defense, and urban transportation needs. Uniform design standards, minimum road widths, signage, increased cooperation between federal and state highway officials, and rules of the road also began to fall into place.

The Federal-Aid Highway Act of 1921 first directed policy toward "the completion of an adequate and connected system of highways, interstate in character."[13] The law tasked the Bureau of Public Roads to develop an interstate highway map within two years and provided a series of formulae about how much funding individual states would receive, how many rural roads could be designated as interstate, and what share of funding could go to interstate highways relative to "intercounty" state roads. Total funding increased to $75 million in the first year, and the amount that could be spent on each mile of roadway doubled to $20,000.

Road construction rapidly increased, and by 1923, the Bureau of Public Roads and state highway planners had designated 6 percent of all public roads as a part of the federal-aid road system.[14] The overall focus remained rural, but the funding and road-systems designations now prioritized an interconnected national highway system within the larger Federal-Aid Highway System. In 1922, General John Pershing, at the request of director MacDonald, produced a map that designated two hundred thousand interconnected roads deemed critical for national defense. Although the Pershing map contained many of the routes that would eventually help form the much smaller Interstate Highway System, the plan generally avoided large urban areas.

Over the next decade, rapid growth in auto ownership and urban congestion contributed to a major shift in federal highway policy.

Writing in the County Road Association of Michigan's magazine in 1935, MacDonald exclaimed, "We have reached a point in our development where we can no longer ignore the needs of traffic flowing from the main highways into and through cities and from feeder roads to the main highways."[15] The next major amendment to US highway policy, the Federal-Aid Highway Act of 1944, provided specific funding allocations for urban highways and explicitly called for a highway system connecting all principal cities and metropolitan areas. The vision for urban highways started to move away from the relatively conservative and integrative plans of the 1930s to the massive and disruptive urban expressways that would soon cut through every major US city.[16]

Into the Cities

The City of Boston Planning Board's 1930 *Report on a Thoroughfare Plan for Boston* provides an early look at urban highway planning in the United States.[17] As in other large and economically productive cities, private automobiles had become popular and were creating substantial congestion, traffic fatalities, and disruption as they competed for space with pedestrians, buses, streetcars, cyclists, and other road users. In metropolitan Boston in 1927, there were already around two hundred registered cars per one thousand residents, and motorists drove an estimated 1.8 billion miles. These large cities were pioneers in building and planning for urban expressways.

Massachusetts was also a leader in highway planning, construction, and finance. In 1892, the commonwealth created one of the first state highway panels to oversee county highway construction and, shortly thereafter, provided funds to carry out construction, as well as the legal authority to charge counties for 25 percent of construction costs.[18] Although small by today's standards, the $300,000 Massachusetts state highway budget was thirty times larger than the Office of Road Inquiry's budget. Stone based the federal highway agency's first model road-building program on a similar program in Massachusetts.[19] The federal highway administration's third director, Logan Page, came from the Massachusetts State Highway Commission.[20]

Boston's 231-page highway plan contained elements that would be familiar to contemporary transportation planners and engineers: an analysis of existing traffic conditions, traffic forecasts, detailed origin-destination and travel-flow maps, reference images of best practices from other cities, cost estimates, travel-time savings estimates, a twenty-five-year construction and finance plan, and arguments for expanding road capacity or risk business stagnation and overwhelming congestion. The document also made the kinds of generic calls for increased state funding that remain pervasive today.

According to author Robert Whitten, planning consultant and president of the American City Planning Institute, the Boston highway plan "furnishes what is probably the most complete factual basis for the design of highway improvements that has ever been secured for any great city."[21] Whitten would have known. He had participated in highway and land use plans for large cities around the United States. And the Boston plan drew on and acknowledged the earlier work of Dr. Miller McClintock, a pioneer in traffic engineering, data collection, and traffic forecasting.[22]

Somewhat less familiar is that the plan contained elegant hand-drawn maps, diagrams, and street sections. Several figures presented renderings of the proposed Central Artery, a roadway that features prominently in the history of US urban highways: first as an example of the callous and casual destruction caused by early urban highway construction; later as a rallying point for the urban freeway revolt, an ambitious attempt to undo the harms of urban highway construction, an engineering marvel, and a symbol of government waste; and finally as a project that improved the city of Boston but consumed tremendous state and federal transportation resources.

At the street level, pedestrians, cars, trucks, and buses continued to have easy access to shop fronts and offices (figure 2-1). Unobtrusive entrance and exit ramps allowed easy access to and from the express lanes above, where traffic would move at an uninterrupted 25 to 30 miles per hour. In short, the roadway design was well integrated with its surrounding urban land uses and articulated the plan's desire for construction to "harmonize with the existing appropriate development" and "avoid injury to the historic interest or charm of the crooked streets of Old Boston."[23] The plan went to great lengths to demonstrate how physical interventions and design treatments—like wide, grassy medians and protected pedestrian crossings—would improve pedestrian safety. Photographs and renderings showed how urban highways could be carefully inserted into existing urban fabrics by trenches that ran below the largely untouched city life above.

When I teach about the history of urban transportation planning, I ask my students what they think about this early highway rendering. Most respond with comments about noise, shadows, vibration, pollution, and the general unpleasantness of living or working next to the elevated structure. They imagine a modern expressway with vehicles whizzing by at speed. Some have even lived in cities with double-decked freeways winding between large apartment and office buildings.

Bostonians would have seen something quite different, something more like the elevated trains running down Washington Street and Atlantic Avenue at the time, something not too dissimilar from the elevated trains still running down major avenues in Chicago, Philadelphia, New York, and other large cities. Whitten even took time to argue that the familiar elevated train infrastructure was wider, louder, and uglier than the proposed roadway.[24]

Although Boston's highway plan called for increased state highway funding, its analysis concluded that a six-cent toll for the express lanes would be sufficient to pay off any bonds used to acquire land and build

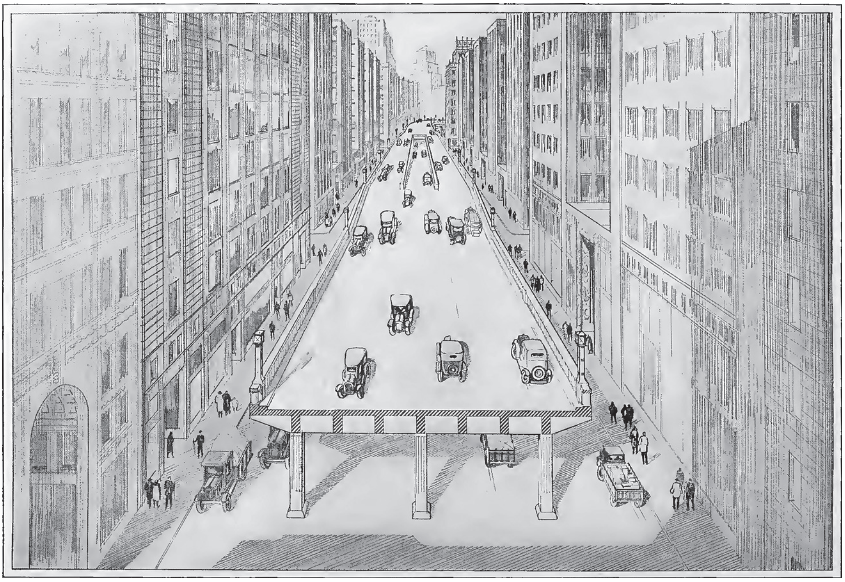

Figure 2-1. The planned Central Artery in Boston cuts through the urban fabric but integrates closely with surrounding land uses and allows access to new high-rises by foot, car, bus, and truck. (Whitten, "Report on a Thoroughfare Plan for Boston," figure 47.)

the roadway. According to Whitten, several investments that might have improved traffic had also been analyzed but were excluded because their benefits to motorists did not outweigh their financial costs.

The 1929 *Regional Plan of New York and Its Environs*, an early privately funded and produced metropolitan land use and transportation plan, presented a similarly fiscally and physically conservative view of urban highways. In addition to elevated expressways resembling Boston's proposed Central Artery, the New York plan included sections of highways with tree-lined central medians, wide sidewalks, cycle paths, and easy connections to surrounding buildings by transit, car, and delivery truck. These proposed major highways had more akin to the grand boulevards and parkways of cities like Boston, New York, Paris, Chicago, and Washington, DC, than anything a city dweller would consider a highway today. The plan even lamented that the hundreds of miles of highways under construction had harmed rather than improved surrounding land values and economic activity in and around New York.[25] The authors argued that "the highway system should be developed on lines that will promote the best economic use of land abutting upon it and thereby create new value in land and buildings as a result of the expenditures on highway improvements."[26] Whitten served as one of several dozen engineering, legal, and planning consultants to New York's 1929 regional plan. The emphasis on integration with existing land uses was consistent with plans for Los Angeles, Oakland, St. Louis, Chicago, San Diego, and other large cities at the time.[27] Coordination with mass transit also tended to feature prominently.

The plan even drew a direct lineage to Daniel Burnham's 1909 *Plan of Chicago*, an exemplar of the City Beautiful movement, and was dedicated to the memory of Charles Dyer Norton, the first chairman of the New York plan and a member of the Commercial Club in Chicago, a group whose membership included Burnham and directly shaped and sponsored the Chicago plan.

Boston and New York's early highway plans, however, also foreshadowed some of the carelessness and destruction that would characterize urban highway building after the National Interstate and Defense Highways Act. In the Boston plan, for example, a dozen images showed transparent lines where new roads would cut through existing shops, houses, and offices in the urban core and neighborhoods, like Roxbury, Dorchester, and Jamaica Plain (figure 2-2). Twenty-five years later, similar lines would partially determine which residents lost their homes and businesses in service of modernity and the modern expressway.

Although careful not to show any images of the downtown property the Central Artery would have consumed, the Boston plan hinted at substantial takings. Land acquisitions accounted for 80 percent of

Figure 2-2. Transparent lines on a bird's-eye view of Boston show where a new highway would have destroyed surrounding shops, houses, and businesses. (Whitten, "Report on a Thoroughfare Plan for Boston," figure 55.)

the project's total $28 million estimated cost, a share consistent with other highway projects of the time.[28] Whitten, recognizing the massive expenditure for a city with a similarly sized total annual budget, made three main arguments to justify the investments. The first was a moral argument. Congestion was an "organic defect," a "widely spread evil" threatening collapse and preventing Boston from reaching its economic potential.[29] Planners, engineers, and architects had a moral obligation to address and repair this growing urban disease.

The next two arguments were more technocratic but again foreshadowed a willingness to destroy substantial urban wealth for exaggerated savings for motorists. First, Whitten argued that although the price tag was high, it was "but 3.2 per cent of the assessed value of the central district," or 1.6 percent of the total city's value.[30] To put that number in perspective, the equivalent share of Boston's contemporary total tax-assessed value roughly equals the city's entire operating budget.[31] It is not and was not anything close to a trivial expenditure. Contemporary infrastructure projects of this magnitude are generally financed almost entirely by state and federal funds. Second, Whitten argued that the price tag was low relative to the $180 million that motorists spent annually on cars in Boston and its surrounding suburbs. The estimated benefits, however, appear to have been excessively optimistic. According to Whitten's calculations, people spent as much money on their 400,000 motor vehicles per year as the entire annualized value of the City of Boston, home to 781,000 residents and the lion's share of metropolitan jobs. Moreover, Whitten claimed that the 1.5-mile Central Artery, despite only carrying 2 percent of traffic, would conservatively create a 10 percent travel improvement for all 1.8 billion miles driven annually in the region. As with many of these types of projects, the costs may have also been substantially and willfully underestimated.[32]

Finally, although Boston's early thoroughfare plans did not appear to contain any overt or covert attempts to target or segregate specific ethnic or racial groups, Whitten's 1922 zoning plan for Atlanta showed the kind of men that would soon be given the power to erase neighborhoods with the stroke of a pen. Whitten's Atlanta plan established legally segregated residential zoning districts for White and Colored races.[33] People could occupy servant's quarters in any district regardless of race. While Whitten generally framed the racial zoning as a matter of reducing conflict and improving conditions for all races, he also presented the Atlanta City Council with a blunter and less idealized perspective: "Home neighborhoods had to be protected from any further damage to values resulting from inappropriate uses, including the encroachment of the colored race."[34] Soon state highway engineers, almost exclusively White, Christian men, would begin to draw the thick black lines on maps that would disproportionately uproot, divide, and destroy communities of color in scores of US cities.[35]

Funding never materialized for Boston's first elevated expressway, and the plan collected dust. The Great Depression, the high price tag, and limited federal funding made the project unrealistic. The concept, however, would persist, and a starkly different-looking elevated Central Artery from the artful rendering would open to traffic two decades later.

Outside of the largest cities, highway plans generally remained rural. Texas, for example, was one of the last states to develop a highway department and start funding and building highways. Although Texas received the largest funding allocation of any state from the Federal-Aid Road Act of 1916, only one hundred miles of road had been paved by 1923.[36] After a corruption scandal slowed work and ended federal aid, a reorganized Texas Highway Department began building and planning the state highway system in earnest using revenues from vehicle registration fees, a gas tax, and county bonds.

The 1933 Federal-Aid Highway maps provided a starkly different view of urban highways in Dallas than the visions presented to city officials in Boston or New York. The plan showed ten designated highways converging on Dallas, the country's thirty-third largest city in 1930, but stopping at its borders. State Highway 360, where President George H. W. Bush would sign the 1991 highway act ushering in the end of the interstate era, did not appear in the plan, nor did any of the other major highways running north-south in between Fort Worth and Dallas. Multiple state highways and interstates now converge and connect along massive interchanges spanning more than six hundred feet in width. Together, these highways consume about a thousand acres of land area in downtown Dallas. Although Dallas has expanded and grown around highways over time, the 1930 city limits still contain 16 percent residents and 21 percent of jobs, particularly high-paying office jobs.

Envisioning the Modern Urban Expressway

Over the next decade, US highway policy became increasingly focused on the jobs created by building urban highways. With the Great Depression, Presidents Herbert Hoover and, to a greater extent, Franklin D. Roosevelt promoted and funded roadbuilding to stimulate the economy and provide employment. In 1930, Hoover nearly doubled annual federal road aid from $75 million to $125 million. Through the New Deal, Roosevelt's administration put an additional $1.8 billion into roadbuilding.[37] Marking this shift in federal priorities, the Bureau of Public Roads moved from the Department of Agriculture to the Federal Works Administration and became the Public Roads Administration in 1939. This focus on employment continues to pervade federal transportation laws and roadbuilding. As Bush described his signature transportation law a half century later, "Really it is summed up by three words: jobs, jobs, jobs. And that's the priority."[38] President Joseph Biden's 2021 federal transportation law's full name is the Infrastructure Investment and Jobs Act.

Many New Deal–era urban highways, such as Connecticut's Merritt Parkway, resemble most closely the images and renderings presented in Boston's *Thoroughfare Plan* and New York's *Regional Plan*. The parkway's two lanes of winding road, separated by a wide grassy median and passing below stone bridges, provided connections across the state and an alternative to the congested Boston Post Road. The parkway continues to serve around sixty thousand car trips per day and, when Interstate 95 is congested, is frequently part of the quickest path between Boston and New York.

The National Register of Historic Places describes the roadway as "the quintessential parkway," "an outgrowth of the City Beautiful Movement," and the culmination of "a generation of experiments in

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