THE LIFE AND DEATH OF URBAN HIGHWAYS

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About ITDP
Founded in 1985, the Institute for Transportation and Development Policy promotes socially equitable and environmentally sustainable transportation worldwide. ITDP works alongside city governments and local advocacy groups to create projects that reduce poverty and pollution, and fight climate change. ITDP has offices in Argentina, Brazil, China, Colombia, Hungary, India, Indonesia, Mexico, and the United States; employs more than 70 staff members; and supplements this team with leading architects, urban planners, transport experts, developers, and financiers.

About EMBARQ
EMBARQ catalyzes environmentally and financially sustainable transport solutions to improve quality of life in cities.

Since 2002, it has grown to include five offices, located in Mexico, Brazil, India, Turkey, and the Andean Region, that work together with local transport authorities to reduce pollution, improve public health, and create safe, accessible, and attractive urban public spaces. EMBARQ employs more than 130 experts in fields ranging from architecture to air quality management; geography to journalism; and sociology to civil and transport engineering.

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Foreword

Peter J. Park served as City Planning Director of Milwaukee under John Norquist and led the effort to replace the elevated Park East freeway with an at-grade boulevard from earliest conceptualization with urban design students at UW-Milwaukee to realization. Because the freeway removal was a priority in the 1999 Downtown Plan, Milwaukee was able to move swiftly when the opportunity to remove the Park East arose.

Cities exist for people; freeways exist for moving vehicles. Cities are centers of culture and commerce that rely on attracting private investment. Massive public spending on freeways in the last century reduced the capacity of cities to connect people and support culture and commerce. While the following report is about urban highways, more importantly, it is about cities and people. It is about community vision and the leadership required in the twenty-first century to overcome the demolition, dislocation, and disconnection of neighborhoods caused by freeways in cities.

This report chronicles the stories of five very different cities that became stronger after freeways were removed or reconsidered. They demonstrate that fixing cities harmed by freeways, and improving public transport, involves a range of context-specific and context-sensitive solutions. This perspective contrasts with the one-size-fits-all approach that was used in the 1950s and 1960s to push freeways through urban neighborhoods. The belief then was that freeways would reduce congestion and improve safety in cities. Remarkably, these two reasons are still commonly used to rationalize spending large sums of public money on expanding existing or building new freeways.

Freeways are simply the wrong design solution for cities. By definition, they rely on limited access to minimize interruptions and maximize flow. But cities are comprised of robust and connected street networks. When limited-access freeways are force-fit into urban environments, they create barriers that erode vitality—the very essence of cities. Residents, businesses, property owners, and neighborhoods along the freeway suffer but so does operation of the broader city network. During traffic peaks, freeways actually worsen congestion as drivers hurry to wait in the queues forming at limited points of access.

The fundamental purpose of a city's transportation system is to connect people and places. But freeways that cut through urban neighborhoods prioritize moving vehicles through and away from the city. In 1922, Henry Ford said, "we shall solve the problem of the city by leaving the city." While freeways certainly facilitated this, by no means did leaving the city solve the problem of city. In fact, the form and functional priorities of freeways in cities introduced even more problems that still exist today.

The freeway in the city was an untested idea when is it was deployed around the world. Decades of failing to deliver congestion relief and improve safety combined with the hard evidence of damaged neighborhoods have proven that the urban highway is a failed experiment. But failures, especially big ones, can also provide many lessons.

The case studies in this report demonstrate a variety of ways that cities can improve after freeways are removed or just not built. They offer effective design and investment strategies for addressing today's challenges of aging public infrastructure and constrained public funding. They also prove that sacrificing neighborhoods in cities to accommodate traffic "demand" is not only costly but often unnecessary. For example, while removing stub-ends of aborted freeways is often perceived to be more acceptable than removing those that provide "necessary through access," the success of stub-end freeway removals simply provide further proof that the planned freeways that were stopped were actually unnecessary in the first place. Jane Jacobs was right. More significantly, the people who fought freeways to protect their neighborhoods and their cities were right.

The removal of freeways in cities today is less a matter of technical limitations and more a matter of pragmatic response, community aspiration, and political will. This report has much to offer to those who aspire to strengthen cities, regions, and nations.

—Peter J. Park

Mexico City Traffic
Image: Matthew Rutledge

Introduction

From the 1940s to the 1960s, U.S. cities lost population and economic investment to suburban locations. To compete, many cities built urban highways, hoping to offer motorists the same amenities they enjoyed in the suburbs. Whatever their benefits, these highways often had adverse impacts on urban communities.

In the United States, federal policy and funding spurred investment in urban highways. The U.S. Highway Act of 1956 set the goal of 40,000 miles of interstate highways by 1970, with ninety percent of the funding coming from the federal government. Fifty percent federal funding was the norm for other transportation projects. By 1960, 10,000 new miles of interstate highways were built and by 1965, 20,000 miles were completed. While most of the investment occurred outside cities, about twenty percent of the funds went into urban settings.

In 1961, Jane Jacobs challenged urban renewal and urban highways in her seminal book, *The Death and Life of Great American Cities.* Jacobs commented on the effects of highways on communities, stating, "expressways eviscerate cities." For the first time, the unintended consequences of urban highways, such as displaced communities, environmental degredation, land use impacts, and the severing of communities, were highlighted. Jacobs went on to successfully fight urban highways in New York City and Toronto, and helped spur the formation of some of the most active community-based organizations in the U.S.

This urban activism had, by the late 1970s and early 1980s, made it nearly impossible to build an urban highway or raze a low-income neighborhood in the United States. New environmental review procedures were put in place to protect communities and parks from the effects of highways. However, the U.S. continued to build and widen highways, moving the construction of virtually all of them to suburban or inter-urban locations. By 1975, the goal of 40,000 miles of new interstate highways had been achieved.

Image: Thomas Wagner via Flickr

Many cities in Latin America, following the Unites States' lead, also began building urban highways in the 1950s and 1960s. A spate of new urban highways were built in Brazil during the dictatorship in the 1960s and 1970s, such as Rio de Janeiro's Rebouças Tunnel and the Freyssinet Viaduct that cut a direct route between the downtown and the fashionable South Zone of Copacabana, Ipanema, and Leblon. The debt crisis of the 1980s slowed the process considerably. With the return of economic growth to Latin America, new urban highways began to reappear again.

In China and India, recent urban highway construction is even more dramatic. Cities in China are building both new highways and surface roads at a rapid pace. In China, all urban land is owned by the government, so land acquisition presents less of an obstacle to highway expansion than in the rest of the world. In India, the pace of highway construction is slower, as land acquisition is far more complex, but state governments are upgrading many large urban arterials with strings of flyovers that over time grow into limited-access freeways.

These new roads carry a significant amount of traffic and contribute to economic growth, but they also blight large sections of cities, threaten historic urban neighborhoods, and concentrate air pollution in highly populated areas, threatening people's health and causing other problems.

In the past fifty years, tens of thousands of miles of urban highways were built around the world. Many are now approaching functional obsolescence. This is leading many cities, not just in the United States, to question the place of major highways in urban areas and whether they merit further investment or should be removed. Today, some of the same urban highways that were built in that period are being torn down, buried at great expense, or changed into boulevards. As cities around the world grapple with congestion, growth, and decline, some, as seen in the following case studies, illuminate what can be done when a highway no longer makes sense.

In light of the fact that so many cities in developed countries are now tearing out urban highways, it is time to re-appraise the specific conditions under which it makes sense to build a new urban highway and when it makes sense to tear one down.

Why Urban Highways

Cities need roads, and sometimes they even need highways, but few cities have thought systematically about when and where they need highways. Highways have a very specific role to play in an overall transportation system: to move traffic long distances at high speeds.

While urban passenger trips can generally be moved most efficiently by some other means than private cars, buses and trucks need to use roads, and these trips are much harder to replace. Both long-distance trucks and buses are heavy-weight vehicles that tear up roads, have difficulty stopping suddenly, and have large engines that pollute heavily and make a lot of noise. Therefore, it is frequently desirable to get as many large trucks and long-distance buses as possible off of local streets. Urban highways should prioritize the rapid movement of suburban and inter-city bus and truck trips and could include exclusive lanes for buses to ensure high capacity passenger moment.

However, such facilities are not as useful for short urban trips, because the indirectness of routes between a trip origin and destination undermines the time saved from the higher speed achieved by limiting access points.

Highways were typically sought as a solution to congestion. Years of evidence has shown that highways in fact do not alleviate congestion. While expanding road capacity might provide relief for the first few years, it is likely to have the opposite effect, even within the first five years of operation (Duranton and Turner, 2011).

By the late 1960s, traffic engineers from both the United States and the United Kingdom had observed that adding highway capacity was not decreasing travel times, and theorized that this was due to additional trips that were generated or induced because of the new roads. Since then, numerous empirical studies and analysis of real world case studies have shown that new road capacity usually induces traffic in direct proportion to the amount of new road space; removing roadways similarly reduces traffic (Cairns, Hass-Klau and Goodwin, 1998), with traffic growing by 0.4 to 1.0 as much as new capacity in the long-run (Hensher, 1977; Noland and Lem, 2000).

In practice, many urban highways were justified with some form of cost-benefit analysis. However, most experts in cost-benefit analysis point out that the tool was never meant to evaluate whether or not to build urban highways but rather to prioritize between competing inter-urban highway projects. Additionally, the analysis ignored important secondary effects, such as the adverse impact of the new road on surrounding property values, or the environmental costs that are generated by new induced traffic (Wheaton, 1978).

Why Remove Urban Highways

Cities are not removing all highways because of a sudden awakening of environmental consciousness or realization that car culture is bad. Rather, cities are removing urban highways in very specific circumstances, which include:

1. Costs of Reconstruction and Repair: In the United States, availability of ninety percent federal funding for roads was an incentive to build highways. Today, diminished federal funding and a growing reliance on private financing is spurring cities to more closely scrutinize costly investments. The costs of reconstruction and repair can be a compelling reason for cities to decide to remove highways. San Francisco, Milwaukee, and Seoul decided to invest in less costly alternatives instead of repairing or reconstructing some of their urban highways (CNU, 2010; Seattle, 2008).

   In Milwaukee, the city removed a thirty-year-old freeway spur for $25 million. Officials estimated it would have cost between $50 million and $80 million to fix that roadway (NPR, 2011). The removal freed up twenty-six acres of land for redevelopment including the freeway right-of-way and parking lots around it (Preservation Institute, 2011).

2. Economic Revitalization: Highways can blight the area around them, what Jane Jacobs called "the curse of the border vacuum." Highways also can sever communities by creating inaccessible paths that bisect the city. Milwaukee, San Francisco, and Seoul wanted to revitalize areas blighted by elevated highways and eliminate the severance effects that were lowering adjacent urban property values (Preservation Institute, 2007).

Image: Arnie Baert

After Seoul removed the Cheonggyecheon the average price for apartments in the area rose by at least twenty-five percent, as compared to only a ten percent growth in neighborhoods further away. Rents for commercial office space rose as well (Seoul Metropolitan Government, 2006). The area has also become a popular destination for locals and tourists alike. As of October 1, 2007, there had been 56 million visitors to Cheonggyecheon. According to the "Hi Seoul" program of the city of Seoul, there are on average 53,000 visitors to the reborn creek each weekday and 125,000 on each day of the weekend.

3. Increased Property Value: Some cities, including Portland, San Francisco, and Seoul have removed urban highways and reclaimed valuable real estate and sparked redevelopment, that in turn has generated more tax revenue for the city. In Portland, the removal of their expressway cleared the way for the creation of the Downtown Waterfront Urban Renewal Area in 1974 and the creation of a large new waterfront park. Land values in the area have increased 10.4 percent annually on average, from $466 million in 1974 to over $1.6 billion in 2008 (City of Seattle, 2008). When San Francisco replaced their double-decked freeway with the street-level boulevard, the "Embarcadero," they saw an increase in property values in the adjacent neighborhoods of 300 percent and a dramatic increase in development in the area (Preservation Institute, 2007).

4. Making Waterfronts Accessible: Often, urban waterfronts used to be functioning ports with many truck movements needed to service the port. Highways were built along waterfronts to facilitate that. Waterfronts have often been polluted, smelly, and undesirable. But with new environmental regulations, many waterfronts have become clean. In multiple cities, port activities have been moved and consolidated outside the city's downtown. This has made waterfronts again desirable land. Harbor Drive in Portland and the Embarcadero in San Francisco are both examples where cities and local constituencies have wanted to reconnect to their waterfronts and develop the land for other purposes (Mohl, 2011).

5. Offering Better Solutions to Meet Mobility Needs: Highways have a specific function—moving traffic long distances at high speeds. To meet mobility needs, investments in other forms of transportation are needed. Bogotá chose to invest in a whole mobility strategy that included bus rapid transit, bikeways, and greenways, instead of elevated highways. Seoul also introduced BRT and restrictions on car use to increase mobility options for all when they removed the highway to create a linear park (Hidalgo, 2004).

When Urban Highways Are Removed

When cities took down or chose not to build urban highways, what they got instead was:

- Harbor Drive, Portland, USA: The Tom McCall Waterfront Park has helped property values in the downtown rise on average 10.4 percent per year and led to a sharp reduction in crime in the area.

- Embarcadero, San Francisco, USA: A world-famous boulevard surrounded by a 25-foot-wide promenade led to a 300 percent increase in adjacent property values

- Park East Freeway, Milwaukee, USA: Halting construction of the freeway preserved Juneau Park. Taking down the highway has opened 26 acres of land to be redeveloped and added back into the tax coffers. Land values have risen faster than in the rest of the city and the area is now reconnected with Milwaukee.

- Cheonggyecheon, Seoul, South Korea: An international best practice for greenways that has also seen an increase in development and rents along the corridor and a decrease in air and noise pollution and traffic.

- Bogotá, Colombia: A 45-kilometer greenway now connects low-income neighborhoods to the downtown, and includes a mass-transit system that revolutionized bus rapid transit and carries 1.8 million people, and over 300 kilometers of bike lanes.

By taking down or not completing their highways, these cities found that reimagining urban highways created better places and attracted higher investment in the surrounding area. More cities around the world, having learned from the cities presented here, are removing highways. Other cities might consider highway removal or halting construction as well. These case studies illustrate how it was done.

Even in wealthy cities like New York, property values are depressed near elevated highways, like this industrial zone near the Brooklyn Queens Expressway in Brooklyn.
Image: Molly Steenson

Alternatives to Building New Urban Highways

Instead of constructing new urban highways, cities can consider...

Managing existing capacity more effectively:

- Congestion pricing and time-of-day pricing can help shift drivers to other modes
  Encourage drivers to travel at less congested times of day
- Parking pricing can also discourage unnecessary car trips

Investing in mass transit:

- Highway construction funds can be re-allocated to expand mass transit or increase service frequency and to shift drivers to transit
- Revenues from a pricing program can also fund transit expansion or improvement

Implementing land use policies that discourage sprawl and reduce unnecessary driving:

- Policies and zoning should encourage in-fill development and the creation of new development near existing development and transit lines
- Providing high quality bicycling and walking facilities can encourage people making short trips to use these modes and alleviate some marginal congestion.

▸ Urban Highway Removals Completed and Planned

Alaskan Way Viaduct
Seattle, Washington, USA
Constructed: 1953
Status: Tear down began in 2011
Km: 4.5
Annual Vehicular Traffic: 100,000 daily
Construction Investment (mil USD): 3,100
Investment per km (mil USD): 688.1
Replacement Type: Tunnel—Boulevard

Habor Drive Boulevard
Portland, Oregon, USA
Constructed: 1950
Status: Torn Down 1974
Km: 4.8
Annual Vehicular Traffic: 25,000 daily
Construction Investment (mil USD): Unknown
Investment per km (mil USD): Unknown
Replacement Type: Boulevard-Park

Central Freeway
San Francisco, California, USA
Constructed: 1959
Status: Torn Down 2005
Km: 1
Annual Vehicular Traffic: 93,000 daily
Construction Investment (mil USD): 50
Investment per km (mil USD): 51.8
Replacement Type: Boulevard

Embarcadero Freeway
San Francisco, California, USA
Constructed: 1959
Status: Torn Down 1991—2001
Km: 2.6
Annual Vehicular Traffic: 61,000 daily
Construction Investment (mil USD): 80
Investment per km (mil USD): 31.1
Replacement Type: Boulevard

Park East Freeway
Milwaukee, Wisconsin, USA
Constructed: 1965—1971
Status: Torn Down 2002—2003
Km: 1.6
Annual Vehicular Traffic: 35,000 daily
Construction Investment (mil USD): 25
Investment per km (mil USD): 15.5
Replacement Type: Boulevard

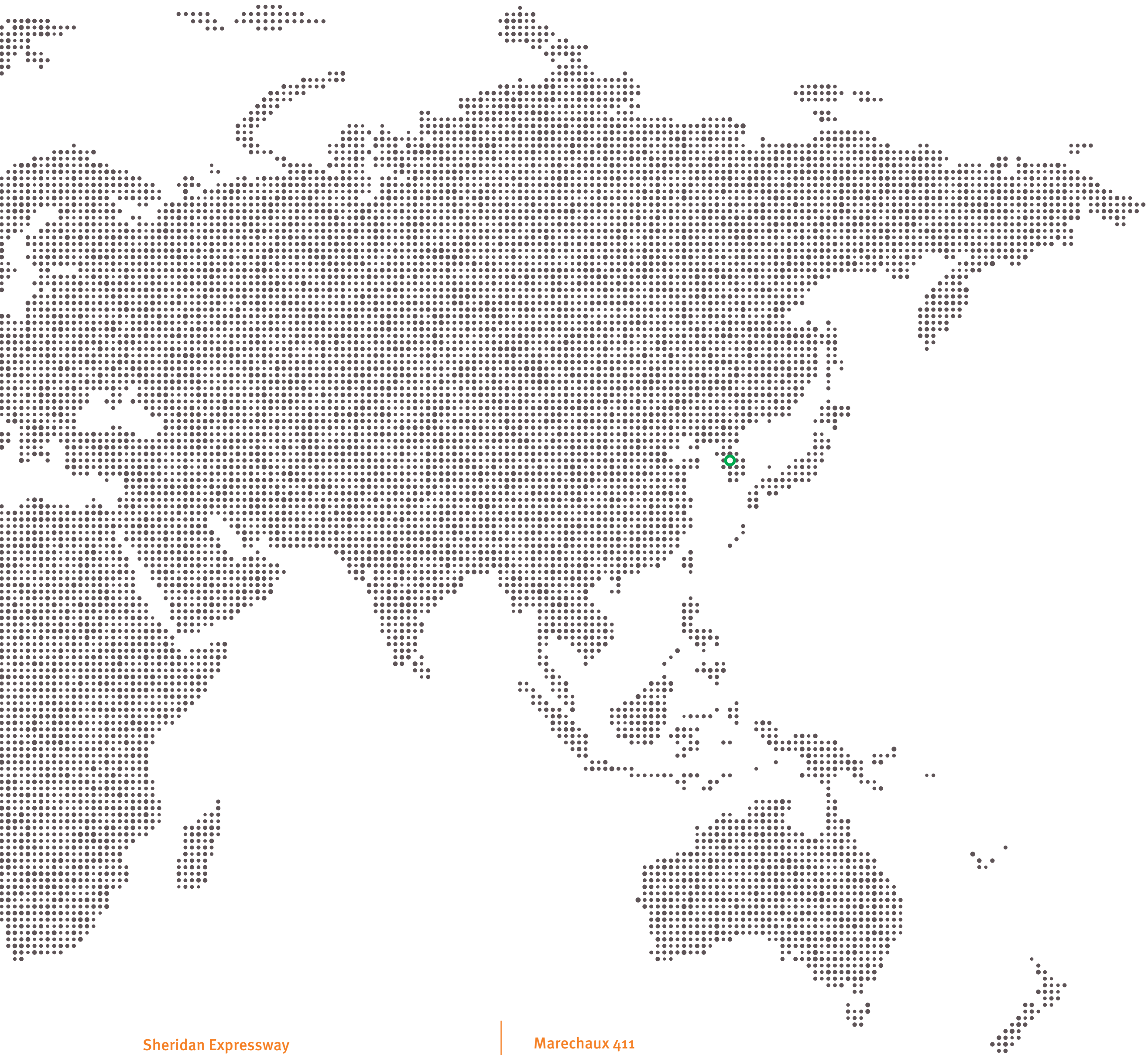
I-64
Louisville, Kentucky, USA
Constructed: 1961
Status: Community proposal to remove the freeway
Km: 3.2
Annual Vehicular Traffic: 86,300 daily
Construction Investment (mil USD): 4,100
Investment per km (mil USD): 1274.1
Replacement Type: Boulevard

Gardiner Expressway
Toronto, Canada
Constructed: 1955—1966
Status: Portions were removed in 2001 and 2003, there is a study underway to remove another portion
Km: 18
Annual Vehicular Traffic: 200,000 daily
Construction Investment (mil USD): 490
Investment per km (mil USD): 27.2
Replacement Type: Boulevard

1-81 Boulevard
Syracuse, New York, USA
Constructed: 1957
Status: Community proposal
Km: 2.3
Annual Vehicular Traffic: 100,000 daily
Construction Investment (mil USD): Unknown
Investment per km (mil USD): Unknown
Replacement Type: Boulevard

Clairborne Expressway
New Orleans, Louisiana, USA
Constructed: 1968
Status: Community proposal for removal
Km: 3.2
Annual Vehicular Traffic: 69,000 daily
Construction Investment (mil USD): Unknown
Investment per km (mil USD): Unknown
Replacement Type: Boulevard

West Side Highway aka "Westway"
New York, New York, USA
Constructed: 1927—1931
Status: Torn Down 2001
Km: 7.6
Annual Vehicular Traffic: 140,000 daily
Construction Investment (mil USD): 380
Investment per km (mil USD): 50.2
Replacement Type: Boulevard



Sheridan Expressway
New York, New York, USA
Constructed: 1958-1962
Status: Proposal being studied by the government
Km: 1.9
Annual Vehicular Traffic: 45,000 daily
Construction Investment (mil USD): Unknown
Investment per km (mil USD): Unknown
Replacement Type: Boulevard

Route 34/Downtown Crossing
New Haven, Connecticut, USA
Constructed: 1960
Status: Construction slated to begin 2014
Km: 0.9
Annual Vehicular Traffic: 30,000 daily
Construction Investment (mil USD): 342
Investment per km (mil USD): 401
Replacement Type: Boulevard

I-93 aka "The Big Dig"
Boston, Massachusetts, USA
Constructed: 1959
Status: Torn Down 2007
Km: 2.9
Annual Vehicular Traffic: 200,000 daily
Construction Investment (mil USD): 15,000
Investment per km (mil USD): 5179.2
Replacement Type: Tunnel—Boulevard

Marechaux 411
Paris, France
Constructed: 1932—1967
Status: Plans
Km: 7.9
Annual Vehicular Traffic: 100,000 daily
Construction Investment (mil USD): 411
Investment per km (mil USD): 52
Replacement Type: Tramway

Georges Pompidou Expressway
Paris, France
Constructed: 1967
Status: Government proposal
Km: 1.8
Annual Vehicular Traffic: 70,000 daily
Construction Investment (mil USD): Unknown
Investment per km (mil USD): Unknown
Replacement Type: Boulevard

A-100 Tunnel
Berlin, Germany
Constructed: 1995
Status: Torn Down 2000
Km: 1.7
Annual Vehicular Traffic: 170,000 daily (2015)
Construction Investment (mil USD): 276
Investment per km (mil USD): 162.4
Replacement Type: Tunnel—Boulevard

Cheonggyecheon
Seoul, South Korea
Constructed: 1967—1971
Status: Torn Down 2003—2005
Km: 9.4
Annual Vehicular Traffic: 102,747 daily
Construction Investment (mil USD): 120
Investment per km (mil USD): 12.7
Replacement Type: Boulevard-Park

Today, downtown Portland is now linked to the waterfront, and a new park provides residents access to the Willamette River Waterfront.
Image: Brxo via Flickr

▸ Case Study

Harbor Drive, Portland, OR

Background

Harbor Drive, an at-grade, four-lane highway, was built in 1942. In pace with most U.S. cities, a number of additional freeways were planned for the Portland area in the 1950s. In 1964, the state completed the first, I-5, along the west bank of the Willamette River. Four years later in 1968 the State Highway Department proposed widening and relocating Harbor Drive between Front Avenue and the west bank of the Willamette River.

But there was already a constituency in Portland that supported creating more open space and public access along the city's waterfront. In fact, Portland's 1968 Downtown Waterfront Plan recommended eliminating the Harbor Drive freeway and developing the land as a park to improve the downtown riverfront. The city appointed a task force to study the feasibility of removing the freeway and replacing it with a park. The task force also evaluated and held a public hearing on three alternative plans for the Harbor Drive freeway. None of the alternatives included closing the freeway, but that alternative was added as a result of the public input the task force received. The freeway removal alternative was created and presented to the city council, and a convincing case was made that Harbor Drive's traffic could be absorbed by the parallel highways of I-5 and I-405. The city council agreed to close Harbor Drive.

About the project

The Harbor Drive freeway was a three-mile long, ground-level highway along the Willamette River that connected an industrial neighborhood with Lake Oswego and areas south of downtown Portland. It was built in 1942, and the four-lane highway carried 25,000 vehicles per day (City of Seattle, 2008).

In the late 1960s, the city of Portland decided to remove the Harbor Drive freeway and replace it with a 37-acre park. The city was convinced that the construction of I-5 and I-405, two interstates running parallel to Harbor Drive, could absorb a sufficient amount of traffic to warrant the removal.

In place of the freeway, the city built Tom McCall Waterfront Park, which opened up the waterfront to pedestrians, creating an important amenity for downtown. The Portland Planning Commission took the lead on the project, which took twelve years (1976—1988) to build using tax increment funds. Construction began along Front Avenue and the Ankeny Plaza area and was followed by four subsequent redevelopment projects until the last section (north of the Burnside Bridge) was completed in 1989 (Portland Parks and Recreation Project Team and EDAW Inc., 2006).

Portland, Harbor Drive

Before: Harbor Drive cut off the downtown waterfront from the rest of the city.
Image: City of Portland Archives, 1974

Stakeholders

The city of Portland, particularly the planning department and the Oregon state governor at the time, Tom McCall, were the driving forces behind the highway removal. Park users, cyclists, and a citizen's committee representing Portland's residents were powerful voices in the public participation process, as were the Portland Oregon Visitors Association and Eastside Business District groups.

Effects

The removal of the freeway allowed for the creation of a park, which served as the focal point for downtown redevelopment and the only direct access point for residents to the Willamette River. The project allowed the city to create the Downtown Waterfront Urban Renewal Area (DTWF URA), and since its creation in 1974, land values in downtown Portland have increased an average of 10.4 percent annually, from a total of $466 million to more than $1.6 billion (City of Seattle, 2008).This has helped expand the city's tax base and encourage more compact and sustainable development.

In terms of mobility, before and after comparisons found 9.6 percent fewer vehicle trips on nearby roads and formerly connecting bridges (City of Seattle, 2008). The decrease in motor vehicle use has helped decrease air and noise pollution in the area.

The freeway's removal has created safer and more pleasant spaces for pedestrians and improved the quality of life in downtown Portland.

The redevelopment of the waterfront area has also helped reduce crime rates partly because of new visibility earned by removing the highway and partly due to the increase in pedestrian "eyes on the street" (City of Seattle, 2008). According to police bureau reports, since 1990 crime has declined by 65 percent in the waterfront area compared with a reduction of 16 percent in the city as a whole.

Overall the project is considered successful and even the impacts on traffic have been minor, thanks in part to the construction of parallel roads. Advance public notice was used to alert drivers of the closure and divert traffic from Harbor Drive to nearby freeways with extra capacity.

A few anchor developments, including the Yards at Union Station to the north and River Place to the south, have increased the availability of downtown housing. And the city continues to expand its waterfront plans. Property values have risen in the area, and today the Portland Development Commission's Downtown Waterfront Development Strategies Project aims to increase mixed-use development along the length of the downtown and three blocks from the waters' edge (pdc.us/ura/dtwf/dtwf.asp).

Timeline

Harbor Drive Removal Project

1968 The Oregon Highway Department proposes widening the Harbor Drive freeway; the city of Portland acquires the Journal Building to provide land needed for the right-of-way.

The city of Portland releases its Downtown Waterfront Plan, which recommends eliminating the Harbor Drive freeway.

1969 A new citizen's group, Riverfront for People, is formed to fight against the state's proposal to widen the freeway.

August: the Portland City Club issues a report entitled "Journal Building Site Use and Riverfront Development," recommending waterfront redevelopment that would provide easy and attractive public access.

August 19: Governor McCall instructs the Intergovernmental Task Force to hold a public hearing on the future of Harbor Drive, the Task Force drafts two alternatives to the state's proposal including moving the freeway in a block from the waterfront and decking over the freeway and building a park on top. The State's traffic engineers convinced the Task Force to not consider the option of removing the freeway altogether.

October 14: A day-long hearing is held, the public is highly critical of all of the alternatives.

November: Governor McCall calls for the creation of a citizen's advisory committee to help plan the project.

December: An eighteen-member citizens' committee holds its first meeting and hires an independent consulting firm to evaluate the options.

1973 Governor McCall continues to pressure his staff to find a way to remove the highway and replace it with a park. Yet another alternative is drawn up and presented to the city council, which finally approves the plan for the highway removal.

The Fremont Bridge opens, completing Interstate 405, the second Interstate through downtown Portland, which makes Harbor Drive somewhat redundant and allows for the removal to begin.

1974 Harbor Drive is closed north of Market Street, and planning for the new park begins.

1978 The new 37-acre waterfront park opens to the public.

1984 The park is renamed Tom McCall Waterfront Park in honor of the former governor.

1999 The city extends Waterfront Park to the south, doubling its size.

Source: Adapted from Preservation Institute, 2007

Today: Embarcadero Boulevard
Image: T. J. DeGroat

▸ Case Study

The Embarcadero, San Francisco, CA, USA

Background

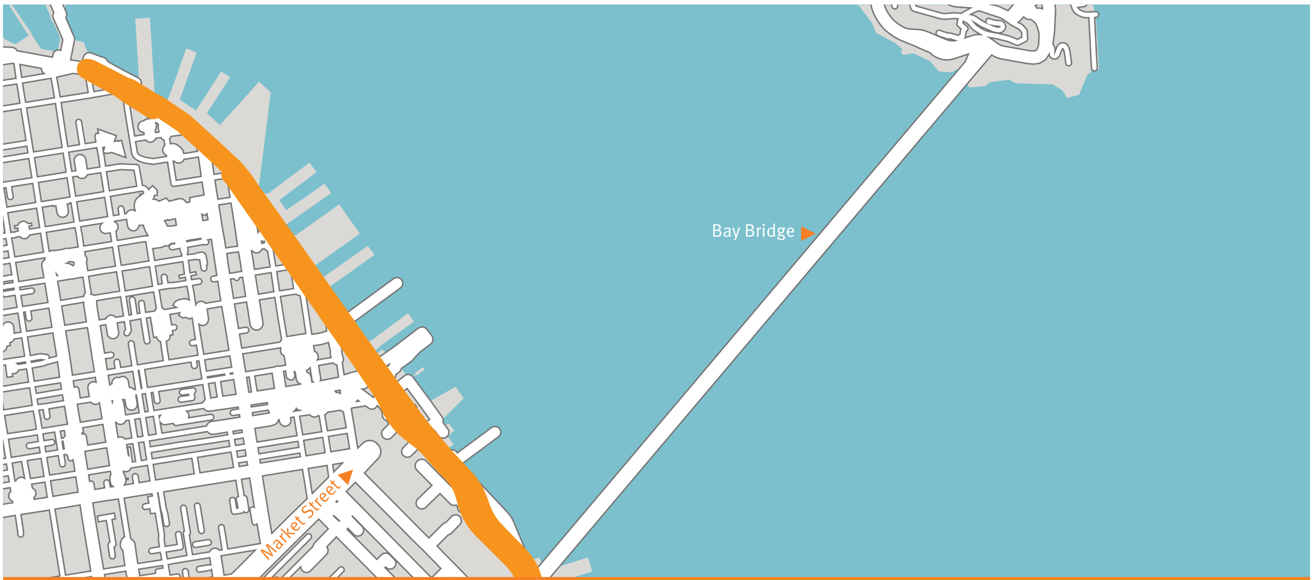
After the Loma Prieta earthquake in October 1989 the Embarcadero and the Central Freeway in San Francisco were left standing, but significantly weakened. CalTrans, California's State Transportation Agency, quickly devised three alternatives to address this issue, 1) seismologically retrofit the damaged structures, 2) tear down the elevated portions and rebuild an underground freeway, or 3) demolish the elevated portions and replace them with a surface street. There was much public debate over these alternatives, but in the end, the majority of San Franciscans wanted to remove the freeway permanently. In January 1991, CalTrans made the formal finding that removing the elevated freeway and replacing it with an at-grade facility was the best solution, and two months later demolition began. The removal of the elevated freeways reconnected San Francisco's depressed east side waterfront to the rest of the city, opening the door for waterfront revitalization.

About the project

The city of San Francisco spent $50 million to create the Embarcadero, a six-lane boulevard, 1.6 miles long, surrounded by a 25-foot-wide pedestrian promenade, ribbons of street lights, mature palm trees, waterfront plazas, and the world's largest piece of public art (Cervero, Kang, & Shively, 2009).

Stakeholders

CalTrans and the residents of San Francisco were the main stakeholders in this project. Local environmental groups played a large role in swaying public opinion. The design was developed by ROMA Design Group.



San Francisco, Embarcadero

Effects

After the 1989 earthquake damaged area freeways, there was a temporary increase in traffic congestion. Soon thereafter, many drivers switched to transit; the BART (Bay Area Rapid Transit) experienced an increase of fifteen percent in its ridership, and the local street grid absorbed a large portion of the remaining traffic (CNU, 2010). Once skeptics saw that the city was not gridlocked without the freeway, it was easier to build support for the proposed boulevard.

When the boulevard was completed, the land that the freeway had occupied became available for new developments and parks. More than 100 acres along the waterfront gave way to a new public plaza and a waterfront promenade (CNU, 2010). The area south of Market Street was slated for 3,000 housing units, 2 million square feet for offices and 375,000 square feet of retail (Preservation Institute, 2007). Replacing the double-decked freeway with a boulevard raised property values in the adjacent neighborhoods by 300 percent and stimulated development dramatically (Preservation Institute, 2007).

Rincon Hill, which is adjacent to the Embarcadero just south of Market Street, was completely cut off by the highway before. The removal of the highway made reinvestment in this neighborhood much more attractive. South Beach, south of Rincon Hill, was also redeveloped with housing, retail, and a new baseball field. Even though this neighborhood was not directly adjacent to the Embarcadero freeway, the opening of the waterfront and the improvement of the Embarcadero as a boulevard helped it to flourish. Dense commercial development lines the boulevard, jobs increased by twenty-three percent and housing in the area increased by fifty-one percent (CNU, 2010).

Many individual developments including the Ferry Building, which was redeveloped with a farmer's market and gourmet food stalls, a new headquarters for The Gap clothing company, and new office space for Pier One home goods were also stimulated by the highway removal.

Drivers with longer trips do report a slight increase in travel times still, but the benefits outweigh the small number of drivers who are inconvenienced. (Preservation Institute, 2007 and CNU, 2010).

Timeline

Embarcadero Freeway Removal Project

1959 Embarcadero Freeway is constructed.

1986 San Francisco voters reject the Board of Supervisors' plan to tear down the Embarcadero Freeway.

1989 October: Loma Prieta Earthquake damages the elevated highway beyond repair,
CalTrans scrambles to develop alternatives.

1991 January: CalTrans makes the formal finding that removal of the elevated highway and replacement with an at-grade facility is the best alternative.
March: Demolition begins.

2000 The Embarcadero Boulevard is completed.

Before: The waterfront seen through
the elevated Embarcadero Freeway
Image: wayfaring.com

The demolition of the Park East Freeway in Milwaukee opens the way to neighborhood revitalization and redevelopment.
Image: Andrew Tucker

▸ Case Study

Park East Freeway, Milwaukee, WI, USA

Background

In the late 1940s and 1950s, the Milwaukee city government introduced plans for the construction of a ring of freeways around the downtown. The Park East Freeway was to connect to I-794, a 3.5-mile freeway linking Lake Michigan to the southern suburbs, and, in combination with the Park West Freeway, would create an east-west regional expressway. The project began in 1971 and was halted in 1972 due to community opposition, and then later abandoned completely, due to rising construction costs and opposition. The incomplete freeway was underused and the land around it, previously cleared for further highway construction, sat vacant for years.

In the early 1990s, the state of Wisconsin finally removed the transportation corridor designation on the cleared land that had prevented it from being developed, and the vacant area was redeveloped into the lively mixed-use development known as East Pointe. The success of its revitalization inspired Mayor John Norquist to remove the under-utilized freeway for further redevelopment and revitalization. Demolition of the Park East Freeway began in 2002 and was completed by 2003.

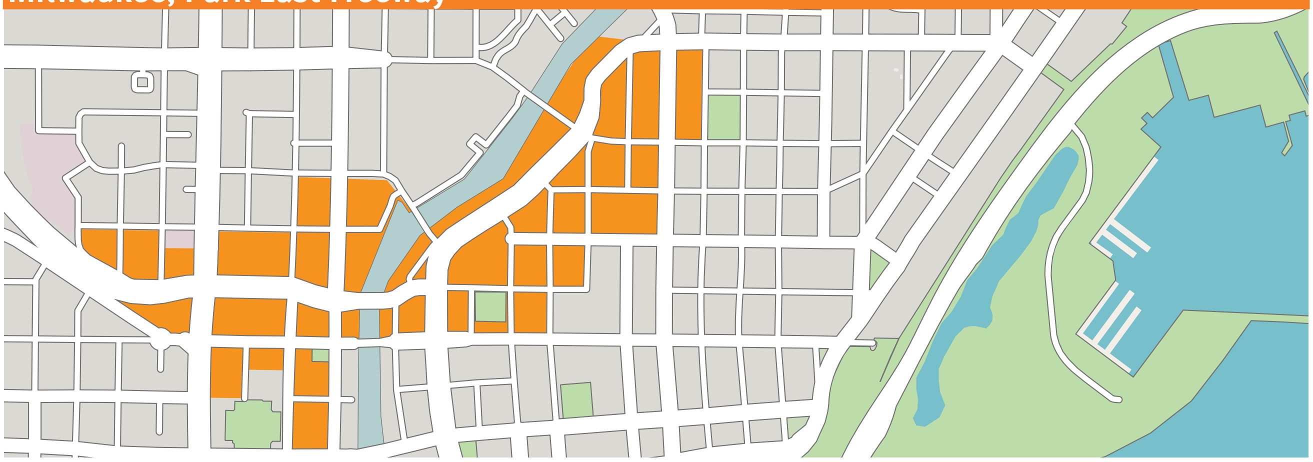
Today, the area that once housed the Park East Freeway is a neighborhood of shops, apartments, and townhouses, on a traditional street grid. The freeway removal not only helped reduce congestion in the area but helped stimulate development.

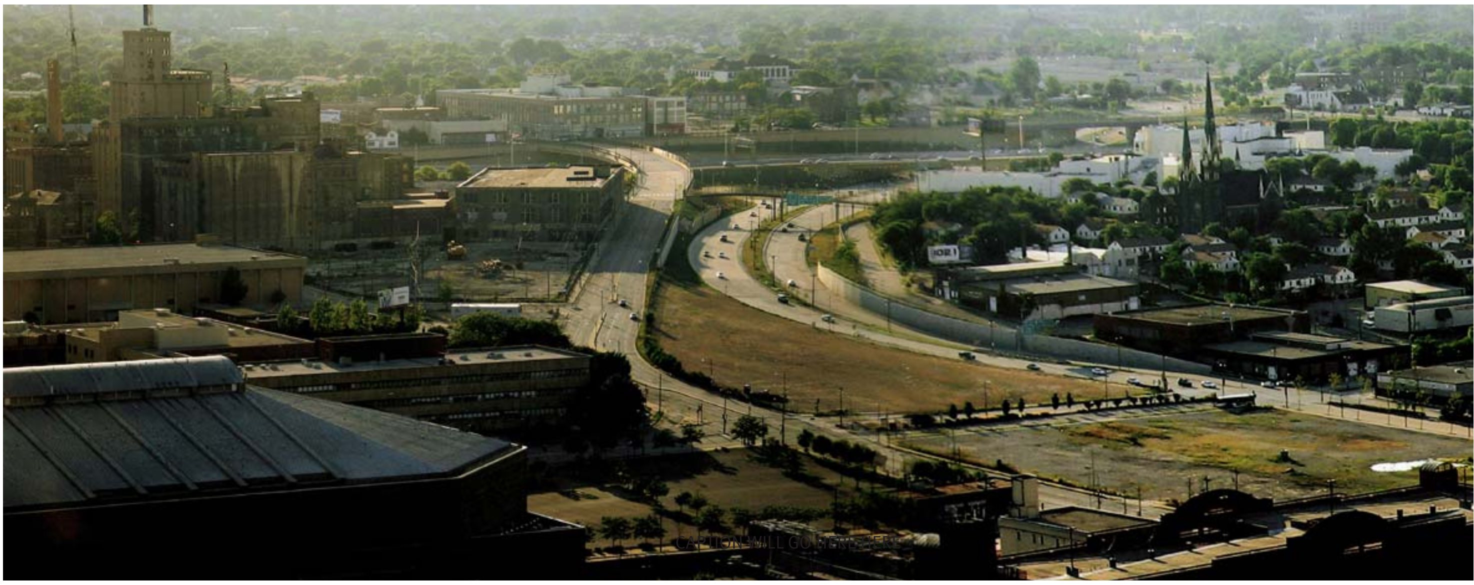
About the project

The freeway was a response to the city's concern about its economic competitiveness and its ability to easily move goods from Milwaukee to major hubs like Chicago. To solve that problem, Milwaukee developed the freeway network that included the Park East Freeway. Property acquisition began in 1965, resulting in the demolition of hundreds of houses and scores of businesses.

By 1971, the first section of the freeway was open and around that same time, local opposition grew because of the highway's detrimental effect on the city, including the pending severance by the highway of Juneau Park from Lake Michigan and the polluting of the park. Elected officials soon supported the opposition and the project was halted. What remained was a one-mile freeway spur that extended from I-43 in the east, near the waterfront, into downtown Milwaukee. The freeway separated the north side of the city from the downtown area with only three exits as well as interrupting the street grid network. Further construction of the freeway was finally terminated in 1972, when Mayor Henry Maier vetoed any additional funds to the proect. (Preservation Institute, Milwaukee, Wisconsin).

Milwaukee, Park East Freeway





Mayor John Norquist, mayor from 1988 to 2004, was inspired by the revitalization and success of the East Pointe neighborhood that developed in the 90s and decided that it was time to demolish the Park East Freeway. Initially, there was some opposition to the teardown, especially from George Watts, a long-time Milwaukee resident, who claimed that the freeway brought vital business to the shop owners in the area. A further analysis showing how under-used the Park East Freeway was eventually discredited any claims to Watts' assertion. Other opponents included business owners that feared the removal would congest their streets and further blight the area. A traffic impact study quelled this sentiment, finding that the project would not impact traffic levels because it offered better connections with existing streets.

A successful redevelopment design competition further won over area residents and business owners.

Demolishing the freeway cost $25 million, with the federal government paying 80 percent of the cost. The cost of keeping the freeway would have been $50 to $80 million in repairs and reconstruction—saving the city $25 to $55 million. It also freed twenty-six acres of land for new development, which also meant a new tax base for the city.

Stakeholders

Local neighborhood and environmental activists were the original catalysts for reversal around the freeway. Mayor Maier stopped construction of the freeway. The federal government played a key role, financing both the highway construction and its takedown. The National Environmental Policy Act (NEPA), passed in 1969, also helped stop the construction of the highway (Cutler, 2001). Opponents brought suit claiming that the environmental impact statement had to be prepared under NEPA before construction started. Although part of the highway had been built and the acquisition of land and destruction of homes had already commenced, the judge upheld the suit and all construction stopped. The Governor and State Department of Transportation were also involved in authorizing the creation and demolition of the freeway.

John Norquist, mayor, and Peter Park, city planning director, were the primary figures pushing for the Park East takedown.

Anton Nelessen Associates were responsible for the revisioning of the Park East area.

George Watts was the key figure in opposition to highway removal. Watts claimed that the freeway system "is the life blood of the city," and, in 2000, even ran against Norquist for Milwaukee mayor to prevent the removal.

View from the top of the clocktower scaffolding during renovation of Milwaukee City Hall looking northwest over the Park East Corridor, 60 acres of open land that resulted from the removal of an unnecessary freeway spur.
Image: trevor.platt via Flickr

Effects

The Park East Freeway was replaced with a surface boulevard that reconnects the grid. Since the take-down, access to downtown Milwaukee has improved. Most of the one-way streets in the area were converted to two-way streets, improving connectivity. The lane widths on the road were narrowed, slowing down traffic and allowing more space for pedestrians. Sidewalks and pedestrian connections were put over the bridges.

Peter Park, the city planning director, used form-based codes, instead of traditional zoning codes, to encourage better development in the area. Three new neighborhoods were created on the new acres of real estate, including: the McKinley Avenue District, which was slated for office, retail, and entertainment development; Lower Water Street District, with offices and existing waterfront residences, and the Upper Water Street District slated for mixed-use infill office development.

Between 2001 and 2006, the average assessed land values per acre in the footprint of the Park East Freeway grew by over 180 percent and average assessed land values in the Park East Tax Increment District grew by forty-five percent during the same period. This growth exceeded the city's overall growth by twenty percent.

Although parcels for redevelopment in the area were ready to enter the market since 2004, development has been slow to happen. The reasons for this may include the recession that began in 2007, the lot sizes being too large, and the fact that control of the land resides in the county and not the city.

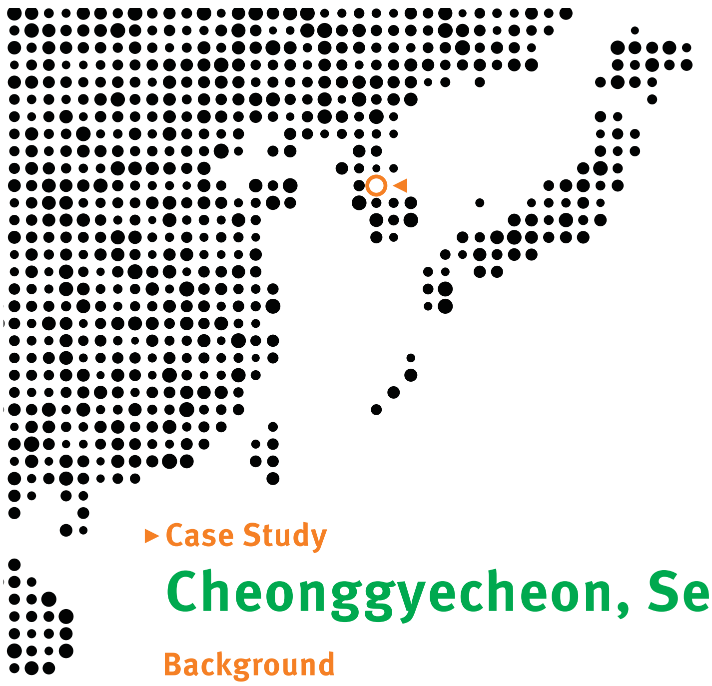
There has been some new developments though, including the new headquarters for Manpower Inc.—a Fortune-500 company—the Aloft Hotel, the Flatiron mixed use and condominium project, the North End neighborhood development, and the Park East Square.

Timeline

Park East Removal Project

1971	Park East Freeway construction begins, 1 mile spur is built.
1972	Construction is halted and then terminated due to local opposition and veto of funds.
1990	The transport corridor designation of the vacant land around Park East is eliminated, allowing the land to be redeveloped.
2002	Demolition of Park East begins.
2003	Demolition ends.
	McKinley Avenue Boulevard completed.

The revitalized Cheonggyecheon Greenway
Image: lensfodder via Flickr



▸ Case Study

Cheonggyecheon, Seoul, South Korea

Background

Cheonggyecheon was once an intermittent natural creek. It passed close to the downtown of Seoul from west to east, an easy walk from Seoul's City Hall and Central Business District (CBD). It measured 13.7 km long and 20 to 85 meters wide.

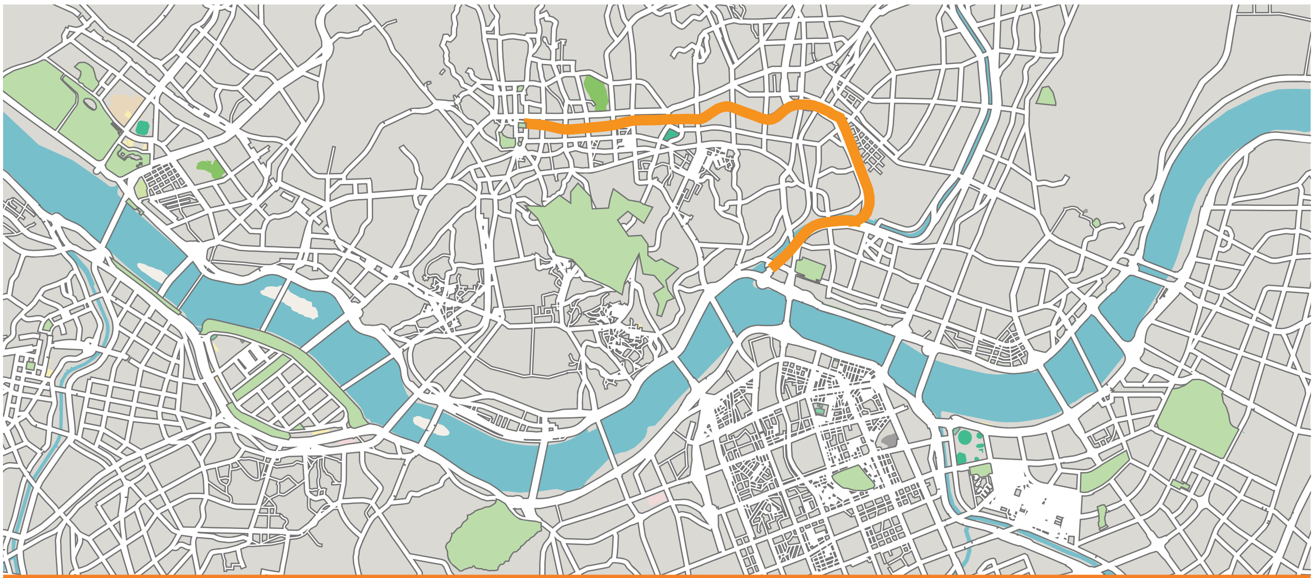
Over time people built along the creek, encroaching on its natural boundaries, and heavily polluting the waterway. By the late 1950s, the pollution and related sanitary issues were so serious that the government decided to cover 6 km with concrete roads. In the 1960s, as Seoul saw a large increase in private car ownership, the roads covering Cheonggyecheon became an ideal right-of-way for an elevated expressway, which was seen as the best way to reduce traffic jams and to improve quality of life. In 1976, the Seoul government completed a four-lane two-way elevated expressway over Cheonggyecheon ("the Cheong Gye Expressway"). In 2003 the Cheonggyecheon restoration project ("the restoration project" for shorthand hereafter) began.

In 2003, traffic surveys by the Seoul Metropolitan Government showed that there were about 1.5 million vehicles entering or leaving twenty-four points along the Cheonggyecheon Expressway each day. While the expressway served the mobility needs of Seoul's drivers, it severely diminished the attractiveness of Seoul's CBD. In the ten years after the expressway was completed, it was estimated that Seoul's CBD lost 40,000 residents and 80,000 jobs (Choi, 2006).

Over time, heavy traffic plus the moisture from the creek under the expressway threatened the safety of the structural elements of the expressway. In the 1990s, experts from the Korean Society of Civil Engineering gave the expressway an overall safety score of "C," meaning that the expressway could barely carry vehicular flows at its design capacity (Choi 2006). Large-scale maintenance and reduction of traffic would be needed to ensure continued safety. The Seoul government limited expressway access to passenger cars or lighter vehicles starting in 1997. Simultaneously, the government began investing millions of dollar to better maintain the expressway.

After lengthy consideration of the costs of ongoing maintenance and the expressway's negative economic impact on downtown Seoul, the government decided to demolish the expressway and to restore Cheonggyecheon beneath the expressway in July 2002. The budget for the entire project was initially estimated at 349 billion won (U.S. $254 million). The project began in July 2003 and was complete by September 2005. The actual price tag for the project was 386 billion won (U.S. $281 million). There are also ongoing costs associated with maintenance of the parks and water recycling facility.

It is worth noting a few other transportation related initiatives that happened around the same time as the restoration project. Seoul implemented a car restriction policy and established designated several kilometers of median lanes for busways simultaneously with the removal of the expressway.



Seoul, Cheonggyecheon Expressway

About the project

The Cheonggyecheon restoration project consisted of four components: removal of the expressway and bridges/ramps connected to it; enlargement and/or rerouting of the creek to the middle of a terrace which is three to four meters lower than the surface roads adjacent to it; construction of water recycling and maintenance facilities for Cheonggyecheon, to ensure adequate water flow quantity and quality; and finally, construction of a terrace and water passageway, a linear pedestrian park with bridges, indigenous plants, ramps for the disabled, sidewalks, waterfalls, squares, fountains, lights, signs, street furniture, etc.

The project created a new 16-m wide and 5.8-km long linear park, with landscaping, good walking facilities, and plenty of street furniture. The Seoul Metropolitan Government, under the leadership of then Mayor Lee Myung-bak, spearheaded the project.

Seoul's government articulated the following goals, providing a strong underpinning for the project:

a. Build Seoul as a human-oriented and environmentally-friendly city;
b. Use the restoration project to help rediscover Seoul's history and culture;
c. Protect citizens' safety;
d. Help revitalize Seoul's CBD with a world-class linear park consisting of a clean stream, indigenous plants, quality sidewalks, street furniture, and more importantly, waterfront places where various human activities such as sightseeing, bridge stepping, and the lantern festival can take place.

Stakeholders

Mr. Lee Myung-bak ran for mayor of Seoul promising to restore the Cheonggyecheon, a promise he fulfilled upon election. He went on to be elected president of South Korea in December 2007.

Drivers voiced concern about traffic congestion if the expressway was removed, and demanded that a traffic simulation model be created to evaluate the potential impacts. Business groups in the CBD voiced concerns that the construction would further reduce their property values and ability to attract business. The mayor convened the Cheonggyecheon Citizens Committee, to collect and coordinate opinions from citizens from all walks of life.

Finally, the mayor formed the Cheonggyecheon Restoration Center, within the metropolitan government to provide technical advice and solutions to the mayor. Other research groups like Workshops for Cheonggyecheon Restoration and the Seoul Development Institute also provided technical input to the center. The Center was responsible for compiling the ideas voiced by various groups about the restoration project and transforming them into actual, implementable plans and designs.

▸ Timeline

Cheonggyecheon Expressway Removal and Greenway Creation

1967-1971 Cheonggyecheon Expressway is constructed.

1990s Korean Society of Civil Engineering gives expressway a "C" grade for safety.

1997 Government limits traffic on expressway to passenger vehicles only to protect the expressway from further degradation.

2001 Lee Myung-bak makes the expressway removal project a cornerstone of his campaign for mayor. Despite some opposition from the business community, polls show nearly eighty percent of Seoul residents support the idea. He is elected to office in June.

2003 A master plan for the stream restoration is completed.

Construction on Seoul's first Bus Rapid Transit line begins, offering an alternative to motorists who used to take the expressway.

Summer: Demolition of the freeway takes place.

Fall: Stream restoration begins.

2004 January: O-gan Bridge completed.

April: Yang-an road completed and open to traffic.

May: Du-mool Bridge and Go-san-ja Bridge completed and open to traffic.

July: Young-dong Bridge completed (but not open to traffic).

September: Gwan-soo Bridge and Bae-o-gae bridge completed and open to traffic.

Beo-dl Bridge completed.

December: Highway removal is completed; Sae-woon Bridge completed.

2005 February: Creek maintenance facilities completed.

March to May: Parkways, pedestrian walks, landscaping, and water features completed.

July: Completed facilities tested.

September: Artwork installed throughout the new park.

Cheonggyecheon Cultural Center opens to the public.

Restoration project is completed.

New park, pedestrian walkways, public art, and water features along the reclaimed Cheonggyecheon creek
Image: riNux via Flickr

Effects

According to data collected by the Seoul Metropolitan Government, before the project, the average vehicle speeds on six major surface roads parallel to or crossing the Cheonggyecheon was 15.3 km per hour (Seoul Metropolitan Government, 2006).

According to the Seoul Metropolitan Government, the public transit accessibility measured by a composite index called "MAG" in Seoul increased by 13.4 percent between 2002 and 2006. After the restoration project, the public transit accessibility to districts of Do-hong, Gangbook, Sungbook, and Nowon in Seoul also saw a significant increase.

The restoration project was also a catalyst for increased property values. Since the project was announced in July 2002, land transactions (including change in ownership, change in renter, and change in lease length) grew in areas parallel to Cheonggyecheon and did not stop until 2006.

According to the surveys of the Seoul Metropolitan Government, the land values in areas around Cheonggyecheon increased after the restoration project, taking Byunk-San and Hyundai Apartment Complexes near the Cheonggyecheon as an example. In 2002, the average apartment price for these complexes was 2.42 million won per m^2. In 2006, the price rose by at least twenty-five percent, to 3-3.3 million won per m^2. During the same timeframe, Heang-dang and Dai-lim Apartment Complexes which are further away from Cheonggyecheon saw only ten percent growth in average price, from 10 to 11 million won per pyong. In terms of office rent, office buildings such as Samil, Dongga, and Seoul Finance near Cheonggyecheon also saw a greater growth than comparable buildings further away from Cheonggyecheon after the restoration project. On average, the former saw thirteen percent increase in rent (Seoul Metropolitan Government, 2006).

As a result of the restoration project, and also Seoul's expansion of mass transit as well as car-use restrictions, traffic in the Cheonggyecheon area decreased quite significantly. According to the traffic surveys by Seoul Metropolitan Government, the number of vehicles entering or leaving twenty-four entry/exist points along the Cheonggyecheon in 2006 decreased by forty-three percent and forty-seven percent, respectively, as compared to their 2002 baselines (Seoul Metropolitan Government, 2006).

As traffic decreased, air quality improved. PM10 (tiny soot particles that are extremely dangerous to human health) levels decreased between 2002 and 2006 in areas both near and far to Cheonggyecheong, but the Seoul Municipal Government found that there was twenty-one percent less PM10 near the former highway site, compared to further away which saw a decrease of only three percent. Other pollutants including NO_2 and VOC/BETX (Benzene, Toluene, Ethylbenzene, m+p-Xylene) decreased in areas around Cheonggyecheon after the restoration project. Prior to highway removal, the area had an NO_2 density 1.02 times that of the rest of Seoul. After, the NO_2 density was reduced to 0.83 times of that of surrounding areas. After the restoration project, BETX pollutants in areas around Cheonggyecheong decreased by twenty-five percent to sixty-five percent (Seoul Metropolitan Government, 2006).

The removal of the highway led to a reduction of the heat-island effect by as much as eight degrees centigrade, according to summertime measurements in comparison to nearby paved roadway conditions (Seoul Development Institute, n.d.). It also brought a reduction of odor and noise, as well as improvements in water quality as well as the creation of a natural habitat. By 2008, the number of fish species had increased five fold, the number of bird species had increased six fold, and plant and insect populations went from fifteen species to 192, compared with 2005 levels (Shin et. al., 2010). More than nine out of ten Seoul residents regard the project as good or very good (Seoul Metropolitan Government, n.d.).

The improved air quality, decreased traffic volumes, and most of all, the high quality new public spaces have made Cheonggyecheon a popular entertainment and recreation spot for Seoul residents and a must-visit destination for tourists. As of October 1, 2007, there had been 56 million visitors to Cheonggyecheon. According to "Hi Seoul," the business and tourism agency of the city of Seoul, there are on average 53,000 visitors to the revitalized creek each weekday and 125,000 on each day of the weekend.

The Cheonggyecheon project has also put Seoul in the international media spotlight. Feature articles on the project have appeared in publications including *The International Herald Tribune, The New York Times, The Christian Science Monitor, Newsweek*, and *Time Asia*, as well as local publications in countries around the globe.

In 2006, Seoul won the Sustainable Transport Award for replacing the 4-mile elevated highway that once covered the Cheonggyecheon River in the city center with a riverfront park, high quality walkways, and public squares. Exclusive bus lanes were constructed along 36 miles of congested streets, and the city government initiated plans for additional bus lanes as part of a broader initiative to improve all aspects of the city's bus system.

Humedal Juan Amarillo is a 45-km greenway that meets the mobility demands of the vast majority of the city's residents who do not own cars.
Image: Carlos F. Pardo

▸ Case Study

Inner Ring Expressway, Bogotá, Colombia

Background

In the mid-1990s the city of Bogotá wanted to decrease traffic congestion and encourage economic activity in the city center, while also decreasing traffic accidents and preventing sprawl. In 1996 the Japanese International Cooperation Agency (JICA), Japan's bilateral aid organization, proposed creating a system of six urban highways and a metro system as the best way to meet these goals and was willing to provide financing for its construction. JICA recommended creating tolls on the highways to provide revenue to repay the loans.

Following a comprehensive review of JICA's proposals, in 1998, Enrique Peñalosa, Bogotá's mayor, had launched a long-term mobility strategy based on non-motorized transportation, bus transit improvements, and automobile restrictions. The JICA proposal, with its focus on highways, did not fit with the proposed mobility strategy.

Peñalosa, from the start of his term, realized that BRT could meet the mobility demands of the vast majority of the city's residents who didn't own cars and therefore were unlikely to benefit from the highways, and invested in a greenway that would better serve the local community. He also understood that BRT could be built in a fraction of the time, at a fraction of the cost that JICA proposed.

Today, the alternative mobility strategy in the city better serves the needs of the people. TransMilenio carries nearly 1.8 million trips per day and provides a traffic-free way for residents to move throughout the city. By 2006, traffic fatalities reduced by eighty-nine percent, thanks to more organized traffic patterns as well as improved crossings for pedestrians. The 357 km of bike lanes has also improved safety and accessibility in the city. Stretching from the poorer areas and suburbs to the downtown, the lanes have increased bike use by five times in the city. The city has been able to meet and exceed the goals they had set out in the mid-1990s without building new highways.

About the Project

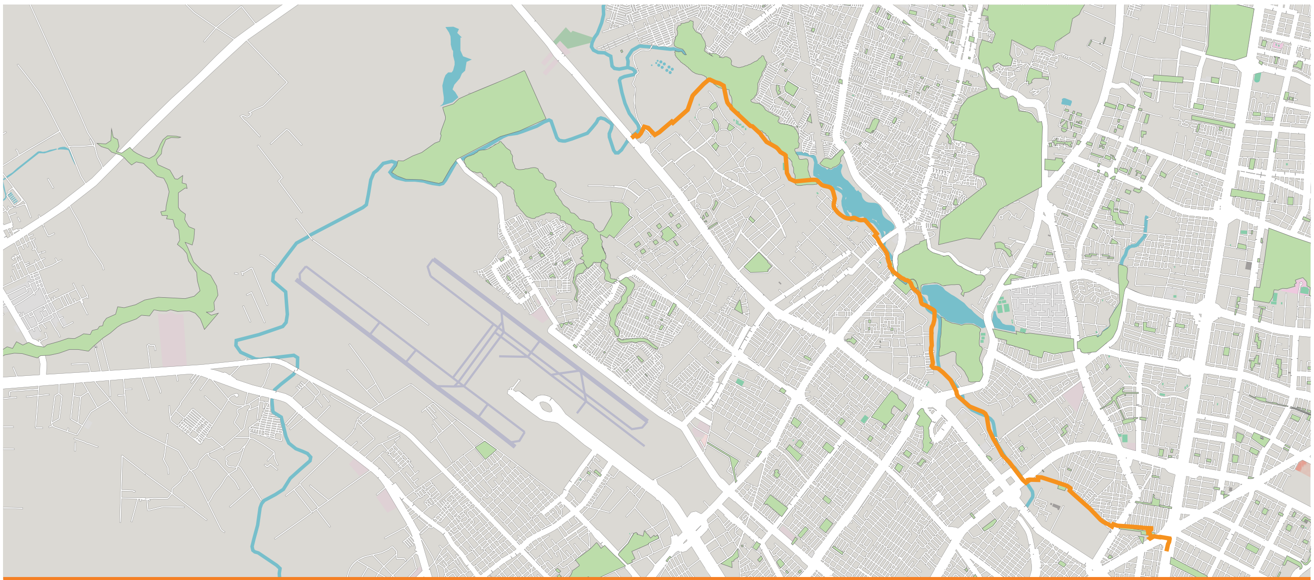
JICA originally considered an urban expressway composed of six highways, including two rings and four radial-ways. The first ring, or IRE (Inner Ring Expressway), was to be a 17.6-km toll road on a concrete bridge with a toll. It was to be a 16.6-km elevated toll road on a concrete bridge with four lanes (two in each direction) and a speed between 60–80 km/h. It was envisioned to 35,000 to 45,000 passenger cars per hour in each direction by 2015.

The total cost for design and construction was estimated at U.S. $1.5 billion (2010 dollars). The project was estimated to have an economic internal rate of return of 14.7 percent and a financial internal rate of return of 5.6 percent and a net present value of U.S. $89 million. The IRE would have ringed Bogotá's central business district.

There were three alternatives considered for the IRE, two of which meant building two full ring roads, and one that would create a partial ring road. This last option was ultimately selected for technical, economic, and environmental reasons, mainly because the alternatives were either too expensive or difficult to implement.

JICA proposed setting the tolls at U.S. $1.25 (2010 dollars) for the IRE's opening in 2006. JICA then projected that the city would gradually increase the tolls to U.S. $1.67 by 2015.

JICA's study concluded the IRE would have no significant noise impact, but the study did recommend the provision of noise barriers along the IRE near school, hospitals, and residential areas. The study also says the IRE would reduce air pollution, probably as a result of the congestion reduction forecasted (idle cars emit more pollution than free flowing traffic).



Bogotá, Inner Ring Expressway

Peñalosa's administration decided to scrap JICA's plans for the IRE and move forward with the proposed mobility strategy that focused on bus improvements and automobile restrictions. He also invested in the creation of bicycle paths, sidewalks, and promenades. The proposed JICA highway location became the Juan Amarillo Greenway, a 45-km greenway for pedestrians and cyclists.

The greenway was previously full of informal settlements and the land had eroded because of lack of proper care by the residents. The greenway transformed the area into a place where the local residents could be outdoors with their families and helped revitalize the area.

The addition of TransMilenio's three trunk corridors, totalling 41 km, and feeder service of 309 km was the center piece and the initial implemented component of the mobility strategy. The system had four terminal stations and fifty-three standard stations. Thirty pedestrian overpasses were constructed to help passengers access the stations, as well as plazas and sidewalks near the stations. All of this was built at a cost of U.S. $213 million, (U.S. $5 million/km) far less than the cost of the proposed IRE. It was funded by a local surcharge on gasoline (forty-six percent), general city revenues (twenty-eight percent), a World Bank loan (six percent), and grants from the National government (twenty percent).

The BRT system opened on December 18, 2000, ten years before the IRE would have been finished, even according to optimistic forecasts. Upon opening, the BRT moved 792,000 passengers each weekday, far more than would have benefited from the IRE (Hidalgo, 2009).

Stakeholders

Mayor Peñalosa led the development of the mobility strategy and its implementation. JICA played an important role in proposing the original project that included an elevated highway as well as transit. Peñalosa instead planned and built many greenways and bikeways and opened the TransMilenio BRT system. He created a local surcharge on gasoline and used the city's budget to pay for the majority of the construction costs. He was also able to secure a World Bank loan and a grant from the national government to cover the rest. The Juan Amarillo Greenway, located where the proposed highway was supposed to go, was planned for during Penalosa's administration, but then built in the following mayor's term.

Effects

For the same cost that JICA projected for 17 km of highway, Bogotá built mass transit. Today, the system carries over 1.7 million passengers per day, equivalent to more than what the highway would have carried, and without the associated environmental and public health harm that additional passenger vehicles would have caused.

As of 2006, some of the project's achievements were: eighty-nine percent reduction in traffic accident fatalities on TransMilenio corridors; forty percent CO_2 reduction; thirty-two percent decline in travel times along the corridor, or an average of 14.7 minutes per user; and an affordable fare for most (U.S. $=0.36) without operational subsidies (Hidalgo, 2009). It has also been reported that aggregated crime in area surrounding the Av. Caracas has decreased.

Also, several real estate agencies have reported an increase in property values less than 1 km away from TransMilenio even when the prices in the rest of the city were in decline (2000-2001). TransMilenio's impact on property values has been more likely to be positive for middle-income housing. Some higher-end residential developers choose to be further from Transmilenio because they dislike the commercial land uses Transmilenio attracts and because of the noise (Muñoz-Raskin, 2010).

TransMilenio is especially important to low-income and middle-income citizens who represent the majority of Bogotá's population. Low-income users represented thirty-seven percent of TransMilenio's ridership in 2003 (when phase two was completed). The highest percentage of TransMilenio users are middle-income citizens (forty-seven percent in 2003) (Jiménez, 2005). These citizens are not likely to have benefited from an elevated highway, or else would have had to spend a disproportionately higher amount of their incomes on transportation in order to access the highway by motorbike, private vehicle, or taxi.

Choosing TransMilenio BRT over the elevated highway will also lead to the city emitting 1.5 times less CO_2 emissions and consuming 1.2 times less energy consumption over a thirty-year period (Acevedo, Bocarejo et al, 2009).

As part of Bogotá's long-term mobility strategy, TransMilenio was implemented in place of constructing an elevated highway.
Image: ITDP

Demolition on the south end of the Alaskan Way elevated highway in Seattle.
Image: Washington State DOT

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Milwaukee preservenet.com/freeways/FreewaysParkEast.html

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New Orleans Recovery Planning Projects - District 4

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Syracuse cnu.org/highways/freewayswithoutfutures

Toronto 8664.org/about.html

9 East 19th Street, 7th Floor, New York, NY 10003 U.S.A.
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