6 Case Studies in Urban Freeway Removal

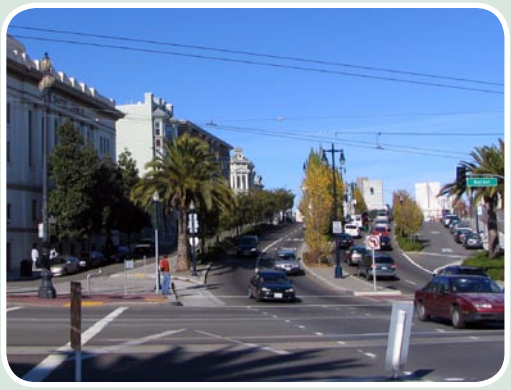
Case Studies

Lessons Learned – Freeway Removal

While there are a number of examples of urban freeway removals in North America, there are certainly no two that are exactly alike. While Seattle's situation is unique, it can learn important lessons from other freeway removal projects including:

- **Reduction of roadway capacity reduces the number of auto trips.** To the extent that vehicle miles traveled can be reduced, a number of additional social and environmental benefits are derived: decreased energy usage and carbon emissions; improved air quality and public health; increased safety for motorists, pedestrians and cyclists; a reduction in fumes and noise pollution; and more cost-effective use of existing transit capacity. In Seattle, a reduction in auto trips might help the city achieve its goal of a 7% reduction in greenhouse gas emissions by 2015.
- **"Spillover" traffic can be absorbed.** Experience to date suggests that the "ceiling" of traffic volumes that can reasonably be accommodated through alternate routes, on all modes, with appropriate demand management and land use strategies may be higher than previously believed. Gridded street patterns are especially effective at accommodating whatever traffic remains once capacity has been reduced (although the downtown Seattle grid, may be limited in its capacity for such absorption). Studies have shown that the addition of capacity can actually increase congestion by "funneling" traffic into a single direct route, rather than distributing it over a network.
- **Freeway removal does not require a major shift to transit.** Removal of an urban freeway will in and of itself change travel patterns significantly. Traffic will find alternate routes and travelers will choose the most convenient mode for their trips or travel at different times or to different locations.

Source: Nelson\Nygaard



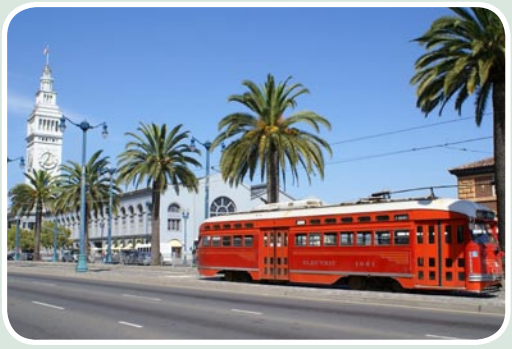
Source: Nelson\Nygaard

San Francisco's Central Freeway carried 100,000 cars per day

- San Francisco's Octavia Boulevard replacement carries approximately 45,000 cars per day with less than 3% shift to transit.

The Embarcadero, San Francisco

- The Embarcadero is an example of a complete street with high auto capacity and a very positive environment for pedestrians, transit users, cyclists and visitors of all types.



Source: istockphoto

Source: Han Tekisalp

- **Freeway removal has a catalytic effect.** Excess right-of-way can often be redeveloped or converted into civic amenities such as open space. Even where this is not the case, however, the impacts of freeway removal tend to be felt over a broad area. Surrounding property values increase, neighborhoods become more attractive to investors and visitors, and crime can be reduced through increased foot traffic and the elimination of shadowy hiding places. Even if crime is not reduced, perceptions of safety often change. None of the cities studied noted any long term negative economic impact, even to areas that had previously been directly served by the freeway.
- **Design is key.** It is not enough to merely replace a grade-separated roadway with an at-grade street. "Complete" street design that seeks to accommodate all users, traffic calming and other engineering techniques should be applied. Design decisions should be guided by concerns about equity and efficient, sustainable use of transportation supply.
- **Reductions of roadway capacity must be managed, mitigated and monitored over time.** Freeway removal is not just a one-time demolition project. To be effective, it requires a long-term commitment and a thorough, integrated approach; one that constantly observes conditions and designs solutions for all users.
- **Freeway removal should only be undertaken after careful consideration of trade-offs.** Even under the most favorable circumstances, freeway removal is not a panacea for urban ills. Inevitably, it will require sacrifices for some. By displacing traffic onto at-grade roadways, it may prove challenging to pedestrians; to the extent that it reduces auto mobility, it may promote some types of businesses over others. In any case, a civic conversation about competing values must take place. Reduced auto mobility for some trips may be acceptable if other values, such as quality of life and economic development, are prioritized.
- **Freeway removal should be part of a larger strategy.** Removals are most effective when they are one element of a comprehensive, clearly articulated civic vision for enhanced quality of life, sustainability and economic development that leverages the opportunities made available by removal. For all of its potential benefits, freeway removal should not be seen as an end in itself but a means to advance greater goals and objectives.

Case Studies

Harbor Drive – Portland, OR

Over thirty years ago, Portland made the decision to raze the Harbor Drive freeway and replace it with a 37-acre park, making it the first city in the United States to initiate the idea of freeway demolition.

The Harbor Drive freeway was a three-mile long, ground-level highway that ran alongside the Willamette River and provided a connection between an industrial neighborhood, Lake Oswego and areas south of downtown Portland. Built in 1942, the four lane highway carried 25,000 vehicles per day.

As the freeway construction movement gained momentum in the 1950s a number of additional facilities were planned for the Portland area. In 1964 the state completed the first freeway proposed under this plan, 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. However, by this time a movement to improve open space next to the waterfront had been initiated and the city's 1968 Downtown Waterfront Plan recommended eliminating the Harbor Drive freeway and developing the land as a park to beautify the downtown riverfront.

A task force was organized to study the feasibility of removing the freeway and replacing it with a park. The nine-member task force was charged with evaluating and holding a public hearing on three alternative plans for the Harbor Drive freeway:

1. Cut and cover, which would underground the highway and place a park above the freeway on the land that the freeway once occupied

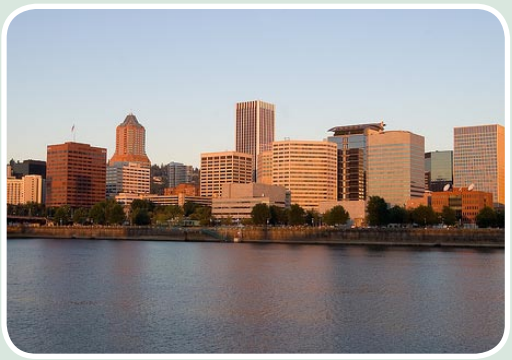
Tom McCall Waterfront Park

Source: Flickr

Key Findings and Outcomes

- Created an important amenity for downtown and the only direct access point to the Willamette River.
- The riverfront park was a key element in the creation of the Downtown Waterfront Urban Renewal Area (DTWF URA).
- Since the implementation of the DTWF URA in 1974, assessed land values in downtown Portland have increased an average of 10.4% annually, from a total of $466 million to more than $1.6 billion.
- Before and after comparisons found 9.6% fewer vehicle trips on nearby roads and formerly connecting bridges.

Portland Skyline



Source: Flickr

How is the case of Portland similar to Seattle?

- Both the City of Portland and the City of Seattle are environmentally and socially progressive cities, whose policy decisions reflect an emphasis on these values.
- There is a high importance placed on creating safe and pleasant pedestrian environments and providing a high quality of life for residents.
- Both Harbor Drive and the Alaskan Way Viaduct provide access to and through their respective downtown areas.

In what ways is Portland different from Seattle?

- Harbor Drive carried only 25,000 vehicles per day, about a quarter of the daily number of vehicle trips on the Alaskan Way Viaduct.
- In Portland, Interstate 5 and the 405 Highway provided drivers with alternative freeway routes through the city as well as additional capacity.

2. Widen the existing freeway and realign it to a straighter configuration
3. Relocate the Harbor Drive freeway to Front Avenue and increase capacity from four lanes to six lanes

Originally, the task force did not even consider the option of closing the freeway, based on projections that the roadway would carry 90,000 trips per day by 1990. Under increasing public pressure from the public and the governor, the task force revisited the issue and ultimately came to the conclusion that if the public was forewarned of the closure, traffic would adequately redistribute itself onto the network, and the freeway could be closed.

The task force recommended closure and the proposal gained leverage when an alternate route, Interstate 405 was completed in 1973 and linked to I-5 by the Fremont Bridge. In May 1974, Harbor Drive was closed and removed to make way for construction of Tom McCall Waterfront Park. From the day of closure, no discernable congestion was recorded on surrounding surface streets.

Impacts

After the removal of Harbor Drive, there were minimal negative traffic impacts partly due to the street patterns and traffic management of downtown Portland. In order to better manage traffic and more effectively utilize the street grid, all the streets in the downtown were converted to one-way and the traffic lights were signalized to enable vehicles to travel across downtown without stopping. The conversion to one-way streets was also accompanied by reduced speed limits in order to ensure a safe and friendly pedestrian environment as well as a bike-compatible environment.

What were the benefits of removing Harbor Drive?

Economic Development. The removal of Harbor Drive freeway was a catalyst in the redevelopment of Portland's downtown waterfront area as it opened up direct access to the Willamette River and 73 acres of land, providing a greater potential for revitalization. In 1974, after the decision to remove Harbor Drive was made, the Downtown Waterfront Urban Renewal Area (DTWF URA) which covers 309 acres was established.

The implementation of the DTWF URA in conjunction with the creation of the Waterfront Park enabled the City of Portland to promote development around the waterfront amenities that also had positive economic impacts within the city as a whole. Working with citizens and businesses, a number of projects have been successfully implemented, providing additional tax revenue for the city, helping encourage growth, and transforming the downtown into a vibrant place.

- **The Yards at Union Station** – 650 mixed-income residential units located next to Union Station in the River District neighborhood
- **River Place** – A mixed-use development
- **Pioneer Place** – A high rise building housing both office and retail uses

In addition to providing a public good and improving the quality of life for Portland residents, the creation of the Waterfront Park and subsequent DTWF URA has produced measurable financial benefits for the city.

- In 1974, 75% of the properties in the redevelopment area were worth the same or less than the value of the land they were on
- By 2002 property values had more than tripled
- Growth in this area had outpaced the growth of the city as a whole by 7% (as of 2002)

Reduction in Crime Rates. The redevelopment of the waterfront area also had impacts on reducing crime rates. According to police bureau reports, since 1990 crime has declined by 65% in the waterfront area compared with a reduction of 16% in the city as a whole. This is partly attributed to new visibility and to the increase in pedestrian "eyes on the street" in the area.

Sources:

Portland Development Commission 2005. A Brief History of Urban Renewal in Portland, Oregon

Portland Development Commission 2005. Urban Renewal: Its Role in Shaping Portland's Future

Seattlepi.nwsource.com

Cevero, Robert. "Freeway Deconstruction and Urban Regeneration in the United States." October 2006

Photo Sources:

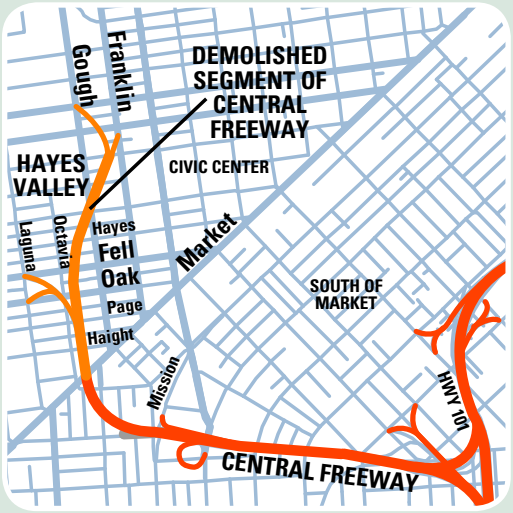
Case Studies

Central Freeway – San Francisco, CA

Background

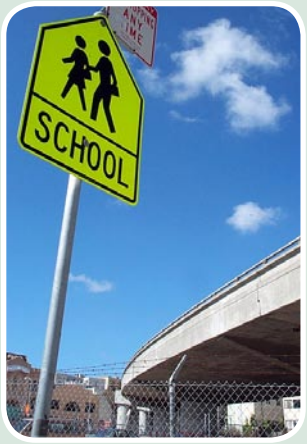
Opened in 1959, the Central Freeway was envisioned as the first leg of two crosstown highways ultimately connecting the Bay Bridge to the Golden Gate Bridge. Due to a citizen-initiated "freeway revolt," just 1.75 miles were built. The freeway extended west from Highway 101 as a six-lane, elevated structure before transitioning to a four-lane, two-level facility. At this point it turned north over the city's main street, Market, into the Hayes Valley neighborhood just west of the Civic Center. Ramps connected to the east-west, one-way couplet of Fell and Oak Streets, and at the freeway's northern end, it transitioned to a north-south one-way couplet, Franklin and Gough Streets. At its peak, the freeway carried approximately 100,000 vehicles per day.

In 1989 the Central Freeway was damaged by the Loma Prieta Earthquake, and the segment north of Fell Street was subsequently demolished. While the California Department of Transportation (Caltrans) began planning a seismic retrofit of the remaining freeway, local officials and citizens, emboldened by the perceived benefits of partial removal of the freeway, began to consider alternatives including a depressed freeway with an at-grade intersection at Market Street. The process accelerated when the segment between Mission and Fell streets was closed for four months in 1996 to demolish the upper, eastbound deck. The gridlock anticipated by Caltrans staff, local politicians and media failed to materialize, and Hayes Valley residents grew accustomed to lower levels of traffic, noise, fumes and vibrations. Around the same time, consensus began to form around a surface boulevard concept developed by Allan Jacobs and Elizabeth Macdonald of the University of California, Berkeley. In 1999, with both freeway retrofit and removal initiatives appearing on the



Source: Nelson\Nygaard

Central Freeway: Before Removal



Source: Nelson\Nygaard

The Central Freeway connected Highway 101 near downtown San Francisco to northern and western neighbors.

Central Freeway: Before Removal

Source: Nelson\Nygaard

How is the case of the Central Freeway similar to the Alaskan Way Viaduct?

- Like the Alaskan Way Viaduct and Aurora Avenue, the corridor consisting of the Central Freeway, Octavia Boulevard, and Fell and Oak streets is a key link in the regional roadway network, a primary through-route made up of both limited-access and arterial roadways and an essential connection to outlying residential districts. While it is some distance from the city's core, the freeway and arterial configuration allowed drivers to avoid one of San Francisco's most constricted chokepoints where three competing grids collide and where several major streets take awkward turns or intersect at odd angles.
- Traffic volumes are likewise similar. Before demolition of the Central Freeway's upper deck, the freeway and the major arterials on Fell and Oak streets carried more than 90,000 vehicles per day. While Octavia Boulevard now handles half that volume, average daily traffic on Fell and Oak in 2006 was approximately 74,000, comparable to the 80,000 on Aurora Avenue north of Denny Way.

ballot, voters approved the removal of the freeway and the replacement boulevard. The Hayes Valley segment of the freeway closed for good in 2003.

Opened in 2005, Octavia Boulevard features four center lanes for through traffic, landscaped dividers, two side, local lanes and two lanes of on-street parking. It connects Fell and Oak Streets to the remaining segment of the Central Freeway at Market Street. At the boulevard's northern end, a new park serves the newly revitalized commercial corridor of Hayes Street. Parcels freed up by demolition of the freeway are being redeveloped into nearly 1,000 units of housing. Traffic in the corridor, which had stood at 93,000 vehicles per day before elimination of the eastbound lanes, has fallen by more than half to 45,000 per day, with some of the remaining traffic displaced onto alternate routes.

Post-Project Evaluation

In February 2007, just less than 18 months after the opening of Octavia Boulevard, the San Francisco Department of Parking and Traffic published an evaluation of boulevard operations and its impacts on the surrounding area. Additional information was gathered from the city's Department of Parking and Traffic for this case study.

Early indications are that while some congestion remains, replacement with a lower-capacity facility succeeded in reducing total volumes, and enough capacity was available in the surrounding grid to accommodate any distribution of remaining traffic.

Among the evaluation's primary findings was that, despite the reduced capacity of Octavia Boulevard, traffic along detour routes in the adjacent South of Market district returned in the months after its opening to pre-freeway closure levels. Of the half-dozen points observed, three experienced decreases in traffic, while none experienced increases greater than 10%. This, along with the reduction in traffic on Fell and Oak Streets, would seem to indicate a significant reduction in discretionary trips and overall traffic in the corridor, although a survey conducted six weeks after closure of the freeway's eastbound lanes in 1996 found that just 2.8% of former freeway drivers no longer made their trips, and just 2.2% of trips had been

shifted to transit. However, nearly 20% of respondents said that they had made fewer trips since the freeway's closure.

Because the new boulevard did not open for several years after the freeway closure, it was initially perceived as a significant addition of capacity for drivers. During the initial weeks after the boulevard opened, the city increased the number of traffic control officers in the area, and it made a number of adjustments to signal timings until the new system reached equilibrium.

Benefits

- The Hayes Valley neighborhood has been transformed from one described as "crime plagued" in a CNN.com profile of the neighborhood to one with stylish shops, restaurants and galleries. According to the Multiple Listing Service, in 1996 the average sales price of a condominium in Hayes Valley was approximately $203,000, or 66% of the average for all of San Francisco. By 2006, the average price of a Hayes Valley condo had increased to $760,000, or 91% of the citywide average.
- On seven acres of former freeway right-of-way, between 750 and 900 units of new housing are planned. About half would be affordable, and costs would be further reduced by limits on parking. Demolition of the freeway helped spur development of the Market & Octavia Plan, a comprehensive land use and transportation strategy for nearly 400 acres of surrounding neighborhoods. An international design competition for four key residential sites attracted more than 160 entries.
- Revenues from sales of freeway parcels were used to fund construction of Patricia's Green, a 16,500 square foot park located where the boulevard meets the retail strip of Hayes Street. Additionally, the tree-lined Octavia Boulevard functions as something of a linear park itself, with its multiple medians and new sidewalk cafes.

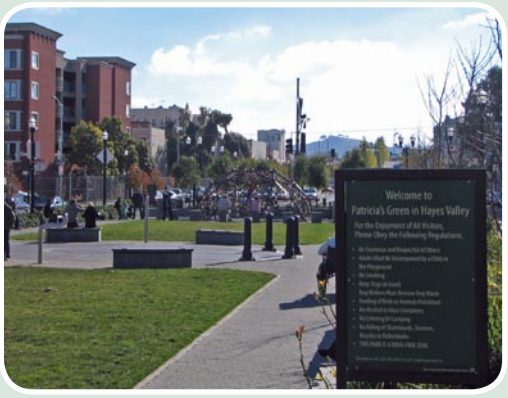
Central Freeway: After Removal

Source: Nelson\Nygaard

In what ways is the Central Freeway different from the Alaskan Way Viaduct?

- Unlike the Alaskan Way Viaduct, the old Central Freeway bisected a residential neighborhood. It both impacted the health and quality of life of neighbors and depressed residential and commercial property values in the immediate area.
- Demolition of the Central Freeway presented substantial redevelopment opportunities, while removal of the Alaskan Way Viaduct would result in few new parcels suitable for development.
- Residents of the outlying residential districts served by the Central Freeway/Fell/Oak corridor already had available to them a range of viable transit alternatives, including the N-Judah light rail line. Moreover, alternate auto routes generally do not require major detours, delays, or travel through the congested downtown core.

Central Freeway: After Removal



Source: Nelson\Nygaard

Summary

The example of the Central Freeway and Octavia Boulevard offers a number of potential lessons for Seattle. While the Central Freeway was unlike the Alaskan Way Viaduct in some ways – most notably, it did not serve as a bypass of the central business district, and so its removal did not displace traffic onto downtown streets – the freeway was used to circumvent a significant bottleneck; and like Highway 99, the corridor remains a heavily used through-route and not a mere spur. It carries comparable numbers of cars, similarly consists of a combination of grade-separated and surface roadways, and it seems clear that on balance, removal of the freeway provided a range of benefits to the community without substantial negative impacts for commuters. "Octavia Boulevard is part of a historical compromise," concluded the 2007 evaluation, "and like all compromises it may not be perfect." Yet, it continued, "it has achieved its most important goals."

Primary Sources

"Octavia Boulevard 2007 Update," San Francisco Municipal Transportation Agency

Impacts

- Peak-hour congestion on Octavia Boulevard has resulted both in backups on Oak Street as well as spillover onto the parallel neighborhood streets of Page and Haight. Adjustment of signal timing has improved the situation somewhat. The city is also considering removal of some on-street parking.
- The February 2007 evaluation also found some impacts to transit service. Buses on Page Street, which must cross the boulevard, can be delayed by as much as two-and-a-half minutes during the morning peak.
- The most serious objections to replacement of the Central Freeway with Octavia Boulevard have had to do with safety. Injury accidents have increased at a rate consistent with increases in traffic, resulting in 2006 in a dubious distinction for the corner of Octavia and Oak streets: It ranked as the city's most dangerous intersection. Most of these collisions were between cars; however, where Market Street meets the boulevard and Central Freeway, motorists regularly make illegal right turns onto the freeway and sometimes collide with bicyclists. A number of design changes have been made, and more radical reconfigurations, such as colored pavement in the bicycle lane, are under consideration.
- As originally designed, Octavia Boulevard would have featured a number of unusual design elements. Several, however, were not incorporated in the final configuration. Side lanes are controlled not just by stop signs, but by flashing red lights; yet the 2007 evaluation found a fair amount of noncompliance, confusion and risk among drivers. At 18'-6", the side lanes are also wider than was intended (although they are narrower than is typically recommended for emergency vehicle access), and their asphalt pavement is not the textured, traffic calming surface that was recommended. Finally, while the side lanes were designed to serve as access routes for local residents and businesses, traffic quickly queued along the southbound side lane at the boulevard's northern end, resulting in a requirement that drivers turn right. Traffic volumes in the northbound side lane, meanwhile, remain higher than had been hoped.

Case Studies

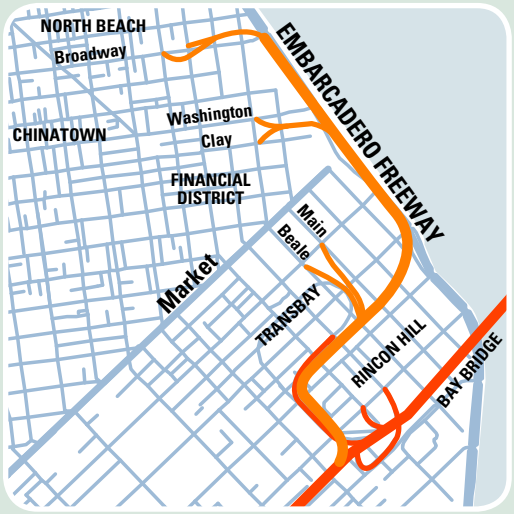
Embarcadero Freeway – San Francisco, CA

Background

Completed in 1959, the Embarcadero Freeway was originally intended to directly connect the Bay and Golden Gate Bridges via the waterfront. San Francisco's "Freeway Revolt" left it as a roughly one-mile connector between the Bay Bridge approach, Chinatown and North Beach. Like Seattle's Alaska Way Viaduct, it separated downtown San Francisco from its waterfront. Like the demolished segment of the Central Freeway in San Francisco, it was a double-deck, elevated highway, resulting in a physical and visual barrier between downtown and the waterfront. At its peak, the Embarcadero Freeway carried more than 60,000 cars per day.

Unlike the Hayes Valley segment of the Central Freeway, the Embarcadero Freeway was torn down shortly after the 1989 Loma Prieta Earthquake. Demolition had been put to a citywide vote before the earthquake, and rejected; once the freeway was damaged and San Franciscans began to live without it, the barrier it created on the waterfront made it a stronger candidate for demolition. The freeway was demolished in 1991 over the objections of merchants in Chinatown, who believed that the Embarcadero Freeway was essential to their economic well being.

The six-lane, palm-lined roadway that took the place of the freeway is known simply as the Embarcadero. The Embarcadero was designed as a "complete street" serving all modes in a beautiful waterfront environment. A vintage streetcar line with daily ridership of more than 20,000, the F-Market, operates in its cobblestoned median, bike lanes flank its sides, and on the water side, a large promenade is crowded with strollers and rollerbladers. At its connection with the foot of San Francisco's "Main Street," Market Street, the boulevard splits into two segments with a large median to allow pedestrians more convenient



Source: Nelson\Nygaard

Embarcadero Freeway: Before Removal

Source: Shaping San Francisco History Project

San Francisco's Embarcadero Freeway was closed after being damaged in a 1989 earthquake. The double decker freeway carried 60,000 cars per day at its peak. The replacement boulevard carries 26,000 cars per day.

Embarcadero Freeway: After Removal

Source: istockphoto

How is the case of the Embarcadero Freeway similar to the Alaskan Way Viaduct?

- Like the AWV, the Embarcadero Freeway was a double-deck freeway along the downtown waterfront. While Port activities in San Francisco had declined over the years, many light industrial uses remain, and new commercial and civic uses have emerged. Both waterfronts feature major ferry terminals, both include historic streetcar lines, both are within walking distance of major tourist attractions, and both are near former downtown service districts undergoing redevelopment.
- The F-Market streetcar line is, as has been noted, both similar to and unlike Seattle's (currently suspended) Waterfront Streetcar. It follows the shoreline along a broad boulevard; however, the F-Market is a much more vital transportation link, operating along the length of Market Street, in addition to the waterfront. While San Francisco enjoys improved transit access to its waterfront today, for nearly a decade after the Embaradero Freeway's demolition, there was no major north-south transit route along or even near the downtown waterfront.

passage, providing a "front door" to the water and a restored Ferry Building. Once the busiest transportation terminal in the Bay Area, the Ferry Building (pictured left) had fallen into disrepair as it found itself in the shadow of the freeway, but now features a busy gourmet food market, and new ferry landings have been restored and slated for further expansion. A few blocks south, the new Rincon Park serves as a focal point for the new highrise neighborhood of Rincon Hill. Across the street is the new headquarters of the Gap Corporation.

Post-Project Evaluation

It is impossible to isolate the impact of removal of the Embarcadero Freeway on development and commerce in downtown San Francisco over the past 15 years. What is clear is that in the years following demolition of the freeway, whole new neighborhoods were established in adjacent areas, major new civic amenities and tourist attractions were opened in the path of the former freeway, and existing tourist destinations that had relied on the freeway for automobile access remained major destinations. In 1990, a New York Times article described Chinatown as a district "in demise"; by some estimates, business had dropped 20% since closure of the freeway. But by 1998, the co-chair of the Chinatown Economic Development Group told AsianWeek magazine that, in spite of competition from new Asian shopping centers in the suburbs, Chinatown had recovered. "San Francisco's Chinatown is still bustling," the article explained, "and merchants say they haven't lost their core customers despite the new competition and the loss of the Embarcadero Freeway nine years ago."

- As of 2000, traffic on the Embarcadero was approximately 26,000 vehicles per day, or less than half that on the old freeway. While post-closure counts indicate that remaining traffic was displaced onto alternate routes to and from the Bay Bridge, it appears to have been successfully absorbed, as levels of service were not substantially degraded.
- Since extension of the F-Market along the Embarcadero and replacement of the old bus route on the street, transit ridership in the corridor has increased several times over. Ferry service and ridership has also increased in recent years.

- A number of factors have no doubt contributed to the growth toward the south of the city's Financial District and the rise of adjacent residential districts. One factor that made redevelopment possible was the removal of the freeway and its ramps in the South of Market district. Approximately 7,000 additional housing units are now under construction or planned in the Transbay and Rincon Hill neighborhoods, many of them in former freeway rights-of-way, and one condominium tower in the area is now offering penthouse units for $2,150 per square foot.
- Likewise, San Francisco's tourism industry grew impressively in the years following removal of the freeway and reclamation of the downtown waterfront. Between 1995 and 2000, visitor spending citywide increased 39%. Tourism fell in the wake of 9-11 and the dot-com crash, but by 2003, when the refurbished Ferry Building opened, it was again increasing. In 2006, visitors to San Francisco spent $7.76 billion, the highest total in the city's history.

Summary

While the Embarcadero Freeway is the demolished San Francisco freeway most often compared to the Alaskan Way Viaduct because of its location, San Francisco's Central Freeway may be a closer parallel in terms of its role in the region. Nevertheless, the example of the Embarcadero offers a few potential insights:

- Broad boulevards, while challenging to design for pedestrian comfort and safety, need not necessarily serve as a major barrier to waterfront access, and they are by any measure less of a visual (and possibly a psychological) barrier than elevated highways.
- In San Francisco, at least, the blighting effect of elevated highways appears to be pronounced. It was only after removal of the Embarcadero Freeway that the city's waterfront emerged as an attractive destination for locals and tourists.
- Freeway removal does not appear to have negatively impacted the economies of nearby neighborhoods, as had been feared. The net economic impact of the freeway's removal for both the immediate area and city as a whole appears to have been positive.

Embarcadero Freeway: After Removal

Source: istockphoto

In what ways is the Embarcadero Freeway different from the Alaskan Way Viaduct?

- The Ports of Seattle and San Francisco are both similar and distinct in key ways. In both cities, primary shipping operations have shifted south, and the downtown waterfronts are being redeveloped into a mixture of uses. However, the Port of San Francisco is no longer a major port, and generates relatively little truck traffic in the downtown area, while the Port of Seattle is a major economic engine for the city.
- Overall traffic in the Embarcadero corridor is lower than along the Alaskan Way. The Embarcadero Freeway served a limited transportation market: It provided direct, grade-separated access to the Financial District, as well as the Chinatown, North Beach, Telegraph Hill and Fisherman's Wharf neighborhoods in San Francisco's northeastern quadrant. Moreover, the adjacent street grid is somewhat more extensive and well-connected than that of downtown Seattle, and was able to accommodate displaced traffic. However, there are relatively few access points to the grid, and greater demands are placed on it by the high number and proportion of jobs in downtown San Franciscos.

Case Studies

Central Artery – Boston, MA

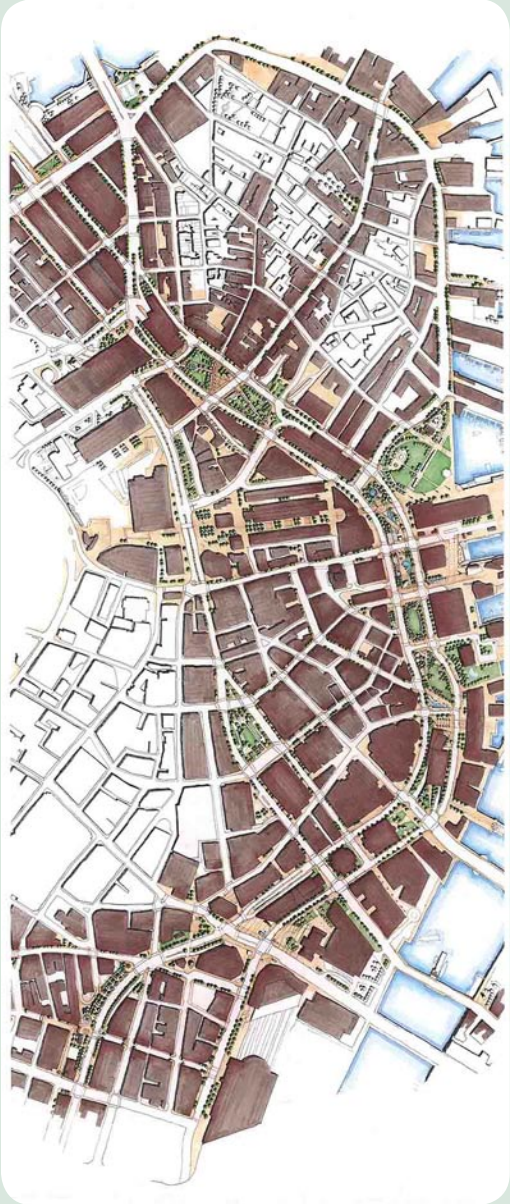
Background

Boston's "Big Dig" project was one of the most ambitious freeway replacement projects in the world, creating an underground freeway to replace the elevated Central Artery that sliced through the heart of downtown Boston. Built over 15 years at a cost of approximately $15 billion, the project exceeded its original budget by a factor of five.

Despite the high cost, the project has delivered on many of its promised benefits – and more are on the way. The 200,000 cars per day that once sliced through the heart of downtown Boston on the elevated Central Artery, cutting off the Financial District from the waterfront and historic North End neighborhood, are largely gone; and in their place will soon be a 27-acre crescent of landscaped boulevard, reconnected streets, neighborhood parks, cultural facilities and modestly scaled development collectively known as the Rose Kennedy Greenway. The design of the Greenway was a joint effort of the Massachusetts Turnpike Authority, the Commonwealth of Massachusetts, the City of Boston and citizen groups. The first of its three major parks, in the North End, was dedicated on November 5, 2007.

Post-Project Evaluation

The Greenway will be under construction for some time; it will likely be many years before its impacts can be accurately assessed. Nonetheless, it is reasonable to expect not just quality-of-life, health, and other benefits both intangible and direct, but measurable economic benefits. A 2003 Tufts University study showed that condominium values in central Boston increased by 5% when sited away from the freeway and increased by 6% when sited close to parks and open space. The study concluded that replacing the Central Artery with open space would likely result in a billion-



Source: Massachusetts Turnpike Authority

How is the case of the Central Artery similar to the Alaskan Way Viaduct?

- The Central Artery/Tunnel Project's relevance to the Alaskan Way Viaduct has much to do with whether the Viaduct is ultimately replaced by a tunnel. In Boston, roadway capacity was not just maintained but increased, though at a very high cost.
- The high cost of the tunnel project resulted in elimination of some of the planned additional mobility improvements including a new rapid bus line, and a direct transit connector between North and South stations, the region's two major regional rail stations. In some ways, Bostonians were asked to make a choice between freeway capacity and increases in non-auto travel.

In what ways is the Central Artery different from the Alaskan Way Viaduct?

- Replacing the Alaskan Way Viaduct, either as a new, elevated highway or underground, would require dedication of much of the existing right-of-way for some sort of replacement facility opportunities for new open space are limited.
- The Central Artery, with its traffic volumes of 200,000 cars per day, was a much busier and more essential auto route than the AWV, more akin to I-5 than the Viaduct.

Sources:

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dollar increase in neighboring property values – three-quarters of a billion dollars simply from removing the freeway, and another $250 million through the addition of parks. And, the authors added in a *Boston Globe* editorial, "(t)hese numbers represent only part of the benefit of the new parks. The billion-dollar bonus does not include the benefits to tourists, commuters, and residents of other Boston neighborhoods. The benefits to others are both aesthetic and commercial: If downtown becomes a more pleasant destination, people may linger and spend more money there."

Separately, a 2004 report in the *Boston Globe* found that "in the fifteen years since the Central Artery/Tunnel pro-ject began, the value of commercial properties along the mile-long strip that… will become the Rose Fitzgerald Kennedy Greenway increased by $2.3 billion, up 79 percent…almost double the citywide 41 percent increase in assessed commercial property values in the same period."

A 2006 study for the Massachusetts Turnpike Authority, meanwhile, added that the "Central Artery/Tunnel Project has attracted an unprecedented level of private investment in new development projects downtown." The study identified $5.3 billion worth of projects recently completed or underway within a five-minute walk of the project, including 4,200 housing units, and it estimated generation of nearly 36,000 new jobs.

Summary

While few would find the Big Dig an example to be followed, Boston did replace the full capacity of its elevated freeway with an underground facility and reclaimed the land that the freeway displaced. The amenities being built in Boston will benefit the entire city, and is expected to benefit the city's economy as well.

Case Studies

Cheonggye Expressway – Seoul, South Korea

Background

Cheonggyecheon ("clear valley stream") is a former seasonal waterway in the city center of Seoul, South Korea. Between 1958 and 1976, the stream was covered and replaced by the Cheonggye Road and Cheonggye Elevated Highway, or Cheonggye Expressway. Prior to demolition, combined traffic counts on both roads were approximately 168,000 vehicles per day, about five-eighths of which was through-traffic.

Between 2003 and 2005, the roads were removed and the stream was restored. The stream is the centerpiece of a 3.6-mile linear park. New two-lane, one-way streets are on each side of the park. While the city's official budget was approximately $385 million (U.S.), media sources have estimated the project's total cost at more than $900 million (U.S.).

Post-Project Evaluation

- In the 15 months after its opening, the park attracted approximately 90,000 visitors per day, 30% of them from outside the metropolitan area.
- A 2005 study by the Seoul Development Institute found that land values of adjacent parcels had increased by an average of 30%.
- While before and after traffic counts for the corridor were unavailable, the number of vehicles passing through downtown decreased 9% after a bus rapid transit system and aggressive Transportation Demand Management measures were implemented as part of the project.
- Summer temperatures in the park, according to project planner Kee Yeon Hwang, are 7 degrees (F) lower than at locations a quarter-mile away.

Cheonggye Expressway: Before

Seoul Metropolitan Government

Cheonggye Expressway: After

Source: Flickr

Demand Management and Freeway Removal

Through a combination of incentives and disincentives, the city of Seoul has, since the mid-1990s, made transit a progressively more attractive alternative to the automobile for trips into and within central Seoul. While the following policies were part of a much larger package addressing congestion, not just in the Cheonggye corridor but throughout the core and city, two key components – the "No Driving Day" program and bus system improvements – were implemented in the months after demolition of the Cheonggye Expressway.

- In 1996, the city began charging private vehicles with less than three occupants a toll of 2000 won (about $2 US) at two major points of entry to the CBD, Namsan Tunnels #1 and #3, during weekdays and for a shorter period on Saturdays. Within a year, traffic fell by 14% and speeds increased 38%. While traffic on alternate routes increased 6%, speeds increased by 16%. Tunnel traffic has since returned to pre-toll levels, but vehicle occupancy rates are now higher, and average speeds have remained faster.
- In 2003, a voluntary "No Driving Day" program was introduced. Participants who leave their cars at home one weekday per week are now eligible for benefits including half-price tolls, 10-20% discounts at public parking lots, a 5% reduction in auto taxes, gas, maintenance and car wash discounts. By 2006, the program had resulted in a 4% decrease in traffic, a 10% reduction in carbon emissions, and annual fuel savings of $50 million (US).
- Starting in 1997, the city instituted regular fee increases for public parking, and in 2004 it announced that it would be reducing the supply of public parking downtown. The city has also sought to restrict supply by lowering parking requirements for commercial development, and a residential parking permit program has been established.
- While two historic bridges were restored (the Gwanggyo Bridge had been hidden under the highway, while the Supyogyo Bridge had been relocated to a park), construction was delayed by a lawsuit claiming that an accelerated timeline had resulted in destruction of archaeological assets.
- An estimated 1200 street vendors were displaced by the project. Many were relocated to a flea market at a nearby stadium; however, in 2007 the stadium was demolished, and plans were made for yet another new market nearby.

How is the case of the Cheonggye Expressway similar to the Alaskan Way Viaduct?

- Like the Alaskan Way Viaduct, Cheonggye Expressway was adjacent to the central business district, and like the AWV, it primarily served as a bypass for regional traffic. To the extent that its removal has not increased congestion, it may serve as an example for Seattle. Between September of 2003, a few months after the freeway's closure, and October of 2004 – a period during which the city implemented both an incentive-based program of no-driving days and a major reconfiguration of bus service including new transit lanes – the volume of traffic passing through central Seoul declined 9.1%. Over the same period, during which fuel prices also increased, citywide traffic was reduced 5.9%. In an article in the *Guardian* (UK), project planner Kee Yeon Hwang made the further claim that "(a)s soon as we destroyed the road, the cars just disappeared and drivers changed their habits." While no data could be found to support the assertion that roadway removal alone reduced congestion, Hwang added that modeling had projected a slight decrease in areawide traffic. This was consistent with his finding that the 1999 closure of Seoul's Namsan #2 Tunnel had improved travel speeds by redistributing traffic over the surrounding network. (Hwang is a prominent proponent of Braess' Paradox, which might be expressed as the theory that direct routes often function as bottlenecks, and so reductions in total capacity can reduce congestion.)
- Replacement of the expressway restored water and open space access, enhanced recreational amenities, and is widely viewed as having improved the quality-of-life of center city residents, workers and visitors.

- Citizens of Seoul, like those in Seattle, have come to place a premium on sustainabililty as a cultural value. In outreach for the project, planner Hwang said residents clearly prioritized environmental concerns. Project champion Lee Myung-bak, who was elected mayor in 2002 in part on a platform of restoring the Cheonggyecheon, has added that "this project is tied to the question (of) how we picture the future of Seoul, our global vision of this city of ours. ... The curtain is slowly falling on the stage called 'modernization.'"

In what ways is the Cheonggye Expressway different from the Alaskan Way Viaduct?

- In the years leading up to demolition of the Cheonggye, Seoul not only had committed to a policy of deterring auto trips into the center city, but had rolled out aggressive Transportation and Parking Demand Management measures to implement it, including congestion-priced tolls for motorists and increased parking fees. Additionally, the corridor is served by multiple subway lines. Perhaps most importantly, however, Cheonggyecheon restoration was accompanied by a voluntary program of no-driving days, with incentives such as reduced fees and tolls to encourage compliance, as well as an overhaul of the city's bus system including a bus rapid transit network featuring exclusive median lanes. (See sidebar for more information.)
- Likewise, Cheonggyecheon restoration was one element of a much larger economic development strategy, with both local and global components. On a local level, much of the project rationale had to do with revitalization of the historic downtown, which has lost market share as the city's economic center has shifted south toward the Gangnam district. On a broader scale, the project has been described by officials as part of a "re-branding" or repositioning of Seoul's image internationally – a meaningful symbolic gesture for a 21st century city. More concretely, the Seoul Development Institute has projected long-term economic benefits of between $8.5 and $25 billion (U.S.) and 113,000 new jobs.

Demand Management and Freeway Removal continued

- Gas taxes have been increased, and an incentive-based TDM program for employers implemented.
- Finally, in 2004 the city's bus system was fundamentally restructured. Most significantly, a network of median bus-only lanes introduced in 1996 was greatly expanded: by 2005, four routes extended 22 miles, by 2007, the system had reached seven routes and 42 miles, and by 2010, it should encompass 12 routes and 73 miles. In 2004, the existing network of curbside bus-only lanes was also expanded. Fares and schedules were coordinated,and integrated with the subway system, and services were color-coded (local downtown buses, for example, are branded yellow). A smart card was introduced, and ITS technology is now used to manage the system. The results: within months, rider satisfaction had reached 90%, speeds in BRT corridors had improved by 33% to 100%, and accidents and injuries on all routes had fallen by a third. Between January and late May of 2005, meanwhile, bus ridership increased by nearly a million passengers per day, or almost one-quarter.

Summary

Perhaps more so than any American example, the Cheonggyecheon project offers evidence that reductions in road capacity accompanied by a comprehensive stategy of TDM and transit expansion can mitigate negative impacts, even where the roadway is a key link in the regional network. Unlike most major U.S. cities, Seoul enjoyed significant transit mode share prior to the project; however, like U.S. cities, it was increasingly choking on its own traffic, with average annual increases in the 1990s of 13 to 15%. The Cheonggyecheon project also illustrates the tangible economic and environmental benefits that can flow from urban design that is richly symbolic and driven in large part by quality-of-life perceptions.

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Case Studies

Riverfront Parkway – Chattanooga, TN

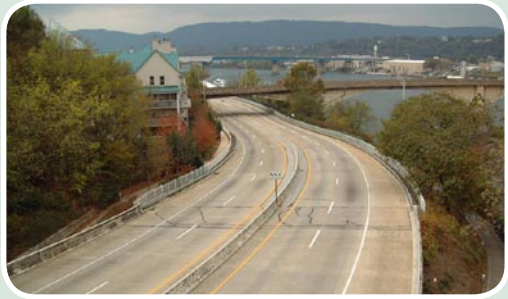
Background

Riverfront Parkway in Chattanooga, Tennessee; was constructed in the 1960s as a four-lane freeway, intended to carry industrial truck traffic along the Tennessee River. But not long after the freeway's construction, Chattanooga went through difficult times: in the late 1960s its economy's manufacturing base contracted, eliminating thousands of jobs; its air was declared by the federal government to be the most polluted in the nation; and the construction and configuration of roads intended to move traffic in and out of the city hurt downtown Chattanooga's business environment and hastened the decline of a once-vibrant city center. The Riverfront Parkway that had been designed to carry heavy industrial traffic no longer had this purpose, and its physical location blocked the city from its riverfront. When the city began a concerted effort beginning in the 1980s to improve its image, led by efforts to enhance the quality of its downtown and restore its connection to the river, it became increasingly apparent that the Riverfront Parkway was a far larger piece of infrastructure than Chattanooga needed.

The design for the reconstructed Riverfront Parkway employed both a two-lane section allowing shorter, safer pedestrian crossings and a four-lane urban boulevard in different sections of its length. These new configurations not only restored pedestrian access to the river by providing an easier street to cross, they also restored an urban street amenable to built fabric that would enrich and expand Chattanooga's downtown. However, implementing the narrowed cross-sections relied on enhancements to the overall street network that would allow necessary traffic distribution.

The new design for the Riverfront Parkway was a catalyst and key component of Chattanooga's 21st Century Riverfront Plan. It involved an exten-

Riverfront Parkway Before



Source: Glatting Jackson

Benefits

The Riverfront Parkway redesign represented years of consensus building and community collaboration. As a result of the Riverfront Parkway efforts, completed in mid-2004, several civic works and development projects have added value and vitality to downtown and the riverfront. Various national publications have named it one of America's most livable cities multiple times in the past ten years. Population in its downtown has increased by over 30% since 1990, nearly $250 million in investment occurred downtown from 1998 to 2002 alone and property values have risen consistently.

Benefits of the project have included:

- Pedestrian connection from downtown Chattanooga to the Tennessee River waterfront.
- Creation of a new waterfront park and event area
- Additional at-grade access from Riverfront Parkway to downtown via four new intersections, allowing more even distribution of trips along downtown streets.
- Added riverfront development opportunities

Riverfront Parkway After

Source: Glatting Jackson

How is the case of Chattanooga similar to Seattle?

- Like the Alaskan Way Viaduct, Riverfront Parkway effectively severed downtown Chattanooga from the waterfront which was the catalyst for its original growth and prosperity.

In what ways is Chattanooga different from Seattle?

- The role of the Riverfront Parkway was to move traffic in and out of downtown.
- Riverfront Parkway carried approximately 20,000 vehicles per day, a significantly lower number than the Alaskan Way Viaduct.
- Chattanooga's economy was in decline, while Seattle retains a vibrant industrial economy and port.

Source: Glatting Jackson

Sources:

Glatting Jackson Kercher Anglin

sive public process including a series of meetings and a community design session where residents, city officials, Tennessee Department of Transportation (TDOT) representatives and key property owners developed a conceptual plan to change the parkway to better fit the needs of the city.

Impacts

Four new intersections on Riverfront Parkway at Second Street, Lookout Street, Lindsay Street and Houston Street were added. Before this, the only access from the Parkway to downtown Chattanooga was focused on two intersections, causing congestion at these concentrated access points. Indeed, of the nearly 20,000 vehicles per day being carried on the old Riverfront Parkway, over 13,000 of these were coming from or going to Chestnut Avenue for downtown access. This was primarily traffic going downtown: on average, only between 2% and 3% of the vehicles making this turn were heavy vehicles that had used Riverfront Parkway for its intended industrial purpose. The addition of access options allowed traffic entering downtown to distribute onto a greater number of streets, lessening the burden on the two previous access intersections and Chestnut Street, which before the design functioned as the main traffic distributor downtown.

Matching the number of travel lanes to new volumes involved a narrowing from four to two lanes after Second Street, as the expected distribution of traffic onto downtown streets at earlier points would reduce Riverfront Parkway volumes. As a result, Riverfront Parkway became a two-lane parkway with greatly improved safety of pedestrian crossings right in front of Chattanooga's Ross Landing Park, the Tennessee Aquarium and the Bluff Arts Centre.

Changing the street design to match urban context involved removal of median barriers and the installation of curbs, gutters, sidewalks and tree planted medians. These have not only improved the aesthetics of the parkway, they have also made it into a desirable downtown address for new development and have improved the pedestrian experience along the Parkway (and not just across it).

Case Studies

Route 29 – Trenton, NJ

Background

Route 29 in Trenton, New Jersey, was constructed in the 1950s to serve as a high-speed commuting freeway adjacent to the New Jersey state government facilities in downtown Trenton. As was typical for the time, expanding suburban residential development combined with the relative freedom of automobile travel precipitated a shift in priorities to maintaining vehicle mobility. The construction of Route 29 converted a historic small riverfront street alongside Trenton's signature park into a four-lane expressway that separated the city's downtown from the Delaware River. It also replaced the canal closest to the river that had historically been Trenton's major transporter of goods and materials, and used valuable riverfront land adjacent to the city's downtown. The expressway now passes under the three main bridges entering Trenton across the Delaware River and accesses U.S. Route 1 through a high-speed interchange built on 18 acres of waterfront land.

The design choices that were made to accommodate private vehicle travel significantly degraded the city's civic realm, walkability, and land value. Pedestrian spaces were converted to automobile spaces. Much of the land adjacent to Route 29 is now occupied by large surface parking lots. The road also has significant safety issues, with collision rates exceeding statewide averages for roads of this type.

In order to address these problems, and to contribute to the revitalization of downtown, Trenton's Capital City Redevelopment Corporation initiated the first of several planning efforts designed to replace the portion of Route 29 that passes through Trenton with an urban boulevard with at-grade street crossings. This plan included changes designed to reduce vehicle speeds, promote pedes-

Route 29 Before

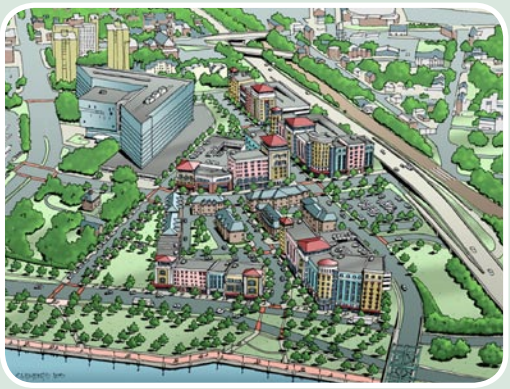
Source: Glatting Jackson

Benefits

The boulevard concept balances mobility needs with access and benefits the City of Trenton by:

- Promoting other mode choices through the provision of pedestrian crossings, connections to adjacent trail facilities, neighborhood sidewalks, and a safe walking environment.
- Respecting the access needs of existing and future land uses
- Improving the flow of vehicular traffic by reducing the number of vehicles exiting the freeway at two major interchanges; adding additional streets and intersections to share the traffic load
- Reducing vehicle speed and enhancing safety by:
  - Eliminating shoulders and high speed ramps
  - Narrowing the width of pavement
  - Adding vertical curbs, street trees, changes in paving material, sidewalks, and on-street parking
  - Creating at-grade intersections

Route 29 After
(As Planned)



Source: Glatting Jackson

How is the case of Trenton similar to Seattle?

- As in Seattle, the Route 29 Expressway represents a physical and psychological barrier between the heart of the city and its waterfront.
- The planning process for conversion of Route 29 into a more urban-oriented street has been led by stakeholder interviews and discussions that identified a need for enhanced network and cross-29 access as critical to a restored city-riverfront connection.

In what ways is Trenton different from Seattle?

- Route 29 carries 60,000 vehicles per day, less than the Alaskan Way Viaduct

trian access to parking lanes and to downtown parks, and improve urban design. The underlying goal of this effort, which began in 2004, was to plan a smarter transportation network that would balance the travel expectations of the public with the need for better connections between the city and its waterfront. In the long term, it would foster a sustained redevelopment of the Capital District in Trenton and restore its sense of place along the Delaware River.

As of December 2007, the New Jersey Department of Transportation (NJDOT) has not yet begun implementation of this plan. As currently envisioned, it actually consists of two separate projects, comprised of the portions of the boulevard north and south of Calhoun Boulevard. The southern section is still in early feasibility studies, while the northern section has completed feasibility studies, but remains on hold due to a lack of funding.

How is Route 29 similar to the Alaskan Way Viaduct?

Like the Alaskan Way Viaduct, Route 29 creates a physical and psychological barrier between the heart of the city and its waterfront. Also like the Viaduct, Route 29 carries a significant amount of through traffic: much of Route 29's traffic travels through Trenton toward the interchange with Interstates 195 and 295. However, unlike the Viaduct, Route 29 also carries large amounts of traffic traveling to the government centers and other major employers in downtown Trenton.

Impacts

The most important impacts of the proposed project would be to promote redevelopment in downtown Trenton, to improve safety, and to remove a barrier to the city's waterfront.

It addition to these advantages, the project may also bring improvements for some motorists. Because Route 29 was initially configured to provide limited access into downtown Trenton, most of the 60,000 daily vehicles that currently use the expressway to access downtown Trenton do so at just two interchanges, Calhoun Street and U.S. Route 1. As originally planned, the reconfigured Route 29 would add 13 at-grade intersections between these two points. This change would better distribute vehicle traffic through downtown Trenton's street grid.

Overall, NJDOT's traffic models show that if the projects were implemented, travel times for motorists would remain comparable to current travel times. Travel times on some segments of Route 29 would decrease due to expanded capacity in the overall street network and the opportunities for traffic distribution that this allowed. Corridor-wide, average peak-hour travel times would increase by approximately 90 seconds. Though this increase initially concerned the New Jersey Department of Transportation, local support for the Route 29 urban boulevard concept has remained strong. In anticipation of this change, private development has already been proposed that would add significantly to the fabric of downtown Trenton and help to construct a large portion of the local street network proposed under the plan.

While the project plans for both the northern and southern segments of the boulevard are continuing, neither will begin implementation during 2008.

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Glatting Jackson Kercher Anglin: Community Planning and Design Firm

Case Studies

Vancouver – British Columbia, Canada

Recently voted the most livable city in the world, Vancouver is in many ways a sister city to Seattle. Located in British Columbia about 140 miles north of Seattle, Vancouver has a similar climate to Seattle and a strong economy based on traditional resource extraction, a high tech economy and tourism. The populations of the cities proper are both almost 600,000 people. Vancouver, however, is less than one-third the land area of Seattle and therefore has significantly higher population densities, especially in the central city.

Vancouver is the only major North American city to not have built a freeway through its core, whereas downtown Seattle has both I-5 and Highway 99. In Vancouver, a proposal in the 1960s to build a freeway through the core was defeated by a grassroots effort of residents in Chinatown and other neighborhoods that the freeway would have cut through.

Strong support for public transit, walking and biking has helped avoid high traffic volumes and unbearable congestion on the streets of Vancouver. New development has been high density, encouraging transit ridership, and key amenities are available within walking distance. The population downtown increased by over 60% between 1991 and 2002 (to 76,000) without any increase in vehicle trips to and from downtown. Today, 81% of all trips within downtown, 60% of all trips to and from downtown and 40% of all trips citywide are made by walking, bicycling, or public transit. The economic cost of traffic congestion in Vancouver has been calculated to be much lower than for Seattle and other more auto-oriented cities. The estimated annual per capita cost of congestion in Vancouver is $220-$340 (U.S., 2006) compared to

Revitalized Gastown
(where proposed freeway would have cut through)

Source: Flickr

- Vancouver and Seattle have similar population size and economies. Vancouver has a comparable transit network but has one-third the land area of Seattle and one-and-a-half times the ridership of King County Metro.
- No freeways have been built through downtown Vancouver, whereas Seattle has two freeways: I-5 and Hwy 99.
- The population in downtown Vancouver grew by 60% between 1991 and 2002, but with no net increase in auto trips. Eighty-one percent of internal trips downtown are by walking or biking and 60% of all trips to/from downtown are non-auto. Comparatively, more than half of trips during the peak hour in downtown Seattle are by automobile.
- The annual per capita cost of congestion is approximately $220-$340 in Vancouver, compared to $780 in Seattle (U.S. dollars, 2006).
- Forty-percent of downtown residents work outside of downtown, leading to a moratorium on housing construction and an effort to increase office development downtown, to achieve a better jobs-housing balance.

False Creek in downtown Vancouver

Source: Flickr user

Sources:

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Greater Vancouver Regional District (http://www.translink.bc.ca)

City of Seattle Department of Transportation (http:// www.seattle.gov/transportation/)

US Census (http://factfinder.census.gov)

National Transit Database (http://www.ntdprogram.gov/ntdprogram)

Photo Sources:

Flickr user upyernoz: http://www.flickr.com/photos/upyernoz/689433/. This author has given permission for use if credit is given under the following license: http://creativecommons.org/licenses/by/2.0/deed.en

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$780 in Seattle. Traffic congestion is worse now in Vancouver than it was ten years ago. But more people are traveling via other modes, so overall travel times and congestion costs have decreased significantly.

Vancouver has achieved these results with a progressive "Living-First" strategy and subsequent plans and policies that emphasize a shift away from automobiles as a dominant form of transportation. The Transportation Plan of 1997 includes a specific determination that road capacity to downtown will not be increased further, with strong accompanying support for public transit, walking and bicycling.

Vancouver has a comprehensive, cost-effective and high-performance transit system, called Translink. It includes a 31-mile long automated rail system, and the rest of the network is comprised of on-street buses, including a highly successful Bus Rapid Transit route. Translink has a service area population similar to King County Metro and similar number of vehicles in service. However, Translink operates within a much smaller area built out at significantly higher densities downtown. Transit is thus more accessible to more people, with one and a half times the ridership of King County Metro. Almost one-quarter of riders on the BRT route formerly drove a car to make the same trip.

Notably however, 40% of downtown residents work outside of downtown. This led to a moratorium in 2005 on residential housing construction downtown, coupled with an effort to develop more office space for a better jobs-housing balance. Vancouver also has the highest housing prices in Canada, and Vancouver households pay the highest proportion of their income towards housing. Efforts to develop more housing and more affordable elsewhere in the city through various programs and policies are being implemented to ensure sustained economic growth for Vancouver and its residents.

Case Studies

Frederick G. Gardiner Expressway – Toronto, Canada

Background

In an effort to reconnect its central city with the waterfront on Lake Ontario, the city of Toronto is considering removing the Frederick G. Gardiner Expressway, which links the city with its suburbs to the west.

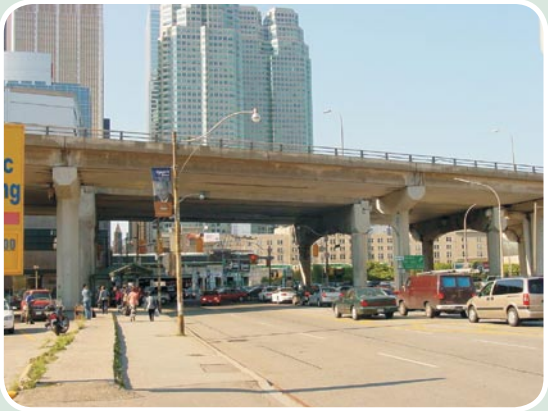
The expressway runs from Highway 427 to the Don Valley Parkway, along the edge of Lake Ontario. It was first planned in 1943, and construction began in 1955. The expressway was built in segments, with the last completed in 1966. The final segment of the freeway to be completed, from Don Valley Parkway to Leslie Street, was demolished in 2001. This takedown was finished on time and under budget, and this success encourages those now supporting removal of the remainder of the expressway. Currently about 40% of commuter trips to and from Toronto are made by private auto, and about a quarter of these travel on the Gardiner. However, transit's mode share for commuters has increased markedly in recent years.

The existing freeway has numerous problems. It is widely considered an eyesore, and the structure itself is outdated (maintenance currently costs about $12 million per year). Perhaps the most serious problem is that the expressway creates a barrier between Toronto and Lake Ontario.

In removing the structure, Toronto would seek to beautify the city and improve the sense of place in the neighborhoods near the roadway. It would seek to maximize the benefits of waterfront revitalization efforts, and would recognize the primary importance of transit as a key to the future growth of the city.

The Toronto Waterfront Revitalization Corporation (TWRC) has studied three options for the Gardiner/Lakeshore Corridor. One is to replace

Gardiner Expressway in Toronto



Source: Toronto Waterfront Revitalization Corporation

Possible outcomes for the Gardiner/Lakeshore Corridor

Do nothing ($12 million Canadian/year maintenance)

Replacement ($1.4 billion Canadian)

Retain and Ameliorate ($465 million Canadian)

Great Street ($490 million Canadian)

Source: Toronto Waterfront Revitalization Corporation

Similarities to Alaskan Way Viaduct

- A key travel route for the city
- A Barrier between the city and its waterfront
- Aging, inadequate infrastructure that would be costly to replace.

Differences from the Alaskan Way Viaduct

- Primarily a route for commuters into and out of the city, rather than a bypass

the expressway with a combination of an at-grade road, an express road on a rail embankment, and a four-lane tunnel. While this would not provide a consistent urban boulevard, it would eliminate the barrier effect of the existing elevated structure. It would cost approximately $1.4 billion.

A second scenario, which has been termed "retain and ameliorate" would attempt to reduce the barrier effect while retaining the existing elevated structure. It would improve north-south roadway connections, remove ramps, and add architectural enhancements to the structure. The estimated cost would be approximately $465 million.

The TWRC's preferred option, termed the "Great Street" option, is to remove most of the freeway and replace it with a Waterfront Boulevard. Even under this scenario, the portion of the freeway west of Spadina, its busiest section, would be retained. The total cost would be approximately $490 million.

Impacts

Models run in 2004 predicted that the "Great Street" option would increase travel times an average of three to four minutes during peak hours, and reduce speeds by 10 to 15 kilometers per hour. Through trips would be an average of two to seven minutes longer.

An analysis of the economic impact, also completed in 2004, found that the plan could generate $950 million (Canadian) in total spending, create 8,100 person-year of employment, and allow the city to avoid $120 million in spending for maintenance of the structure.

Models predict that level of service for autos would be somewhat reduced during the project's implementation, but that a reasonable level of service could be maintained. A key to reducing implementation impacts would be to build a replacement system before demolishing existing systems whenever possible.

The plan envisions that future growth can be accommodated through expanded public transit. This vision is consistent with the objectives described in the city's major planning documents (including its Official Plan, Central Waterfront Secondary Plan, and Ontario's Greenbelt and Growth Strategy.) There are currently 12 transit

projects underway and scheduled for completion by 2009, part of a $1 billion planned expansion of Toronto's GO transit system, which will allow for an increase of travel capacity far bigger than the capacity currently provided by the Gardiner.

In addition to expanded transit capacity, the Great Street plan envisions an upgraded street network. The most important such improvement is the extension of Front Street, which would have to be built before the freeway was removed. The Front Street Extension would be expected to carry 30% of all traffic bound for downtown, and accommodate movement in and out of the city for more than a third of the traffic that now uses the Gardiner. Planners have concluded that levels of service for autos would be unacceptable without this extension.

How is the Gardiner Expressway Similar to the Alaskan Way Viaduct?

Like the Alaskan Way Viaduct, the Gardiner Expressway is a major transportation corridor through downtown Toronto. While it serves primarily as a commuter route, rather than as a city bypass, the Gardiner shares with the Viaduct high traffic volumes and the fact that it is a barrier between the city and its waterfront. The Gardiner is also an aging piece of infrastructure and therefore inadequate to accommodate future growth without major new investment. Studies on the future of the Gardiner corridor have cited Seattle and its debate about Alaskan Way Viaduct as a peer city considering a similar set of issues.

Like Seattle, Toronto would have to couple the removal of its freeway with significant improvements to the street network, as well as major new investments in transit to accommodate future growth. In its planning documents and in its recent investment decisions, Toronto has already committed to expanded transit mode share for commuters as a key to its future.

Sources

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Case Studies

Park East Freeway – Milwaukee, Wisconsin

Background

In 2003, Milwaukee replaced its aging Park East Freeway, a mile-long elevated spur, with McKinley Avenue, a landscaped six-lane surface boulevard. The most important factor motivating the plan was the city's interest in encouraging redevelopment and reinvestment in the surrounding property.

Running from I-43 to downtown, the Park East Freeway was one section of a 1970s era plan to ring Milwaukee's central business district with an expressway. The expressway loop plan had raised significant opposition both from community activists and from elected officials when it began, and construction had been halted before the expressway could be extended to Lake Michigan. The Park East Freeway began operating in 1971, but because the other segments were never completed, it was underutilized. This spur divided the northern part of downtown from the rest of the central city, creating both a visual and a physical barrier and lowering property values on the surrounding land.

McKinley Avenue, a new at grade six-lane boulevard, is fully connected with the surrounding street grid. The county's Board of Supervisors approved a resolution endorsing the removal of the freeway in 1999, and Wisconsin governor Tommy Thompson dropped his initial opposition to the plan because of the facility's low traffic volume. Demolition began in 2002 and was completed in 2003 using federal ISTEA money, as well as local Tax Increment Financing. The county was the lead agency, and it worked in cooperation with the City of Milwaukee and the Wisconsin DOT.

Park East Freeway in Milwaukee Wisconsin

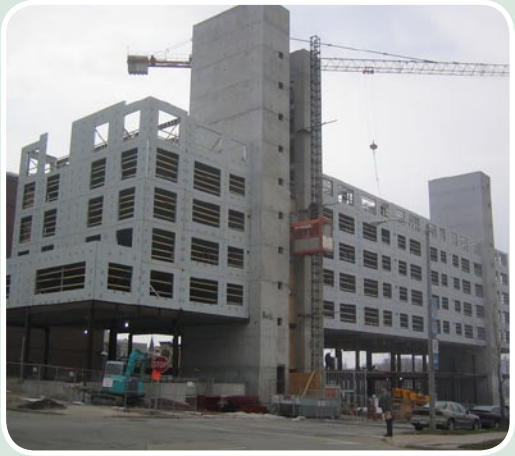
Source: Milwaukee Planning Department.

How is the case of Milwaukee similar to Seattle?

- Park East Freeway, like the Alaskan Way viaduct, created a major physical and psychological barrier in the heart of the central city.

In what ways is Milwaukee different from Seattle?

- As a spur and part of an incomplete freeway network, the Park East Freeway carried just 54,000 trips per day, significantly fewer than the Alaskan Way Viaduct.



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New development in Milwukee attributed to freeway removal.

One of the activists who led community opposition to the 1970s expressway plans, John Norquist, had been elected Mayor of Milwaukee in 1988, and was one of the city officials who supported the effort to remove the Park East Freeway. Norquist resigned as mayor in 2003 to become president of the Congress for New Urbanism, where he now serves.

The estimated cost to rebuild the aging freeway was $100 million. By contrast, the total cost of replacing it with McKinley Avenue was $25 million, about $20 million of which was paid with federal funds. The plan also allowed for other street modifications in the surrounding network, including the conversion of some streets from one-way to two-way operation to improve traffic flow.

Impacts

In 1999 the Park East Freeway carried 54,000 weekday trips, significantly fewer than the Alaskan Way Viaduct. Slightly more than half of these trips were through traffic, and the rest had origins or destinations in the central business district or immediately to its north. At the time, trips in 2020 were predicted to be 60,600 per week day, and the replacement of the expressway with a surface arterial was anticipated to reduce this total to 52,600. Roughly 24,000 trips would be diverted to surface arterial streets, and 8 to 11,000 trips would be diverted from uncongested conditions on the existing expressway to other, more congested freeways. The major negative impact was a somewhat reduced level of service for some motorists. In adopting the plan, the mayor and city council acknowledged this impact and proceeded because of the plan's other benefits.

The main objective of the plan, as adopted by the city and county, was the "promotion of development and redevelopment in the area of the Park East Freeway" (Amendment to the Regional Transportation Plan). The demolition of the freeway converted approximately 26 acres of right-of-way into land available for private development. The redevelopment area, which includes the old right-of-way as well as surrounding land, is now composed of roughly 28 traditional city blocks on 64 acres. Some previously divided streets have been reconnected, a new Knapp Street lift bridge

crosses the Milwaukee River, and the city's downtown Riverwalk has been extended.

The redevelopment area created three new neighborhoods: McKinley Avenue District (office, retail, and entertainment); Lower Water Street District (office and residential in addition to the existing residential); and Upper Water Street District (higher density residential). As of 2007, five projects totaling $340 million of investment are either under review or approved, and more have been proposed.

The plan did diminish the parking supply. Because the existing Park East Freeway had depressed the value of surrounding land, much of the adjacent property was used for surface parking lots. The elimination of the expressway encouraged development and raised land prices, which encouraged development on land that then provided approximately 2,400 surface parking spaces.

How is the Park East Freeway Similar to the Alaskan Way Viaduct?

The Park East Freeway, like the Alaskan Way Viaduct, created a major physical and psychological barrier in the heart of the central city. Also similar to the Viaduct, a significant amount of the traffic that traveled on the freeway was through traffic, although about half was central business district traffic. The key difference between the Park East Freeway and the Viaduct, however, is that the Park East Freeway carried significantly less traffic overall. Removal of the freeway, as a spur, did not create the same need to mitigate the significant traffic impacts as Seattle will experience when it removes the Alaskan Way Viaduct.

The key lesson for Seattle from the Park East Freeway removal project, therefore, is not in how to deal with traffic impacts, but in demonstrating the benefit of removing an elevated freeway for a surrounding community. The elimination of the freeway structure came at a much lower financial cost than rebuilding it, and allowed for a more complete street network, and a much improved neighborhood feel in the adjacent areas.

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