BACK TO THE FUTURE:

A History of Transit Planning in the Puget Sound Region





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The next several pages contain summaries of the six chapters that comprise Back to the Future. The full 180 page Back to the Future document has been published on LuLu Online in May, 2013, and is available on the flash drive submitted with this award application. Each chapter is an individual research report prepared by one of the students enrolled in the BE seminar in Fall 2011 and Winter 2012.

PROJECT DESCRIPTION

As these papers show, the history of transportation infrastructure development in the Puget Sound Region has been immensely complex, with multiple overlapping agencies implementing various modes of transportation and sometimes competing, rather than cooperating, in the provision of services to the region. Similarly, the agencies charged with implementing transportation facilities encounter a range of overlapping jurisdictions with different requirements for review and approval. Transportation agencies often present their planning and decision-making as a rational process depending on analyses of the distribution of residential populations and employment locations, and the most efficient allocation of resources to link home and work. However, political factors and funding limitations often interfere and shape decisions. Further the complex factors that go into computer modeling to estimate future travel demand can be based on assumptions that do not prove out once the transportation plans have been implemented. To give just one example, many of the urban rail systems planned in the 1970s were based on the assumption that costs for fossil fuels would continue to rise at rapid rates, but fuel costs actually dropped significantly after the early 1980s so the predicted ridership for the systems them coming on line was slow to materialize. Back to the Future presents the results of a CBE program under the name BE Labs. As explained on the CBE web site, "BE Labs expressly engage grand challenge problems, test novel methods, and promote rigorously transdisciplinary frameworks for research, instruction, and design inquiry."

The concept for this work originated when Christine Bae, Manish Chalana, Jeffrey Ochsner, Louisa Iarocci and Ann Huppert, discussed the lack of available information about the history of the development of the physical form of Seattle and surrounding communities. The discussion also touched on questions of how decisions were made that produced the network of transportation facilities that currently shape Seattle and the Puget Sound region. These faculty also generally agreed that the region has been significantly shaped by decisions about transportation infrastructure made over the last half century, yet information about how decisions were arrived at could not easily be found. Further, if one wanted to improve decision-making processes in the future, it would be difficult to learn from the past because information about the decision-making processes that created the present network of facilities would likely only be found in primary resources buried in various libraries and archives or in newspaper accounts that had never been researched.

Ultimately, knowledge of this history might provide a contemporary context for planning decisions that circumvents the political quagmire that too often seems to surround contemporary regional transportation planning.

OUTREACH

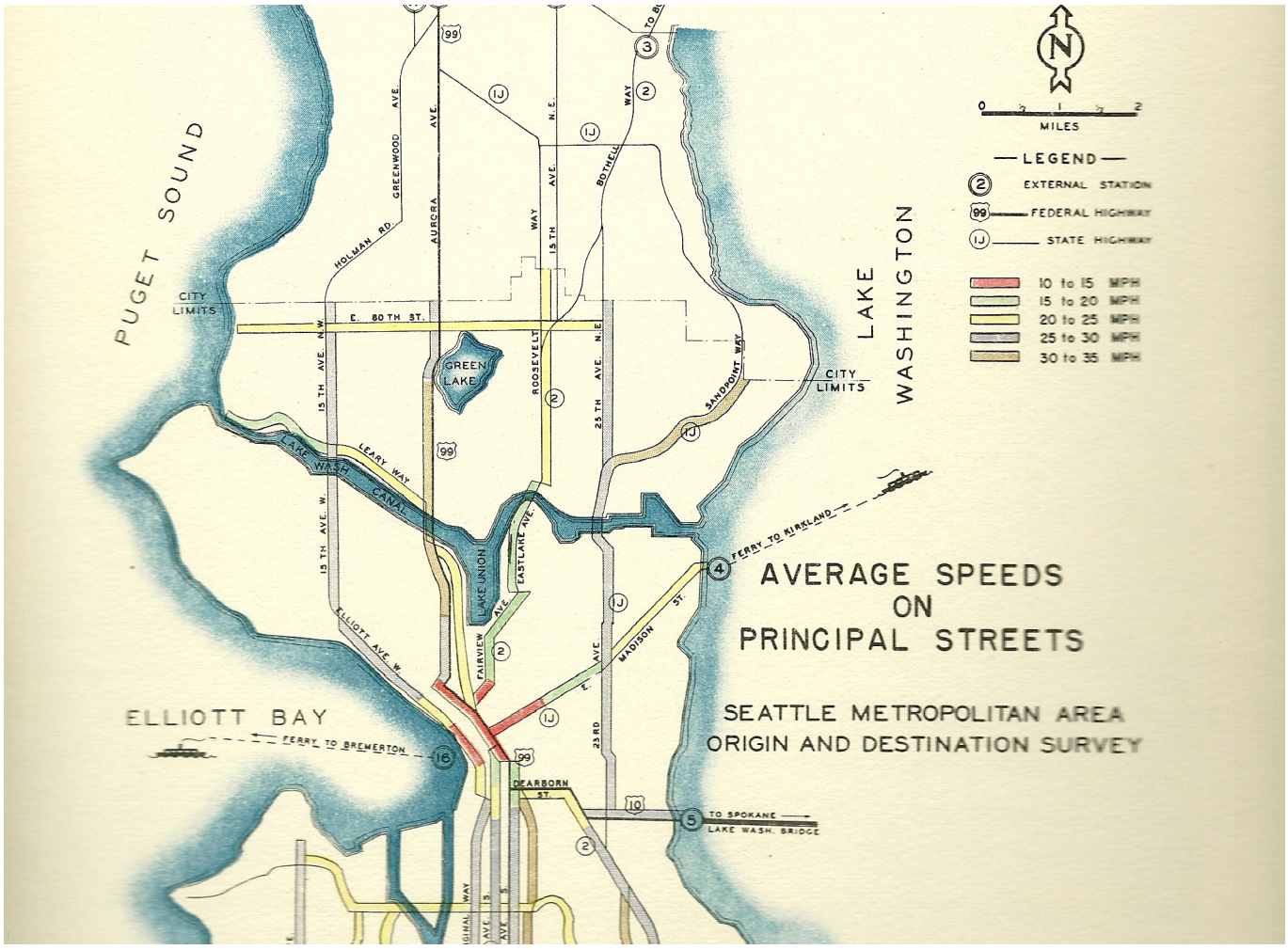
Each chapter drew heavily from a partnership that formed between graduate students, faculty, and practicing professionals. Several transit agency officials were interviewed at length about these topics, and their insights provided a useful perspective to the overall document. Direct quotes from these officials appear throughout the document. Twice during the process, an audience was invited to view presentations of student draft and final work. Feedback during these presentations was vital to the relevance of the work.

The Puget Sound Region made a bold move in 1996 when they, for the first time, elected to move ahead with a public transportation system that included rail and was something regionally oriented for moving people.
- Martin Young
Sounder Operations Manager,
Sound Transit

The Construction of Interstate 5: Downtown Seattle through the University District
by Kassandra Leingang

This chapter looks at two aspects of the development of the Interstate - 5 freeway through Seattle. The first part provides a historical review of the early studies and the decision-making process that led to the determination of the final route. The second part explores the impact of the construction of I-5, focusing on the section from downtown Seattle through the University District.

Over a thirty-year period beginning in the 1930s, the Washington State Highways Department (predecessor to today's Washington State Department of Transportation (WSDOT)), studied alternatives, chose an alignment, and constructed a north – south freeway through Seattle. Early studies were developed in response to increasing levels of vehicular congestion in Washington State, which had begun in the mid 1930s. Early analyses identified a need for an additional north-south highway through Seattle, but its alignment was initially undetermined. To answer this question, the Washington State Highways Department (WSHD) conducted a public origin and destination study in the mid 1940s. (Origin and Destination Survey, 1946). Both internal participants (residents of the Seattle metropolitan area) and external participants (people traveling, arriving, or traveling through but living outside of the Seattle metropolitan area) were included in the study. Along with this public survey, the Highways Department analyzed costs, counted volumes, examined geotechnical data, and evaluated land use impacts. By the early 1950s, the Highways Department selected the route that they believed would have the highest vehicular use, lowest cost, most acceptable soil conditions, and least objec



tionable land use impacts. (Seattle Freeway, its conception and development, 1958).

Initially it was thought that the new freeway would be constructed as a toll road and the Highway Department began making estimates of the cost of adding tolling facilities. In 1956, however, Congress passed, and the President signed, the Federal Aid Highway Act, creating the Interstate Highway system which provided a mechanism to fund the highway extending from Tacoma to Everett.

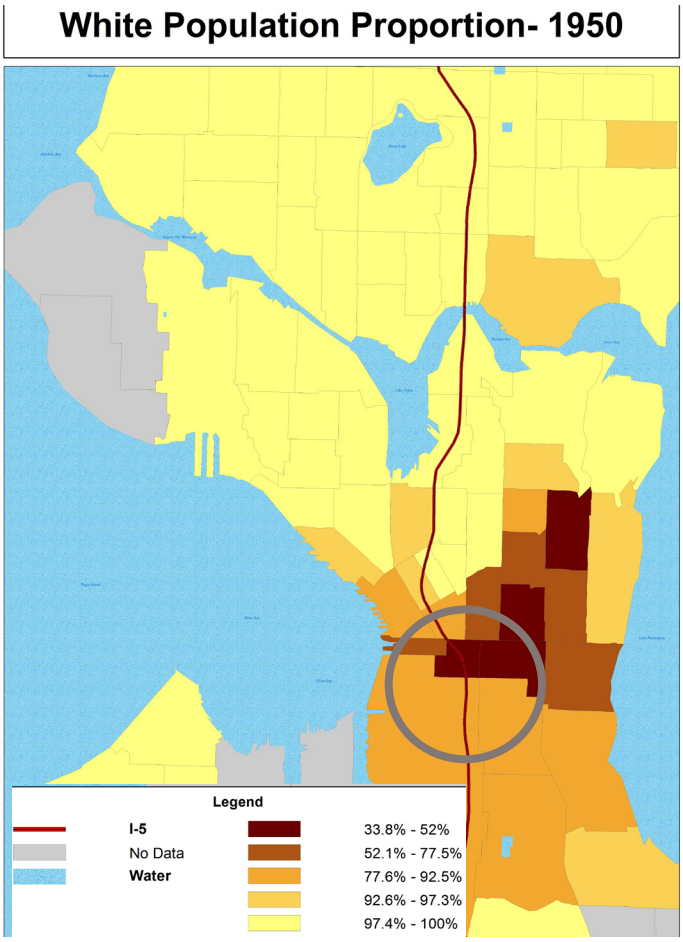
After the Federal Highway Act passed, the final design proposal outlined a 12 lane thoroughfare: 4 lanes in each direction and 4 reversible lanes (to add capacity in the peak direction at the peak time of day). This design was chosen despite the fact that the estimated 1975 peak hourly traffic volumes were above the design capacity. The decision was based on a cost-benefit determination that even if the 1975 peak traffic was above the highway capacity for an hour each day, it was not worth the additional cost of adding an additional lane to accommodate the extra vehicles. (Feasibility Report: Seattle Freeway, 1958) The final route selection was based on the lowest right-of-way acquisition cost with the highest expected vehicular use.

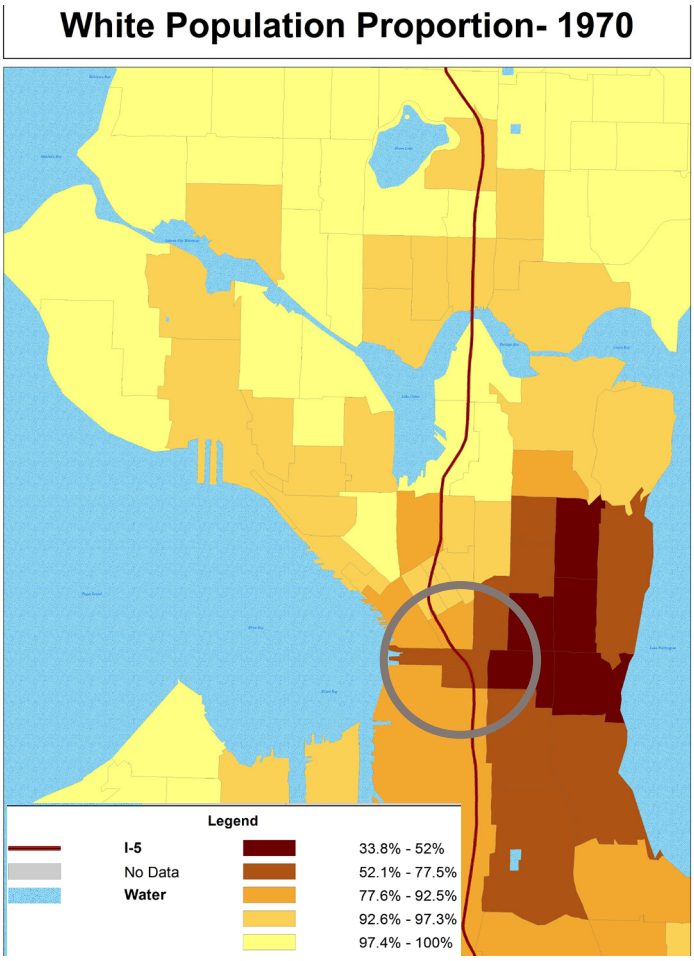
The construction of Interstate 5, from the late 1950s to the early 1960s, followed the design of 1958, a design based on studies extending back to the 1930s. (Seattle Freeway, its conception and development, 1958) Work began in 1958 with the construction of the high level Ship Canal Bridge. The highway was then extended north through the University District and finally south through downtown Seattle. The project was completed in the late 1960s.

An Historical GIS Examination of the Interstate-5 Corridor
by Scott Beckstrom

The development of the Interstate Highway System profoundly reordered the physical and social landscape of American cities. The post-war freeway orthodoxy produced substantial shifts in the natural and built environments, local and regional economies, degrees of mobility and accessibility, social cohesion and sense of place, among others. This research attempts to visualize the physical impact of the Interstate 5 corridor upon a 10-block study region in Seattle. Furthermore, it seeks to determine changes in city-wide census demographic trends attributable to highway construction. The use of historical GIS methodology is central in the pursuit of these research goals.

Historical GIS is found to be effective in visualizing the qualitative extent of spatial change across time. However, generating quality quantitative results from historical US Census data is less successful. The depth of this research effort does not approach the investment required to properly attribute spatial dependency between I-5 and demographic trends in statistically relevant manner. Despite this analytical shortcoming, historical GIS is found to be a valuable and increasingly important tool in constructing historical geographies.





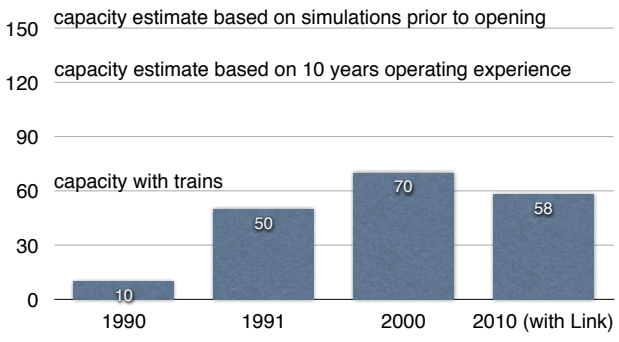
Seattle Bus Tunnel
by Oran Viriyincy

The Downtown Seattle Transit Tunnel carries buses and trains under congested downtown streets in a 1.3-mile long tunnel with five stations and connections at the ends to surface streets and freeways. The Municipality of Metropolitan Seattle (now King County Metro) opened it in 1990 to increase transportation capacity, speed and reliability; and improve the downtown urban environment without needing to build a rail system like the rejected 1970 Forward Thrust proposal. Downtown employment grew rapidly in the 1970s and 1980s, with transit handling the increased travel demand. This led to buses jamming downtown streets during rush hour, creating an unsightly "wall of buses" belching exhaust and noise, threatening downtown's vitality.

Due to problems with the unreliable Breda dual-mode buses and conservative planning and management, the tunnel was not used to its greatest potential. The elaborate signaling system was never implemented since the tunnel was greatly underused until joint bus-rail operations began in 2009. After that, the tunnel experienced issues with capacity and delays. Although the tunnel was said to be ready for future light rail service, changing technology and unusable tracks meant that the tunnel had to be closed for two years to prepare it for light rail.

Systemwide ridership projections made during the environmental review process were never met. Possible explanations include the crash in oil prices in the 1980s, recessions, and growth of suburban employment and population relative to the city, combined with a transit network oriented towards downtown commuters that no longer met the travel needs of a growing region. Only after years of stagnant per-capita ridership and new growth management policies did planners begin to restructure the transit system for all-day service between regional centers.

The planners and bus drivers who designed and operated the system had ideas for improving it but management was not willing to invest money and were afraid of too much change. Ideas like restructuring bus service were not fully embraced many years later, when the agency faced financial troubles. The tunnel, despite its flaws, was a visionary project that paved the way for a future light rail system while providing benefits to bus riders for years prior. There's much to be studied in greater detail than this paper can examine. Future research opportunities include case studies of the Breda vehicle procurement process, the effect of the two-year King County-Metro merger on planning and operations, and a what-if scenario of alternative route network design.



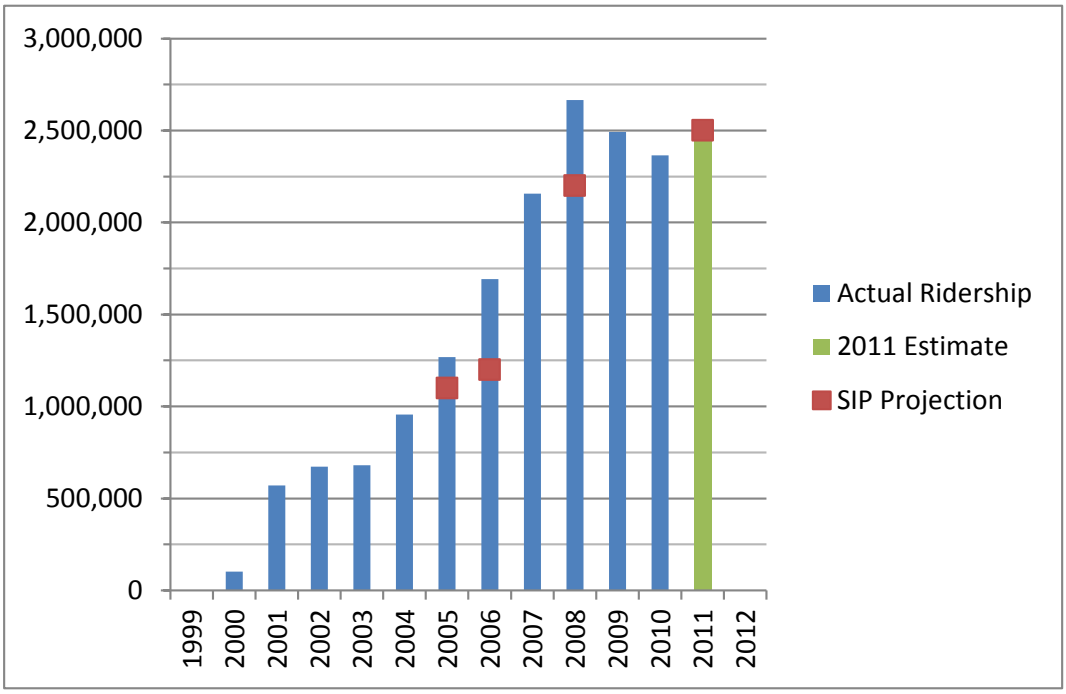
PM Peak buses / hour / direction (Sources: Sound Transit 2001 Joint Ops report and King County Metro Schodule Data)

Seattle Bus Tunnel Convention Place Station

Sounder Commuter Rail
by Brian Mann

In 1993, the Central Puget Sound Region Transit Authority, now known as Sound Transit, was created by voters in King, Pierce, and Snohomish counties and tasked with finding ways to manage and solve traffic congestion, especially related to commuter travel in the greater Puget Sound metropolitan area. Along with increasing the regional bus system and building a new regional light rail system, Sound Transit proposed to use freight rail tracks, already in place and transporting goods between some of the principal cities in the region, for a commuter rail system. This system would connect the major employment centers of Seattle, Tacoma, and Everett with residential communities along the route, including Puyallup, Auburn, Edmonds, and others. The goal was to provide an alternate means of travel into the major cities for residents of these suburban towns, so that they would not have to use the increasingly congested highway network during the peak periods.
By 1996, the Sound Move proposal had been approved by voters within the counties and work began on implementing the commuter rail lines, including negotiating the use of the freight tracks, improving the track and signal systems along the routes, constructing station facilities, and ordering the vehicles. General Motors EMD won the competition to supply the locomotives and Bombardier was selected to supply the cars and coach-cabs. The Burlington Northern Santa Fe (BNSF) Railway's tracks were selected as the route because they had better opportunities for station locations, and they had more potential capacity allowing a higher level of commuter rail service.

On Sunday, September 17, 2000, the system, now called "Sounder," had its inaugural run and that week it began regular passenger service on the Tacoma-Seattle line with two trains operating two round trips daily. On Sunday, December 21, 2003, the Seattle-Everett line had its first run with regular service starting the next day with two round trips daily. The lag between the



Annual operational ridership comparison, 2000 through 2011

deployments of the two lines was primarily a result of the north line route's proximity to the shore of Puget Sound which required a substantial amount of environmental work (Young, 2011). In an effort to bring service online as quickly as possible, Sound Transit focused on the south line between Tacoma and Seattle.

As Sounder grew more popular the ridership increased. Sound Transit, working with the BNSF, implemented a series of previously planned capacity improvements, including increasing the number of trains making round trips each day, running reverse routes, adding additional cars to the trains, and even running the trains on the weekends to serve special events. Through the contractual agreements with BNSF, these improvements were linked to capacity improvements made by the railroad company to the corridor in order to ensure that the faster moving commuter trains could be given priority over slower freight trains with little to no disruption of either passenger or freight service. However, since BNSF was also operating the Sounder trains for Sound Transit, it was mutually beneficial to increase service.

Today (2012), both Sounder lines are running at full, original contractual capacity and serving an average of 9,000 daily commuters through the first half of 2011 (Sound Transit, Quarterly Performance Report, Third Quarter 2011). By June of 2009 there were four daily round trips with three cars per train between Seattle and Everett, and nine daily round trips with seven cars per train between Seattle and Tacoma, including two reverse trips. See Figure 1.2 for a comparison of annual operational ridership between 2000 and 2011. One of the reasons for the growth and popularity of Sounder is its proven reliability, which to some commuters is more important

Peter de Lory © 2001 / Sound Transit

The Waterfront Line: A History of Streetcars in Seattle and on its Central Waterfront
by Andreas Pillar

The electric streetcar has had a prominent place in Seattle's transit landscape in various forms and locations intermittently for over a century. Seattle was an early adopter of the electric streetcar in 1889, and the enthusiastic efforts of competitive private developers helped to facilitate development in such once-distant neighborhoods as Madison Park, Woodland Park, Rainier Valley, and Ballard. Many of the routes operated by Seattle's first generation of streetcars continue to function as the city's major circulation routes today—most are now served by diesel or electric trolley buses, but current planning efforts also envision a network of modern streetcars retracing several of the historic routes.

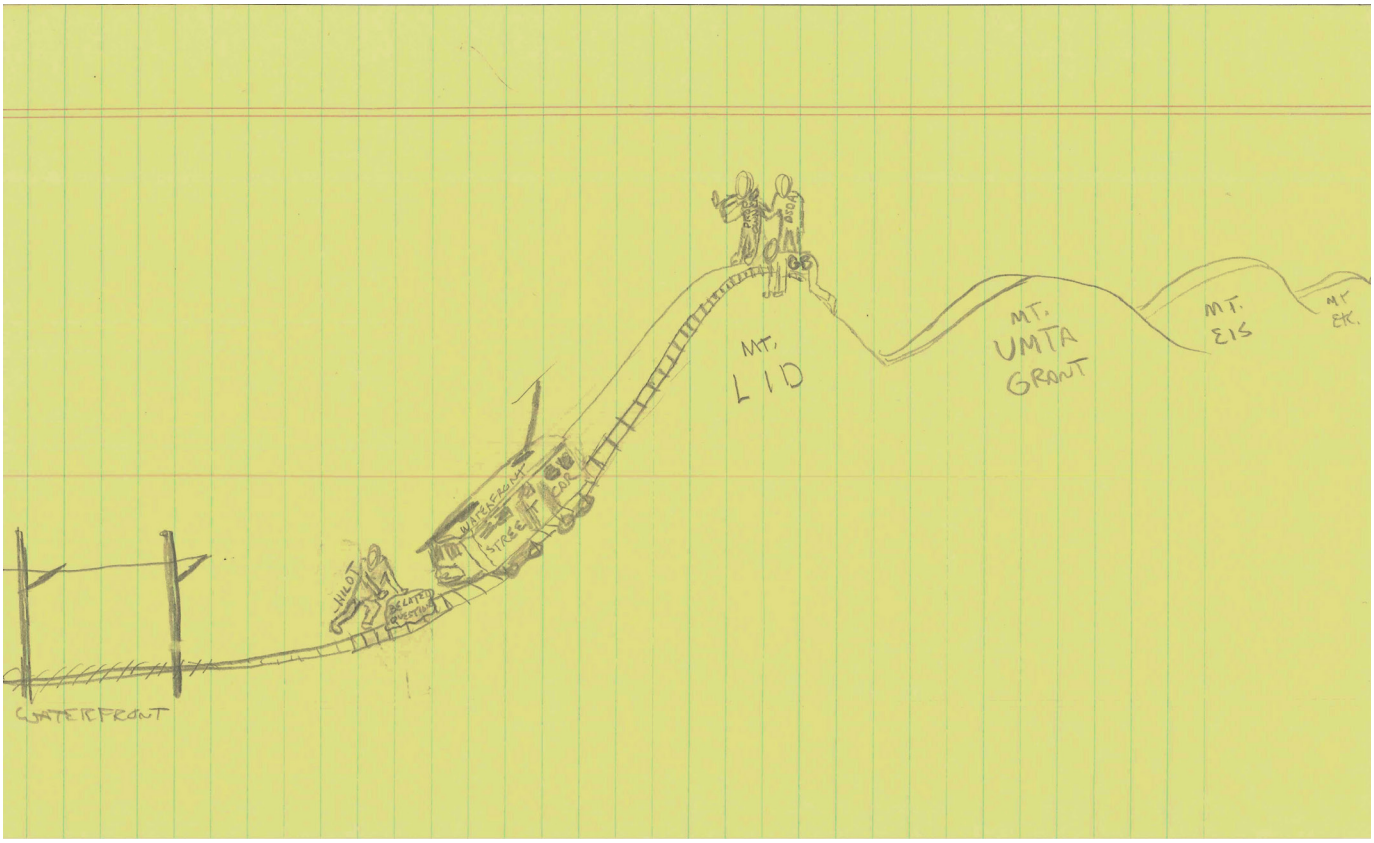
The first municipally-developed streetcar line in the country was built in West Seattle in 1902, which was annexed by Seattle only a few years later. Seattle began operation of its own first line in 1914, connecting downtown to Ballard, and voters approved a bond issue in 1918 for the construction of an elevated streetcar line on Railroad Avenue (now Alaskan Way), which served primarily to transport workers to shipping and canning industries along Seattle's waterfront. Meanwhile, the city's independently-operated lines were consolidated by a single national utility, and when political, financial, and regulatory factors lead to a decline in service quality and relations with labor unions and the public, Mayor Ole Hanson in 1919 negotiated the City's acquisition of the entire streetcar network for $15 million—estimated to have been three times the system's worth. Despite generally profitable operations, this overwhelming debt, among other factors, lead to the system's total deterioration. Against voters' wishes, the City began implementing the Beeler Organization's second modernization plan in 1939, and by 1941, the entire streetcar network had been removed and replaced with electric trolley buses.

By the 1970s, the character of Seattle's waterfront had shifted decisively from industry to tourism, entertainment, and housing. It was during this period of transformation that the concept of the Waterfront Streetcar was born. Councilman George Benson supported the idea and became its strongest and most active advocate, negotiating track leasing arrangements with Burlington Northern, personally selecting the vintage streetcars in Melbourne, and collecting signatures from area property owners for the creation of a local improvement district when public funding fell short and Council support grew weary. With the support—financial and otherwise—of local property owners and the public, Melbourne's vintage jade-and-cream trolleys became the first to operate on Seattle's streets in more than forty years in May 1982. Though initially conceived primarily as a novelty and attraction for tourism, by the late 1980s the line had come to be seen as an integral part of Metro's Downtown Seattle Transit Project, and service began on the line's extension through Pioneer Square to the International District Transit Tunnel Station in 1990. Additional line extensions were considered to the east and north in the early 2000s in conjunction with planning of the city's first modern line and potential future network, but none of the extensions came to fruition.

The modern streetcar concept did gain traction, however, both with city officials and property owners in the redeveloping South Lake Union neighborhood. In 2003, Mayor Greg Nickels formally proposed running a modern streetcar between Westlake Center and Lake Union, largely retracing one of the city's most

well-used original streetcar lines. A local improvement district was formed in 2005 to levy approximately half of the capital cost of the $50 million line; service began on Westlake Avenue by December 2007, and annual ridership has exceeded projections ever since. Voter approval of the Sound Transit 2 ballot measure in 2008 set in motion the on-going development of the city's second modern line, the First Hill Streetcar, which is expected to begin service in early 2014. Several additional potential lines are currently in the conceptual planning phase, including routes to Fremont, Ballard, and the University of Washington, each of which closely approximate routes previously served by Municipal Street Railway cars decades ago.

While planning of the South Lake Union Streetcar moved swiftly from concept to construction between 2003 and 2006, the Waterfront Streetcar was removed from service indefinitely in 2005 when its maintenance barn was demolished to allow for the construction of the Olympic Sculpture Park. Plans for a replacement facility dissolved during the 2008 financial crisis, so the vintage Melbourne streetcars remain in a warehouse awaiting their ultimate fate. A waterfront line remained a part of SDOT's transit network plans through 2007, but some public officials have since expressed greater interest in a potential First Avenue Streetcar instead. However, with the Alaskan Way Viaduct slated for demolition in 2016 and the Central Waterfront set to undergo a grand redevelopment, the opportunity exists to put Seattle's vintage streetcars to some form of honorable use or public display. Will future patrons of Seattle's Central Waterfront have to wait decades before tracks can be re-laid along the Benson Line's former route, or will the service be reinstated as an homage to the waterfront's recent and more distant past and to Seattle's storied streetcar history?



Drawing believed to be by George Benson of the many hurdles to realizing the Waterfront Streetcar. (Courtesy of the the Seattle Municipal Archives, George Benson Subject Files.)