Westside Express Service Rail Project Before-and-After Study (2013)

Portland, Oregon

U.S. Department of Transportation

Federal Transit Administration

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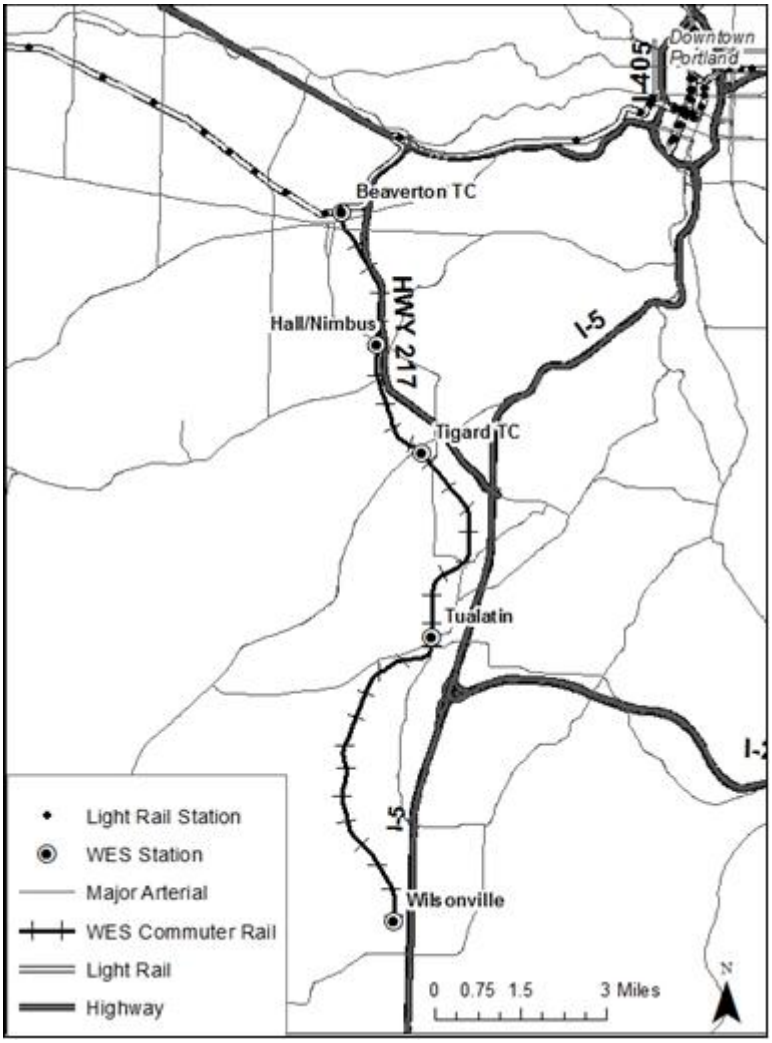
Wilsonville to Beaverton Commuter Rail Project; Washington and Multnomah Counties, Oregon

The Wilsonville to Beaverton Commuter Rail project established commuter rail service in an existing railroad corridor between Beaverton and Wilsonville, Oregon. The line is known as the Westside Express Service, or WES. At its northern terminus at the Beaverton Transit Center, WES connects with the Portland area's light rail system. WES is the first commuter rail line in the Portland area. The accompanying figure is a map of the project and the corridor it serves.



The "Westside Express Service" Commuter Rail Line

Commuter rail service in the corridor was conceived and planned by Washington County as an "exempt" project proposed for less than $25 million in New Starts funding. After the project advanced into preliminary engineering (PE), the Tri-County Metropolitan Transit District (TriMet) assumed the management of its development and construction. The Portland and Western Railroad (PNWR) operates WES under an operating agreement with TriMet.

The project entered PE in August 2001, and entered final design (FD) in May 2004. The Federal Transit Administration (FTA) and TriMet executed a Full Finding Grant Agreement (FFGA) for the project in October 2006, and an amended FFGA in November 2008. WES opened for revenue service in February 2009.

Physical scope of the project

WES commuter rail operates on 14.7 miles of track between Beaverton and Wilsonville. In Beaverton, WES operates on 0.5 miles of new, in-street, at-grade track connecting the Beaverton Transit Center station with the right-of-way of the Portland and Western Railroad (PNWR). For the remaining 14.2 miles to Wilsonville, WES shares the single track PNWR right of way with freight operations. The project refurbished the existing track, added a 3,000-foot passing track, replaced or modified 13 railroad bridges, installed a cab signal system and central train control, and upgraded the signals at 29 grade crossings to current safety standards.

The project built five passenger stations, four with park-and-ride lots with a total of 700 spaces, and purchased a vehicle fleet of three diesel multiple units (DMUs) and one unpowered passenger car. (TriMet subsequently used local funds to purchase two additional self-powered vehicles needed as spares for WES operations.) Stations accommodate 2-car trains with high platforms that provide level boarding for their full lengths. The project also funded an agreement with PNWR for shared use of its track, the realignment of the 0.5-mile street segment in Beaverton, and acquisition of property for the street realignment and construction of the park-and-ride lots. The new maintenance and storage facility near the Wilsonville station supports the current 6-vehicle fleet and has sufficient capacity for two additional vehicles.

The anticipated scope of the project through planning and project development was quite consistent with the as-built project in terms of its alignment, number of stations, and termini. Adjustments occurred in the planned vehicle fleet (reduced from six to four vehicles during preliminary engineering in order to reduce costs) and the location of the Washington Square station (moved 0.6 miles during final design to a location that permitted the addition of a park-and-ride lot but provided less direct pedestrian access to adjacent commercial areas).

More significant changes occurred in the scope of work to upgrade the existing PNWR track. Initial plans called only for basic repair, including the welding and surfacing of existing tracks and replacement of deteriorated railroad ties only (estimated at about one-third of all railroad ties). The negotiated shared-use agreement with PNWR and subsequent amendments required the full re-construction of the roadbed, improvements to an operating rail dispatch center in Albany, Oregon, installation of on-board cab signals on all existing freight locomotives that may operate in the corridor, and installation of new rail over the 14.2 miles of shared track.

Scope modifications continued after the FFGA, including roadway traffic-flow and safety improvements at crossings and stations, fencing and pedestrian crossings, enhancements to the 0.5-mile street-running segment in Beaverton, and utility relocation throughout the alignment.

Capital cost

The actual cost of the project was $162.0 million in year-of-expenditure (YOE) dollars. Some 68 percent of total costs were incurred for physical facilities (guideway, structures, and stations – 41 percent; vehicles – 13 percent; systems – 10 percent, and the maintenance facility – 3 percent). An additional 24 percent of total costs were for engineering and design. The average cost per mile was $11.0 million including all costs.

The YOE predictions of capital costs at the project development milestones consistently underestimated actual costs. The predicted cost at PE-entry was $84.8 million (-48 percent); at FD-entry $103.5 million (-36 percent); and at the FFGA $117.3 (-28 percent). The principal cause of these underestimates was the continuing evolution of negotiated requirements to upgrade the freight rail line to permit shared use by commuter rail trains. The PE-entry prediction assumed only modest upgrades. The initial agreement with PNWR, signed late in preliminary engineering, informed the cost predictions at FD-entry and the FFGA but continued to evolve throughout final design and after the FFGA execution. The largest unanticipated costs were for retrofitting PNWR fleet of locomotives for the updated train control system, track bed rehabilitation for the entire corridor, and unanticipated property acquisition costs associated with park-and-ride access and access closures. The complex nature of property acquisitions, freight

railroad negotiations, and intergovernmental coordination resulted in higher than expected project management and legal services.

Comparisons in constant dollar terms that remove the effects of inflation suggest that unanticipated inflation caused 25 percent of the YOE-dollar underestimates at PE-entry and FD-entry, and 18 percent of the YOE-dollar underestimate at the FFGA. Consequently, unanticipated scope items and the added complexity of upgrading the freight railroad corridor contributed the other 75 to 82 percent. Unanticipated inflation effects arise with lengthening schedules for project development and construction and with higher than expected annual rates of inflation. The cost predictions for WES experienced both causes. At PE-entry in August 2001, the schedule anticipated project opening in September 2004; by FD-entry in May 2004, the anticipated opening had moved to September 2007; and by the FFGA in October 2006, it was November 2008. Much of this slippage was caused by the increasing complexity of the project scope. Part was caused by the project's increasing costs and the need to seek a larger amount of FTA capital funding. This larger funding request meant the project could no longer be "exempt" from FTA's rating and evaluation process for major capital grants. The evaluation process required additional time for FTA reviews of cost estimates and ridership forecasts as well as adjustments by TriMet to the project scope to control costs and to meet FTA cost-effectiveness requirements. Difficulties with the vehicle manufacturer added several months at the end of the schedule – not affecting construction costs but causing FTA and TriMet to execute an amended FFGA solely to reflect the delay in project opening.

Annual rates of inflation in construction costs were higher than expected both nationally and in the Portland area during this period as steel, concrete, and labor prices were driven by the global economy and weather events in the United States. Between FD-entry in 2004 and the FFGA in 2007, for example, inflation in construction prices was 23 percent, well above the inflation projected by TriMet and other project sponsors during that interval.

Transit service

On weekdays, WES trains depart every 30 minutes in each direction between 5:30 am and 9:30 am, and again between 3:00 pm and 7:00 pm. The service does not operate at other times of the day or on weekends. End-to-end runtime is 27 minutes (33 mph), including dwell times at stations and the 10 mph street-running segment in Beaverton. On-time performance has averaged 98 percent since service began. This performance reflects a provision in the operating agreement between PNWR and TriMet that gives PNWR a financial incentive to maintain monthly average on-time performance of 98 percent or better. In FY 2011, incentive payments totaled $265,000. PNWR has largely shifted freight operations in the corridor to times outside of the peak-period-only WES operations.

At the Beaverton Transit Center, WES has a cross-platform connection to the MAX light rail system that provides service every six minutes to points east, including downtown Portland, and every 10 minutes to points west. Eleven connecting bus routes provide 30 departures per hour. Bus connections are available at all other WES stations: Hall/Nimbus (two routes with four departures per hour); Tigard Transit center (five routes, 14 departures per hour); Tualatin (one route, two departures per hour); and Wilsonville (seven routes, 14 departures per hour). Bus services in the Wilsonville area were reconfigured with the opening of WES so that all bus routes stop at the Wilsonville station. Soon after WES opening, the national economic recession caused a downturn in payroll-tax revenues that support TriMet operations – leading to modest

reductions in bus services in the corridor. These reductions largely focused on off-peak periods and therefore have not affected connections with the peak-period-only WES schedule.

Service plans prepared during project development accurately anticipated actual WES service levels. The only significant difference was that the plans included no significant changes to bus services in the corridor, while the actual outcome included a restructuring of bus service in the Wilsonville area to connect all routes to the Wilsonville WES station.

Operating and maintenance costs

WES commuter rail service operates under an agreement between TriMet and PNWR. TriMet maintains vehicles and facilities, including stations and park-and-ride lots. PNWR operates the commuter rail trains, provides dispatch functions, carries the operating insurance, and maintains the right-of-way. Commuter rail services cost approximately $5.9 million to provide in FY 2011 – approximately $3.9 million in PNWR provided services and just over $1.9 million in TriMet services, materials, and supplies. Commuter rail service represented two percent of all TriMet O&M costs in FY 2011. The opening of WES had no significant impacts on bus O&M costs in the corridor.

Predictions of WES O&M costs at the project development milestones underestimate the actual outcome. Predictions of costs for PNWR cost centers understated actual costs by $1.3 to $1.4 million, primarily because of underestimates of costs for train operations and, to a smaller degree, insurance. Predictions of costs for TriMet cost centers overstated actual costs by $0.4 to $0.5 million, yielding underestimates of total annual O&M costs for WES of roughly $1 million.

Ridership

Over the first two years of operation, WES ridership grew from 1,200 trips to 1,600 trips. Ridership continues to grow, reaching 1,700 trips per day in 2012, all over a period when financially driven reductions in TriMet services led to no growth in system-wide ridership. Three-quarters of WES riders are traveling between home and work. Some 45 percent of riders report that they have no car available for the trip. Only 21 percent of riders parked at a WES park-and-ride station while another 10 percent parked on other transit routes (primarily at MAX light rail stations) and transferred to/from WES. Aggregate usage of the four WES park-and-ride lots averages 45 percent with no lot exceeding 75 percent of capacity; some of the parking utilization is by cars parked by riders boarding buses at WES stations. Among all WES riders, 52 percent make one transfer and 32 percent make two or more transfers to complete their trips; only 16 percent require no transfer.

Nearly half (48 percent) of all WES riders travel from residences in and near the WES corridor to destinations within the corridor. Another 32 percent travel from those same residential areas to other destinations on the Westside including 16 percent to Westside areas east of the corridor, 13 percent to areas west of Beaverton extending to Hillsboro, and 4 percent to outlying areas. Only 12 percent of WES trips are to downtown Portland and 7 percent are to areas east of downtown and the Willamette River. The small market to downtown Portland and the Eastside reflect the substantial TriMet express-bus service from the southern parts of the corridor directly to downtown. This service captures most of the travel market to downtown and the Eastside. Consequently, WES primarily serves north-south travel between parts of the Westside. It competes effectively in this generally suburban market where it provides a transit alternative

with travel-times competitive with travel on Highway 217, which is heavily congested throughout the peak periods.

Overall transit ridership in the WES corridor increased by approximately 1,000 trips per day suggesting that roughly 60 percent of WES riders are new to transit while 40 percent have shifted from buses to WES.

Ridership predictions during project development focused on the horizon-year forecasts used in FTA evaluations of proposed projects. Predictions of opening-year ridership were interpolated from the horizon-year forecasts. Opening-year predictions were 2,400 at PE-entry, 2000 at FD-entry, and 1,600 at the FFGA. The latter two predictions reflected a "likelihood analysis" required by FTA that reduced the number of predicted WES rider in travel markets where the generation of commuter rail trips appeared to be less likely. These markets included travelers from households with a car for each adult worker whose WES trips would involve both park-and-ride access and two or more transfers to reach their destination. The net effect of the likelihood analysis was to reduce total opening-year WES ridership by 20 percent. The interpolated opening-year predictions at all three milestones are reasonable representations of the actual 1,600 riders two years after project opening; the FFGA prediction matches the actual ridership outcome exactly.