Exhibit No. ___ (KH-11)
Dockets TR-100127,
TR-100128, TR-100129, and
TR-100131 (*consolidated*)
Witness: Kathy Hunter

BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION, Petitioner, v. CENTRAL PUGET SOUND REGIONAL TRANSPORTATION AUTHORITY AND THE CITIES OF LAKEWOOD AND DUPONT, Respondents.	DOCKETS TR-100127, TR-100128, TR-100129, and TR-100131 (*consolidated*)

EXHIBIT TO

TESTIMONY OF

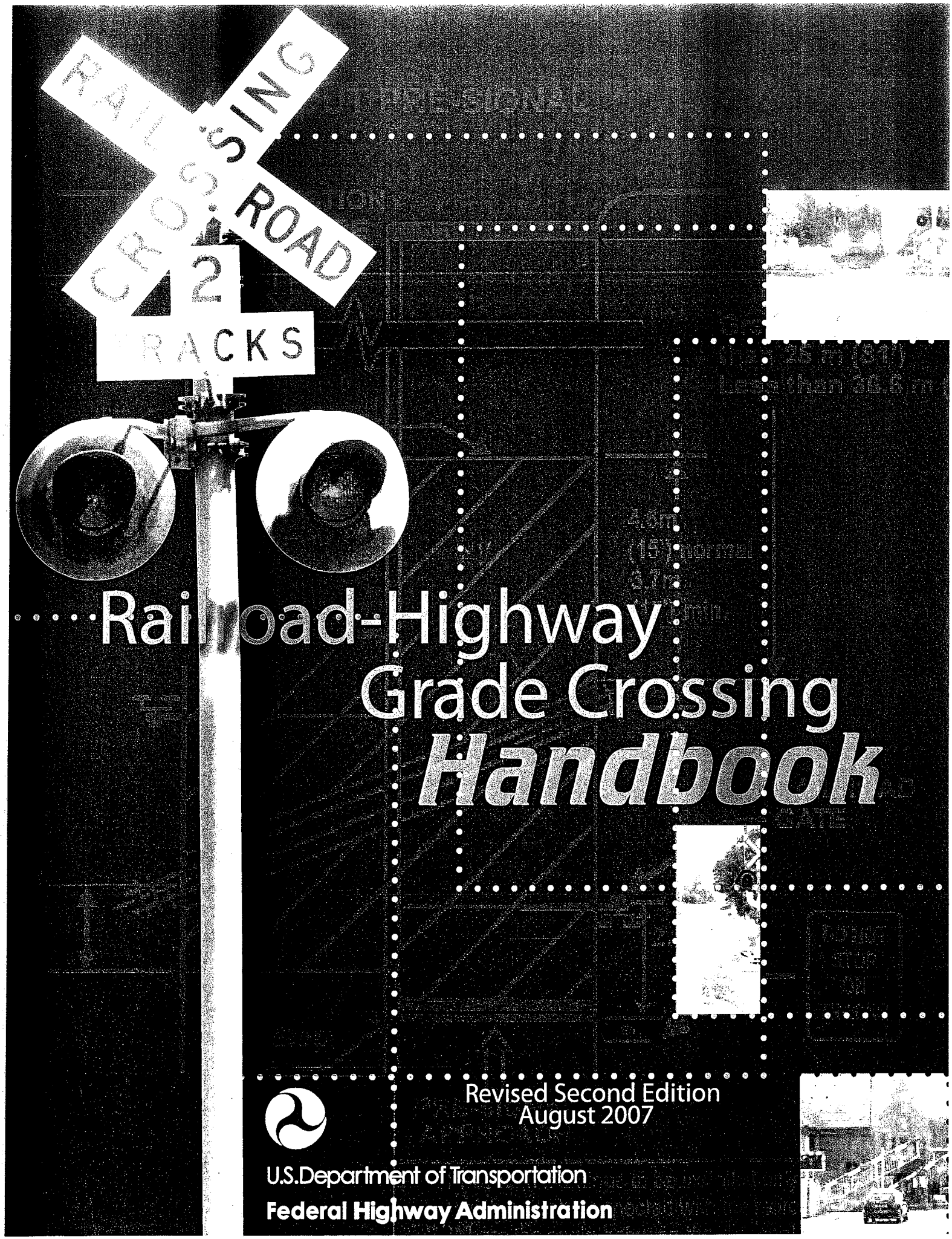
KATHY HUNTER

STAFF OF

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

U.S. Department of Transportation
Railroad-Highway Grade Crossing Handbook (excerpt)

May 7, 2010



Railroad-Highway Grade Crossing Handbook

Revised Second Edition
August 2007

U.S. Department of Transportation
Federal Highway Administration

Costs of eliminating crossings depend on whether the crossing is merely closed to highway traffic, a grade separation is constructed, or the highway or railroad is relocated. These costs are discussed along with other considerations for each type of elimination alternative.

C. Grade Separation

The decision to grade separate a highway-rail crossing is primarily a matter of economics. Investment in a grade-separation structure is long-term and impacts many users. Such decisions should be based on long-term, fully allocated life-cycle costs, including both highway and railroad user costs, rather than on initial construction costs. Such analysis should consider the following:

- Eliminating train/vehicle collisions (including the resultant property damage and medical costs and liability).
- Savings in highway-rail grade crossing surface and crossing signal installation and maintenance costs.
- Driver delay cost savings.
- Costs associated with providing increased highway storage capacity (to accommodate traffic backed up by a train).
- Fuel and pollution mitigation cost savings (from idling queued vehicles).
- Effects of any "spillover" congestion on the rest of the roadway system.
- Benefits of improved emergency access.
- Potential for closing one or more additional adjacent crossings.
- Possible train derailment costs.

Specific recommendations for grade separation are contained in the FHWA Technical Working Group report in Chapter V.

A recently released report entitled *Grade Separations—When Do We Separate* provides a stepwise procedure for evaluating the grade-separation decision.[75] The report also contains a rough screening method based on train and roadway vehicular volumes. However, as pointed out in the report, the screening method should be used with caution and should be calibrated for values appropriate for the particular jurisdiction.

75 Nichelson, Jr. , G. Rex and George L. Reed. *Grade Separations—When Do We Separate.* 1999 Highway-Rail Grade Crossing Conference. Texas Transportation Institute (TTI), College Station, Texas, October 17–19, 1999 (www.tti.edu or www.tamu.edu).

Recent publications include a methodology reflecting safety and economic factors applied in Israel;[76] a grade-separation policy for light-rail train crossings with specific highway operational, safety, and rail transit operational criteria adopted by the Los Angeles Metropolitan Transportation Authority;[77] a methodology applied in central Arkansas that considered use of seven quantitative factors: noise, community cohesion, delay, accessibility, connectivity, geographic distribution, and safety;[78] and a methodology by Nichelson and Reed presented at the 2001 National Highway-Rail Grade Crossing Safety Conference.[79]

D. Highway and Railroad Relocation

Other alternatives to highway-rail grade crossing problems are relocation of the highway or railroad or railroad consolidation. These alternatives provide a solution to other railroad impacts on communities; however, the costs associated with relocation or consolidation can be quite high.

Railroads provide advantages and disadvantages to communities. They generate employment opportunities for local citizens, provide transportation services to local industries and businesses, and are a source of tax revenue to government agencies. The presence of railroads in communities can impose some disadvantages, such as vehicular delay and safety concerns at highway-rail grade crossings. In addition, the presence of railroads may impose noise and other environmental concerns upon the community. Railroad relocation to the outer limits of the community may be a viable alternative for alleviating these concerns while retaining the advantages of having railroad service. Relocation generally involves the complete rebuilding of railroad facilities. This not only requires track construction but also acquisition of right of

76 Gitelman, Victoria, A. Shalom Hakkert, Etti Doveh, and Ayala Cohen. "Screening Tools for Considering Grade Separation at Rail-Highway Crossings." *Journal of Transportation Engineering* (January 2006).

77 Ogden, Brent D. "Los Angeles Metropolitan Transportation Authority Grade Crossing Policy: Reducing Uncertainty And Defining Scope And Cost For Light Rail Transit/Roadway Crossings." Proceedings, American Public Transportation Association Light Rail Conference, Miami, Florida, 2004.

78 Schrader, M.H. and J.R. Hoffpauer. "Methodology For Evaluating Highway-Railway Grade Separations." *Transportation Research Record*, No. 1754, Traffic Control Devices, Visibility, and Rail-Highway Grade Crossings, 2001.

79 TransTech Group, Inc., G. Rex Nichelson, and George Reed. "A Procedure for the Provision of Highway-Railroad Grade Separations." 2001 National Highway-Rail Grade Crossing Safety Conference sponsored by TTI, College Station, Texas, April 2001.

iii. locations where train crews are routinely required to stop their trains because of cross traffic on intersecting rail lines or to pick up or set out blocks of cars or switch local industries en route.
iv. switching leads at the ends of classification yards.
v. where trains are required to "double" in or out of yards and terminals.
vi. in the proximity of stations where long distance passenger trains are required to make extended stops to transfer baggage, pick up, or set out equipment or be serviced en route.
vii. locations where trains must stop or wait for crew changes.

6. Grade Separation

a. Highway-rail grade crossings should be considered for grade separation or otherwise eliminated across the railroad right of way whenever one or more of the following conditions exist:

i. The highway is a part of the designated Interstate Highway System.
ii. The highway is otherwise designed to have full controlled access.
iii. The posted highway speed equals or exceeds 113 km/hr. (70 mph).
iv. AADT exceeds 100,000 in urban areas or 50,000 in rural areas.
v. Maximum authorized train speed exceeds 177 km/hr. (110 mph).
vi. An average of 150 or more trains per day or 300 million gross tons per year.
vii. An average of 75 or more passenger trains per day in urban areas or 30 or more passenger trains per day in rural areas.
viii. Crossing exposure (the product of the number of trains per day and AADT) exceeds 1 million in urban areas or 250,000 in rural areas; or
ix. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 800,000 in urban areas or 200,000 in rural areas.
x. The expected accident frequency for active devices with gates, as calculated by the U.S. DOT Accident Prediction Formula including five-year accident history, exceeds 0.5.
xi. Vehicle delay exceeds 40 vehicle hours per day.[1]

b. Highway-rail grade crossings should be considered for grade separation across the railroad right of way whenever the cost of grade separation can be economically justified based on fully allocated life-cycle costs and one or more of the following conditions exist:

i. The highway is a part of the designated National Highway System.
ii. The highway is otherwise designed to have partial controlled access.
iii. The posted highway speed exceeds 88 km/hr. (55 mph).
iv. AADT exceeds 50,000 in urban areas or 25,000 in rural areas.
v. Maximum authorized train speed exceeds 161 km/hr. (100 mph).
vi. An average of 75 or more trains per day or 150 million gross tons per year.
vii. An average of 50 or more passenger trains per day in urban areas or 12 or more passenger trains per day in rural areas.
viii. Crossing exposure (the product of the number of trains per day and AADT) exceeds 500,000 in urban areas or 125,000 in rural areas; or
ix. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 400,000 in urban areas or 100,000 in rural areas.

1 *Guidance on Traffic Control Devices at Highway-Rail Grade Crossings.* Washington, DC: Federal Highway Administration (FHWA), Highway/Rail Grade Crossing Technical Working Group, November 2002.