

## National Highway System (NHS) Freight Connectors

NHS freight connectors are the public roads that connect major intermodal terminals to the highway network. They are critical components of our transportation system and important conduits for the timely and reliable delivery of goods and services. Hence, it is important to evaluate the condition and performance of intermodal connectors and their related investment needs. Highlights of two FHWA studies on the condition of NHS freight connectors and needed improvements are discussed here.

Public roads leading to major intermodal terminals are designated NHS connectors by the U.S. Department of Transportation, in cooperation with state departments of transportation and metropolitan planning organizations (MPOs). Several criteria are considered, including the level of activity of an intermodal terminal and its importance to a state's economy. There are 517 freight-only terminals and 99 major airports that handle both

passengers and freight. These 616 intermodal freight terminals are connected to the NHS by 1,222 miles of connectors (Table 1).

Although intermodal connectors account for less than 1 percent of total NHS mileage, they handle large volumes of trucks moving goods between terminals and the NHS or other modes. Intermodal connectors also support defense mobilization and national security. Because of the military's increasing reliance on commercial transportation to move supplies and personnel, intermodal linkages to ports and airports have become an integral part of national defense planning.

NHS freight connectors are typically located in older, industrialized and mixed land use areas that are subject to physical constraints. They usually average less than two miles in length and have lower design standards than mainline NHS routes (primarily Interstates and arterials). FHWA found that freight connectors are in poorer condition than NHS routes, which can slow freight movement, damage goods in transit, decrease efficiency, and negatively affect safety. Specifically, FHWA's *NHS Intermodal Freight Connectors* report found:

- Connectors to marine ports have twice the percentage of mileage with pavement deficiencies compared to non-Interstate routes.
- Connectors to rail terminals had 50 percent more mileage in the deficient category than non-Interstate routes.
- Connectors to airport and pipeline terminals appeared to be in better condition, with about the same percentage of mileage with pavement deficiencies as those on non-Interstate NHS routes.
- The most frequently cited deficiencies were problems with shoulders, inadequate turning radii, and inadequate travel way width.

This 2000 report to Congress, based on an inventory conducted in 1998, did not include an assessment of needed improvements or investment requirements. FHWA initiated a follow-on effort to develop an estimate of investment needs for NHS freight connectors based on the identified deficiencies. Table 2 shows connector deficiencies and the type of improvement needed.

Table 1. NHS Connector Mileage

Function Class	Mileage
<b>Total Rural and Urban</b>	<b>1,222</b>
<i>Rural</i>	219
Interstate	5
Other principal arterial	32
Minor arterial	57
Major collector	88
Minor collector	7
Local	30
<i>Urban<sup>a</sup></i>	1,004
Interstate/Expressway	89
Other principal arterial	438
Minor arterial	294
Collector	117
Local	66

Note: Numbers do not add to total due to rounding.

<sup>a</sup>Urban encompasses facilities within an FHWA-adjusted Census urbanized area (UA). A UA is an area of 50,000 people or more with a minimum population density. Census UAs are adjusted to include additional areas, such as airports, satellite cities/towns, and strip developments adjacent to high-use roadways, that are important to or serve the urbanized area and, in some cases, land that will become urban in the near future (3-5 years).

**Table 2. Deficiencies and Improvements Needed**

Identified Deficiency and Improvement Needed	Mileage		
	Rural	Urban <sup>a</sup>	Total
<b>Capacity Needed</b>	<b>39</b>	<b>362</b>	<b>401</b>
Major reconstruction	7	75	82
Major widening	32	287	319
<b>Lane Widening</b>	<b>29</b>	<b>81</b>	<b>110</b>
Minor reconstruction	10	29	39
Minor widening	19	52	71
<b>Pavement Work</b>	<b>114</b>	<b>356</b>	<b>470</b>
Reconstruction	24	46	70
Resurface shoulders	63	159	222
Resurface	27	151	178
<b>No Action Needed</b>	<b>62</b>	<b>181</b>	<b>243</b>

Note: Numbers do not add to 1,222 miles due to rounding.

<sup>a</sup>See Table 1 for definition.

The principal findings of the needs analysis are:

- Nearly one-third of total connector miles were judged to be in need of additional capacity.
- Approximately 38 percent of connector miles needed pavement work, which includes resurfacing and reconstruction of lanes and shoulders.
- Only 20 percent of total connector miles were considered to have adequate pavement and lane or shoulder width.
- A program to eliminate identified deficiencies is estimated to cost more than \$2.5 billion (current 1996 \$) (Table 3).
- If a systemic effort were initiated to improve the overall level of service of the NHS connectors, more in accordance with the conditions and service of the mainline NHS routes, then an investment of approximately \$4.2 billion (current 1996 \$) would be required (Table 4).
- The cost of improving spot deficiencies would add another \$87.1 million (current 1996 \$) to the total costs for both estimates.

There is wide agreement among freight stakeholders that intermodal connectors need to be improved. As with all transportation improvements, funding is a major concern. The issues related to funding NHS connector improvements are similar to those of freight investments in general. States and MPOs, for example, often see intermodal connectors as a low priority when compared to pressing needs of passenger travel. Compounding this issue is the fact that more than half of NHS connector mileage is under local jurisdictional control (Table 5). Localities may not have the money to fund needed improvements, and states may not have the authority to

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**Table 3. Cost to Eliminate Deficiencies (1996 Current \$ Millions)**

Identified Deficiency and Improvement Needed	Investment Needed		
	Rural	Urban <sup>a</sup>	Total
<b>Total Costs</b>	<b>141.5</b>	<b>2,368.3</b>	<b>2,509.8</b>
<b>Capacity Needed</b>	<b>112.5</b>	<b>1,979.7</b>	<b>2,092.2</b>
Major reconstruction	18.8	565.2	584.0
Major widening	93.7	1,414.5	1,508.2
<b>Lane Widening</b>	<b>2.6</b>	<b>209.4</b>	<b>218.1</b>
Minor reconstruction	6.1	108.2	110.8
Minor widening		101.2	107.3
<b>Pavement Work</b>	<b>20.3</b>	<b>179.2</b>	<b>199.5</b>
Reconstruction	6.5	70.5	77.0
Resurface shoulders	10.6	59.9	70.5
Resurface	3.2	48.8	52.0

<sup>a</sup>See Table 1 for definition

**Table 4. Cost to Improve Performance Level (1996 Current \$ Millions)**

Improvements	Investment Needed		
	Rural	Urban <sup>a</sup>	Total
<b>Total Costs</b>	<b>171</b>	<b>4,032</b>	<b>4,203</b>
<b>Capacity Needed</b>	<b>113</b>	<b>2,252</b>	<b>2,365</b>
Lane Widening Needed	7	220	227
Pavement Work Needed	51	1,560	1,611

Note: Numbers do not add to \$4,204 million due to rounding.

<sup>a</sup>See Table 1 for definition.

**Table 5. NHS Connector Mileage by Jurisdiction**

Jurisdiction	Mileage	Percent
<b>Total</b>	<b>1,222</b>	<b>100</b>
<b>State</b>	<b>349</b>	<b>29</b>
<b>Local</b>	<b>635</b>	<b>52</b>
<b>State and Local</b>	<b>238</b>	<b>19</b>

spend funds on local roadways. The result is that intermodal connector needs are not met. Concerns related to intermodal connectors are among the many issues that Congress will consider in its reauthorization of the highway program.

**For More Information Please Contact**

Joanne Sedor  
Office of Freight Management and Operations  
Federal Highway Administration  
202-366-8959  
joanne.sedor@fhwa.dot.gov



U.S. Department of Transportation

Federal Highway Administration