

**Working Paper  
00-01**

**A Review of the FRA's Proposed Rule  
Requiring Locomotive Horn Sounding  
At All Public At-Grade Highway-Rail Crossings**

**Chicago Area Transportation Study  
300 West Adams Street, Chicago, Illinois 60606**

**A Review of the FRA's Proposed Rule  
Requiring Locomotive Horn Sounding  
At All Public At-Grade Highway-Rail Crossings**

**Working Paper 00-01**

**By  
Steve Laffey  
Chief of Data Services**

**Chicago Area Transportation Study  
300 West Adams Street  
Chicago, Illinois 60606  
(312) 793-0357  
[www.catsmpo.com](http://www.catsmpo.com)**

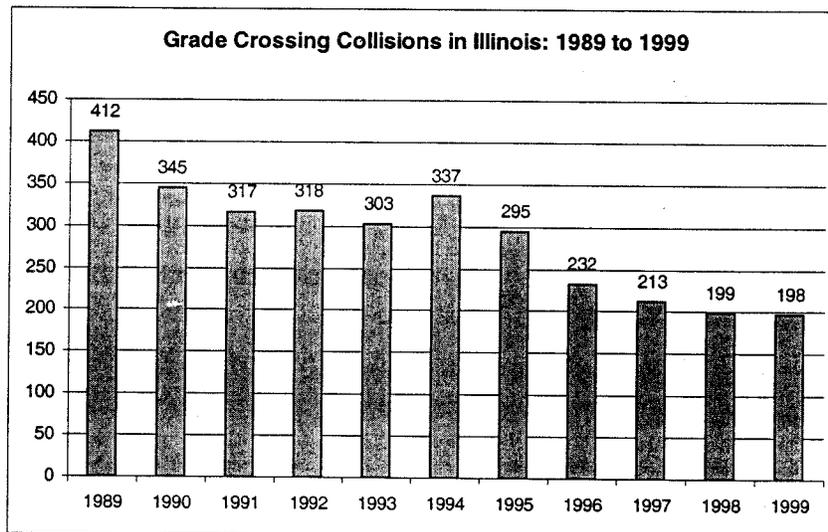
**March 27, 2000**

## EXECUTIVE SUMMARY

In 1994, Congress passed the Swift Rail Development Act which required the Federal Railroad Administration (FRA) to develop rules and regulations requiring trains to sound their air horns at all public at-grade highway-rail crossings. The intent of Congress was to “prevent the careless movement of vehicles around warning devices.”

Throughout the United States, there were 158,588 grade crossings active as of December 31, 1997. At approximately two percent (1.7) of all grade crossings, trains are currently prohibited from routinely sounding their horns, except in cases of emergency. “In 1996, there were 79 out of 3,788 collisions at whistle ban crossings that resulted in 2 fatalities, 39 injuries to non-railroad employees, and two injuries to railroad employees.” Approximately two percent (2.1) of all grade crossing collisions occurred at grade crossings that have a whistle ban in effect.

In Illinois, collisions at public grade crossings have declined by fifty-two percent since 1989. In northeast Illinois, injuries have declined by seventy percent and fatalities have declined from 26 in 1988 to nine in 1997, a sixty-five percent decrease. The large rate of decline is more impressive when one adds in the fact that between 1980 and 1999, train traffic and average vehicle miles traveled by motor vehicles, have both increased by approximately 45 percent.



This report reviews FRA’s Proposed Rule and its potential impacts upon residents of Illinois. The Proposed Rule will have considerable impact on residents of Illinois and of northeastern Illinois in particular. FRA identified 1,978 grade crossings with a whistle ban, of which 899 are in Illinois.

Ninety-seven percent of Illinois whistle ban grade crossings are in the six counties of northeastern Illinois; Cook, DuPage, Kane, Lake, McHenry and Will.

FRA's Draft Environmental Impact Statement estimated that 177,110 individuals in Illinois would be impacted by the Proposed Rule, of which 74,230 individuals would be severely impacted. In comparison to work previously done by CATS, FRA's noise model appeared to underestimate the number of Illinois residents potentially impacted. CATS revised its earlier analysis of 1999 to take into consideration findings from the FRA's Draft Environmental Impact Statement and other recent empirical studies. CATS estimates that 1,644,212 individuals will be impacted by the Proposed Rule, of which 757,609 will be severely impacted. Ninety-six percent of all individuals impacted in Illinois, reside in the six counties of northeastern Illinois.

FRA also developed a cost-benefit estimate that indicated that the benefits of preventing three fatalities and 39 injuries annually outweighed the estimated costs. FRA estimated costs of \$116 million based upon the assumption that all affected communities will install the lowest cost alternative to maintain community peace and quiet. Analysis performed by CATS to realistically estimate the costs of installing a variety of supplemental and alternative safety measures at all 1,978 affected grade crossings indicates a cost estimate of between \$440 and \$590 million. FRA estimates the benefits over a twenty-year period to be approximately \$188 million assuming that the rate of grade crossing collisions continues to decline on the present trend of four percent annually. A realistic estimate of the costs of the Proposed Rule indicates that the costs outweigh the predicted benefits.

FRA's Proposed Rule addresses a very small set of all grade crossings and grade crossing collisions in the United States. FRA is suggesting that a relatively small expenditure is necessary to upgrade the 1,978 grade crossings which currently have a whistle ban in place, when a realistic estimate of the costs indicates otherwise. The Proposed Rule will preempt the role of the Illinois Commerce Commission which has a demonstrated history of improving grade crossing safety. Finally, residents of Illinois and northeastern Illinois in particular, will bear a disproportionate burden of the costs of the of the Proposed Rule.

<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
Executive Summary	i-ii
Table of Contents	iii
List of Tables	iv
List of Figures	iv
List of Appendices	iv
1.0 Introduction	1
2.0 Background	1
2.1 The Proposed Rule	2-4
2.2 Comments Requested to the Proposed Rule	4-6
3.0 Review of the Draft Environmental Impact Statement: Affected Environment and Consequences - Safety, Noise and Economics	7
3.1 Safety	8-11
3.2 Noise	11-14
3.2 Cost-Benefit Analysis	14-15
4.0 CATS Noise Impact Analysis	15-24
5.0 Cost of Supplemental Safety Measures	25
5.1 Median Barriers	26
5.2 Temporary and Permanent Closure of a Street	26
5.3 One Way Street with Full Gates	27
5.4 Four Quad Gates	27
5.5 Photo Enforcement	28
5.6 Programmatic Law Enforcement and Public Education and Awareness	29
6.0 CATS Cost Analysis	29
6.1 Application of the Revised Costs	30-32
6.2 Comparison of CATS and FRA Cost Estimates	33
7.0 Conclusion	33-35
Guide to the Appendices	36

<b>LIST OF TABLES</b>	<b>PAGE</b>
1. Grade Crossings by Type of Warning Device	10
2. Comparison of Types of Warning Devices at Grade Crossings	10
3. Noise Distance Decay Rate	16
4. Noise Thresholds	17
5. Geographical Data Used	17
6. Geocoding Percentages	18
7. Population Potentially Impacted: All Grade Crossings	19
8. Population Potentially Impacted: Whistle Ban Grade Crossings	19
9. Population Potentially Impacted: Exempt Grade Crossings	19
10. Population Potentially Impacted Summarized by US Congressional District	23
11. Top 25 Illinois Cities Potentially Impacted	24
12. Cost Scenario 1: USA Engineering Treatment at 1,978 Crossings	30
13. Cost Scenario 2: USA Performance Treatment at 1,978 Crossings	30
14. Cost Scenario 3: Illinois Engineering Treatment at 899 Crossings	31
15. Cost Scenario 4: Illinois Performance Treatment at 899 Crossings	31
16. Cost Scenario 5: ICC Exempt Engineering Treatment at 4,828 Crossings	32
17. Cost Scenario 6: ICC Exempt Performance Treatment at 4,828 Crossings	32

<b>LIST OF FIGURES</b>	<b>PAGE</b>
1. All Public At-Grade Crossings in Illinois (9,890)	20
2. All Whistle Ban Grade Crossings in Illinois (899)	21
3. All Illinois Commerce Commission Exempt Grade Crossings (4,828)	22

<b>LIST OF APPENDICES</b>	<b>PAGE</b>
A. 49 CFR Part 222 – Use of Locomotive Horns at Highway-Rail Crossings	37-44
B. Data and Information Requirements Analysis	45-50
C. Summary of Population Potentially Impacted - All Grade Crossings	51
D. Summary of Population Potentially Impacted - Whistle Ban Grade Crossings	52
E. Summary of Population Potentially Impacted – ICC Exempt Crossings	53
F. Summary of Population Potentially Impacted – by US Congressional District	54
G. Summary of Population Potentially Impacted – ICC Exempt Crossings – by US Congressional District	55
H. Summary of Population Potentially Impacted – Whistle Ban Grade Crossings ¼ Mile Impacts Summarized by City	56-58
I. Summary of Population Potentially Impacted – Whistle Ban Grade Crossings ½ Mile Impacts Summarized by City	59-61

## **1.0 INTRODUCTION**

In 1994, the United States Congress passed the Swift Rail Development Act (Swift Act), which required the Federal Railroad Administration (FRA) to develop rules and regulations mandating railroad locomotive horns to be sounded at all public at-grade highway-rail crossings. The Swift Act was amended in 1996 with passage of the Federal Aviation Administration Reauthorization Act (FAA Act). The FAA Act required FRA to “take into account the interest of communities that have in effect restrictions on the sounding of a locomotive horn at highway-rail crossings; or have not been subject to the routine sounding of a locomotive horn at highway-rail grade crossings.” The FAA Act also required FRA to work in partnership with affected parties and permitted FRA to waive any portion which “is not likely to contribute significantly to public safety” and instituted a 365-day period before the rule would take effect once the final rule is published. Congress’ intent in passing these two laws is to increase safety at public at-grade highway-rail crossings by “preventing the careless movement of vehicles around warning devices”.

The purpose of this report is to review the requirements of the Proposed Rule and estimate the impacts of the Proposed Rule to residents of Illinois. The report begins by summarizing the requirements of the Proposed Rule and identifying 40 potential areas to comment on. The report then focuses on the noise impact and cost-benefit analyses of the Proposed Rule and Draft Environmental Impact Statement. The report summarizes FRA’s approach and findings and offers two alternative analyses developed to more realistically quantify the noise impact and cost-benefit to residents of Illinois.

## **2.0 BACKGROUND**

FRA has published several studies related to whistle bans, including; *Horn Acoustics Analyses (1993 and 1999)*, *Florida’s Train Whistle Bans (1995)*, and the *Nationwide Study of Train Whistle Bans (1995)*. Three documents were also published in support of the rule; *Draft Environmental Impact Statement*, *Technical Supplement to the Draft Environmental Impact Statement*, and *Regulatory Evaluation and Initial Flexibility Assessment*. All of these documents are available over the internet at either the FRA or Volpe Transportation Systems Research Center Web sites.

## 2.1 The Proposed Rule

Pages 2230 - 2270 of the January 13, 2000 Federal Register present the rule and relevant background information, such as the perceived need for the Proposed Rule. The Proposed Rule itself, runs from page 2263 - 2270 and is included in this report as Appendix A. In general, the Proposed Rule will require all freight and passenger trains to sound the train's air horn when approaching and entering a public at-grade highway-rail crossing. There is currently no federal law requiring horn sounding, however, many states, including Illinois, currently require trains to sound their horns at public at-grade crossings. The Illinois Commerce Commission (Commerce Commission) is responsible for railroad safety in Illinois and administers the Grade Crossing Improvement Program funds. The Commerce Commission has categorically exempted railroads from requiring trains to sound their horns at grade crossings equipped with automatic warning devices which have had three or fewer accidents in the preceding five years. The Proposed Rule consists of three subparts and three appendices which will be explained in greater detail below.

Subpart A of the Proposed Rule indicates that the rule does not apply to private railroad operations or to rapid transit operations that are not part of the general railroad system. In this case, the Chicago Transit Authority appears to be exempt as well as any private in-plant freight operations that do not operate on part of the general railroad system. The Proposed Rule will preempt any state laws regarding horn sounding at grade crossings. Subpart A also details how waivers may be obtained from portions of the Proposed Rule, or the Rule as a whole. The Administrator may issue a waiver if it is determined that "a waiver of compliance with a provision of this part is in the public interest and that the safety of highway and railroad users will not be diminished."

Subpart B indicates that train horns are required to be sounded whenever a train is approaching and occupying a public highway-rail at-grade crossing. The warning sounded is to be a long/long/short/long blast of the horn. The horn should start not prior to a quarter mile before the crossing and should not last for less than 20 seconds nor longer than 24 seconds. Subpart B requires that railroads install whistle boards at locations indicating when a locomotive operator should begin sounding the train horn. The whistle board should be located so that a train operating at maximum authorized timetable speed will have 20 seconds to sound a warning. Railroads are required to install new whistle boards only when maximum authorized timetable speeds change. Of particular importance is the fact that this section, or any other section of the propose rule, does not prohibit

sounding the train horn in emergency situations. This part of the Proposed Rule explained when train horns are required to be sounded. The final section of the Proposed Rule explains which types of railroad operations are exempt and how communities may create quiet zones where railroads will be required to not sound their horn on a routine basis.

Subpart C and Appendices A, B and C indicate when train horns are not required to be sounded based upon either the type of railroad operation or through the creation of a “quiet zone.” Quiet zones are areas where communities have agreed to install supplemental and/or alternative safety measures that provide warning value equal to that of the locomotive horn. Five types of supplemental safety measures and two types of alternative safety measures have been approved for use so far. Railroad operations that do not exceed 15m.p.h. and provide crossing protection through manual warning techniques are exempt from the horn sounding requirement. Appendix C confuses this exemption by adding in-street routes or trains that operate within 30 feet of a highway.

Communities that install supplemental and/or alternative safety measures equal to the value of a train horn, may, with FRA approval, create two types of quiet zones. The first type of quiet zone is “community designation.” Under the “community designation” option, communities must install one or more of five types of supplemental safety measures outlined in Appendix A at each grade crossing in the proposed quiet zone. Once the supplemental safety measures have been installed, the community must notify FRA, the local highway authority responsible for each crossing within the quiet zone, the state highway authority, and each railroad operating over the crossing. The five supplemental safety measures identified in Appendix A are:

- ◆ Temporary closure of grade crossing
- ◆ Four quadrant gate system
- ◆ Gates with medians or channelization devices
- ◆ One way street with gates
- ◆ Photo enforcement

Photo enforcement requires perpetual monitoring as long as the device is in place. No other monitoring or action need be taken to maintain “community designated” quiet zones, except to certify to FRA at the five-year point that the devices are still installed and functioning as intended. The alternative to the “community designation” creation of a quiet zone is “FRA acceptance.”

“FRA acceptance” is intended to permit communities who can not universally install one of the five standard supplemental safety at every location, to create a customized quiet zone incorporating a combination of supplemental and alternative safety measures. Appendix B describes the two approved alternative safety measures; programmed law enforcement and educational awareness. Other safety measures, such as wayside horns or vehicle presence detectors, etc, may be added as empirical evidence demonstrates their effectiveness. Creation of quiet zones via the “FRA acceptance” route requires extensive data collection and analysis activities, and use of the FRA GradeDec grade crossing investment decision model. Regardless of which method is used to create a quiet zone, they must share five common characteristics:

- ◆ all crossings must have automatic flashing lights and gates;
- ◆ all warning devices must have constant warning time circuitry;
- ◆ all quiet zones must be at least one-half mile long;
- ◆ all crossings must have whistle boards;
- ◆ all crossings must have highway signs indicating train horns are not sounded.

This section provided a brief review of the Proposed Rule. The Federal Register requests comments from affected parties. Section 2.2 presents a list of those areas explicitly identified in the Federal Register for which the FRA is seeking comments.

## **2.2 Comments Requested to the Proposed Rule**

1. Page 2239. Final rule will not go into effect for 1 year after publication.
2. Page 2241. Horn noise levels: 3 options = 104dBA, 111dBA and variable. Is a variable train horn level a good idea? If variable train horns are not a good idea, should all horns be required to be 104 dBA or 111 dBA
3. Page 2241. Horn noise levels at side and 100' from center not exceed the level 100' in front of locomotive. This will require railroads to relocate and/or to redesign horns.
4. Page 2241. Railroad perspective on cost to relocate horn to improve directionality. Approximate cost is \$10 million. FRA wants to know what the railroad industry thinks of having to relocate train horns.
5. Page 2242. Rule and who it applies to. Does apply to tourist lines, not to private in-plant switching operations or pedestrian crossing. Should the rule apply to all types of railroad operations equally, or does selective application make sense?
6. Page 2244. 15 second or 20 second warning time? Community exposure may be significantly reduced by going to a 15 second sounding as opposed to the traditional 20 second long/long/short/long sounding.
7. Page 2245. Categorical exclusions for certain types of rail ops or crossings. Same as comment number 5. Who should the rule apply to.
8. Page 2246. Analysis requires use of FRA Accident Model, should communities be permitted to use own method and data? FRA prefers communities who seek to create quiet zones use the FRA grade crossing investment decision model to quantify costs and benefits. FRA suggests that permitting communities to use their own data and method to calculate costs and benefits will slow down process.
9. Page 2247. Three approaches to who designates quiet zones: state agency, traffic control authority or local municipality? Which governmental entity should handle the development of a quiet zone from

- an administrative perspective. The Illinois Commerce Commission currently has the statutory authority to regulate grade crossing safety.
10. Page 2248. Highway warning sign - should one be required and what should it look like? National standard? The Proposed Rule is requiring 1 highway sign for each direction of travel to warn motorists that train horns do not sound at this crossing.
  11. Page 2249. Inventory forms updated with re-certification every 3 or 5 years. Is this good or bad? Should updating the inventory be a requirement? Should railroads be required to update inventory on a regular basis instead of inventory being voluntary.
  12. Page 2250. Ban crossings as of October 6, 1996. Does this include the 4,8282 grade crossings categorically exempted by the Illinois Commerce Commission because they have automatic warning devices in place and have had less than three accidents in the past five years.?
  13. Page 2251. FRA exempting a few communities already in process. Good thing or bad? FRA is exempting eight communities who were working to establish quiet zones with FRA at time the Proposed Rule was published.
  14. Page 2251. Effectiveness measures for any and all supplemental safety measures. Are they reasonable and appropriate? Each supplemental or alternative safety measure has been assigned an effectiveness rating based on limited empirical experience and data. Is there enough science behind the calculation of the effectiveness measures to make them credible?
  15. Page 2251. Is the entire effectiveness measure approach reasonable and effective? FRA has developed a methodology to assign effectiveness ratings for specific safety devices based upon one or two site specific studies. Is this approach reasonable?
  16. Page 2251. Should national averages be used for effectiveness measures, or should they be custom suited to meet different region's experience? Different regions have different experience with grade crossing safety, should region specific effectiveness ratings be permitted?
  17. Page 2251. Relevance of Nationwide Study and Florida Study in setting effectiveness rating of train horn at .38? Are the conclusions drawn from the Florida and Nationwide Whistle Ban studies relevant and appropriate?
  18. Page 2254. Effectiveness rating of .82 for 4 quad gates. Is this effectiveness rating appropriate and reasonable?
  19. Page 2254. Effectiveness rating of .75 for median barriers. Should it be reduced to reflect novelty of approach?
  20. Page 2254. How to best establish effectiveness ratings for median barriers of different lengths? Many potential installations of median barriers cannot accommodate the required 100 foot length on both approaches. Should the effectiveness rate vary with length of the barrier, and if so, how should the effectiveness rating vary?
  21. Page 2254. Is the effectiveness rating for 1 way street with total gate appropriate at .82, or that of a 4 quad gate? Should the effectiveness rate for a one-way street with gates completely blocking the street be equal to 1?
  22. Page 2255. Should there be a minimum penalty for violations, or a max, or should there be a national penalty structure? Illinois currently has a standard penalty of \$500. Is this a good idea?
  23. Page 2255. For photo enforcement. Should there be a minimum ratio of live cameras to number of installations?
  24. Page 2255. Comment on process of alternative safety measures in Appendix B and are the effectiveness ratings appropriate?
  25. Page 2256. Communities that have had success in decreasing violations and increasing safety. Share experiences and knowledge. FRA is specifically seeking comments from communities with effective law enforcement and public educational and awareness programs.
  26. Page 2257. FRA reserving right to make articulated gates a supplemental safety measure. Good idea or bad, should articulated gates be an alternative safety measure now?
  27. Page 2257. Different treatments for crossings for day and nighttime operations. Good idea or bad. Florida experience suggests that nighttime bans only would be a bad idea.

28. Page 2258. In order to develop a better cost-benefit analysis, FRA is seeking comments on what a reasonable mix of supplemental and alternative safety improvements a community might make are.
29. Page 2259. Implies that STP funds are readily available for all improvements. Is this true?
30. Page 2260. Impact on small entities: government, business etc is unknown. Comment on this if there is perceived to be costs/benefits.
31. Page 2260. Impact on small businesses in particular desires comment.
32. Page 2261. Information collection requirements - OMB - are the data collection and monitoring requirements of the Proposed Rule onerous. For photo enforcement, law enforcement and public education and awareness campaigns, baseline data must be gathered and perpetual quarterly monitoring maintained. Is this reasonable? **Comments on this issue must go to the Office of Management and Budget by March 13, 2000 with a carbon copy to FRA. Appendix B presents an analysis of the potential cost associated with data and information requirements.**

In addition to the specific issues identified above, there are several general areas, not explicitly identified, in the Federal Register that affected parties may wish to comment on, these are listed below.

- A. Page 2240. Use of 7.5 dB drop off level. Generally, 6dB is the value used for the decrease in sound per doubling of distance. Do the attenuation factors listed by FRA really have a cumulative effect, or is there a lower synergistic effect?
- B. Page 2242. Rule only applies to general system of railroads, not transit. Clarify for CTA grade level crossings in northeastern Illinois.
- C. Page 2242. Illinois Commerce Commission currently is the only legal authority in Illinois permitted to regulate grade crossing safety. Will Commerce Commission wish to coordinate quiet zone creation in Illinois? Will Commerce Commission be in favor of quiet zone creation? How will Commerce Commission continue to allocate Grade Crossing Improvement Program funds if it no longer has any authority to enforce improvements.
- D. Page 2243. Waiver = application of rule = counterproductive? Since Illinois has an excellent safety program in place, could/should Illinois seek a state-wide waiver since the Proposed Rule is likely to be counter productive?
- E. Page 2244. Does Illinois already have law regarding horn sounding and placement of whistle boards?
- F. Page 2246. Street running or does the exemption apply to all slow speed freights? Appendix C confuses whether or not all freight operations that occur at less than 15 miles per hour and provide manual crossing protection are exempt.
- G. Page 2249. 14 day notice to all parties - is this sufficient time to inform the appropriate staff at the local community, all railroads operating at the crossing and the appropriate highway authority?
- H. Page 2257. Assumption that all communities will use low cost barriers and not a mix of alternatives. FRA is specifically seeking comment on the mix of alternatives that may be applied. FRA's assumption is that all communities will install the lowest cost alternative of detachable median barriers. Is this a realistic assumption?

Section 2.1 and 2.2 briefly outlined the requirements of the Proposed Rule and listed 32 specific issues that FRA is seeking comment on and listed an additional eight issues where general comments may be desirable. The next section will review the *Draft Environmental Impact Statement* paying particular attention to the sections on safety, noise and economic consequences of the Proposed Rule.

### **3.0 REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT: AFFECTED ENVIRONMENT AND CONSEQUENCES - SAFETY, NOISE AND ECONOMICS**

The DEIS, Technical Supplement and Regulatory Evaluation were all released concurrently with publication of the Proposed Rule. Collectively, they present the FRA approach to quantifying potential impacts from the Proposed Rule on the human and physical environment. The DEIS and the Technical Supplement present FRA's thought process and methodology in performing the noise impact analysis and the cost-benefit analysis, in great detail. The cost-benefit analysis also draws information and analysis from the Regulatory Evaluation and Initial Regulatory Flexibility Assessment (Regulatory Evaluation).

The Executive Summary of the DEIS begins by re-asserting that train horns are most effective at warning motorists at passive grade crossings and indicates that the overall purpose of the study is to improve safety at grade crossings. The DEIS then discusses consideration of the no-action alternative of maintaining the status quo. FRA concludes that "FRA lacks authority to implement the no-action alternative, and adoption of the no-action alternative would require congressional action to reverse its mandate to regulate the use of locomotive horns at highway-rail grade crossings." The DEIS then considers the impacts and consequences to safety, noise, environmental justice, health and human welfare, and economics.

Ultimately, the DEIS concludes that the no-action alternative of perpetuating the 62 percent greater collision frequency at whistle ban crossings would result in avoidable collisions, injuries and fatalities and their associated costs to society. The DEIS indicates that the preferred alternative of requiring horn sounding and creating quiet zones of supplemental and alternative safety measures will prevent 39 collisions, 17 injuries and three fatalities annually. FRA has estimated the total cost for implementation to be approximately \$116.4 million and the benefits to be \$188.3 million. Section 3.1 will examine safety at grade crossings and whistle ban grade crossings in particular.

### 3.1 Safety

The FRA has conducted several studies examining safety at whistle ban grade crossings. In 1992, FRA studied whistle ban grade crossings operated by the Florida East Coast Railway and published the report *Florida's Train Whistle Ban*. In 1995, FRA analyzed all known whistle ban grade crossings in the nation and the accidents that occurred at whistle ban crossings and published their findings in the report entitled *Nationwide Study of Whistle Bans*. These two reports form the basis for FRA's approach to quantifying the safety hazard associated with whistle bans. This section summarizes the findings of both reports.

*Florida's Train Whistle Ban* study determined that "there were almost three times more collisions after the whistle bans were established". Florida's ban covered 511 grade crossings along the Florida East Coast Railway. Florida's whistle bans were nighttime only bans. The results indicate that for the 511 crossings analyzed, accidents occurred at a higher rate with the ban in place than when the ban was removed. Due to the nighttime only nature of the whistle bans, this finding is not transferable to the general set of all public grade crossings.

*Florida's Train Whistle Ban* led FRA to conduct a nation-wide analysis of grade crossings with whistle bans in place. The FRA worked with the Association of American Railroads to develop an inventory of grade crossings with known whistle bans. The survey reported 2,122 grade crossings with a ban, not including the 511 whistle ban locations in Florida. The *Nationwide Study* indicates that about three to five percent of all accidents and two percent of all fatalities occur at grade crossings with a whistle ban (p. 2232). FRA's study also found that 40 percent of grade crossings with a ban were equipped with active warning devices, compared to the national average of only 17 percent.

The *Nationwide Study* consists of three separate analyses. FRA performed a before-and-after analysis, a statistical analysis of the national inventory of approximately 168,000 grade crossings, and an accident analysis. "For the twelve case studies, a total of 130 collisions occurred during whistle bans while 80 occurred when horns were sounded, indicating a 38 percent reduction in the overall rate of collisions after whistle bans were cancelled. 41 injuries and 11 fatalities occurred during the whistle bans, compared to 28 injuries and 4 fatalities for periods without whistle bans." (p. 3-5)

FRA also conducted an analysis of the national inventory of grade crossing to determine if any type of crossing is more dangerous than another type. The analysis utilized the FRA accident prediction formula based on data items in the national inventory of grade crossings. The grade crossing inventory is voluntary and rarely updated, resulting in out of date information for data items such as; AADT, daily train frequency, number of highway lanes, number of tracks, and landuse.

The accident prediction formula, which is based on key data items within the inventory, was applied to grade crossings with a whistle ban (1,222) and those without a ban (167,000). The two sets of crossings were then divided into ten groups based on their predicted accident rate, and then a comparison of the number of accidents for each of the ten intervals was made. This analysis concluded that for most of the intervals, the set of non-ban grade crossings has accident rates less than those of the whistle ban grade crossings. On average, grade crossings with a ban experienced 84 percent more accidents than grade crossings without a ban. (p. 3-7)

FRA revised this analysis with new information regarding whistle ban crossings and examined accident rates by three classes of crossings: passive (crossbucks), flashing lights only, and gates. Accident rates from 1992 through 1996 were used and the analysis replicated with new data. The revised study indicated “an average of 62 percent more collisions occurred at crossings equipped with automatic gates and flashing lights than at similarly equipped crossings across the nation without bans.” (p. 2234) FRA indicates that the effectiveness rating of a train horn in preventing collisions is .38. FRA is using this value as the effectiveness rate for train horns in the Proposed Rule.

The revised analysis also concluded that crossings equipped with only flashing lights experienced a 119 percent more accidents than similar crossings without a ban. However, this was not the case in the Chicago region, where crossings with only flashing lights had 16 percent fewer accidents than crossings without a ban. Ultimately, FRA concluded that the “train horn warning is most critical at crossings without gates but which are equipped with other types of active warning devices.” (p. 2235) Table 1 indicates that northeastern Illinois’ grade crossings are equipped with active safety devices at almost twice the rate of the United States as a whole.

**Table 1. Grade Crossings by Type of Warning Device.**

Warning Device	USA 1998	USA%	IL 99	IL 99%	NE IL 1999	NE IL%
no signs	5,421	3.4	339	3.4	153	7.8
other signs	492	0.3	2	0.0	0	0.0
stop signs	10,903	6.9	2	0.0	0	0.0
crossbucks	75,558	47.6	4,399	44.2	337	17.3
manual protection	4,191	2.6	198	2.0	88	4.5
hwy, wigwag or bells	1,519	1.0	114	1.1	16	0.8
flashing lights	28,098	17.7	2,623	26.4	442	22.6
gates	32,406	20.4	2,267	22.8	917	47.0
<b>total</b>	<b>158,588</b>	<b>100.0</b>	<b>9,944</b>	<b>100.0</b>	<b>1,953</b>	<b>100.0</b>

Warning Device	USA 1998	USA%	IL 1999	IL%	NE IL 1999	NE IL%
active	62,023	39.1	5,004	50.3	1,375	70.4
passive	96,565	60.9	4,940	49.7	578	29.6

Source: 1998 Railroad Safety Statistics, FRA 1999 Illinois Inventory and CATS 1999 Inventory

The general theme of the nationwide study is that crossings with only passive warning devices, or with automatic lights but not gates, benefit the most when a whistle ban is removed. In the Chicago area, however, crossings with automatic flashing lights, statistically experience fewer accidents than similar grade crossings without a ban. Table 2 compares the type of warning devices present at whistle ban grade crossings in the United States and Illinois.

**Table 2. Comparison of Types of Warning Devices at Grade Crossings.**

Warning Device	USA	USA%	USA Ban	USA Ban%	ILL Ban	ILL Ban%
gates	28,139	16.7	1,106	55.9	547	60.8
flashers	29,645	17.6	341	17.2	136	15.1
crossbucks	85,440	50.8	340	17.2	63	7.0
none/other	24,999	14.9	191	9.7	153	17.0
<b>total</b>	<b>168,223</b>	<b>100.0</b>	<b>1,978</b>	<b>100.0</b>	<b>899</b>	<b>100.0</b>

Grade crossing that have a whistle ban are significantly better protected than the general set of all grade crossings. Across the USA, only 34.3 percent of all grade crossings are protected by active warning devices. Whistle ban grade crossings in the USA are protected by automatic warning devices 73.1 percent of the time and whistle ban grade crossings in Illinois are protected by automatic warning devices a comparable 75.9 percent of the time. It makes sense that whistle ban grade crossings in general are better protected because most grade crossings in Illinois (73%) are protected by automatic warning devices and 45 percent of all whistle ban grade crossings are in Illinois.

The third part of the FRA analysis, was an analysis of collisions that occurred at whistle ban grade crossings between January 1, 1988 through June 30, 1994. There were 948 accidents which resulted in 308 injuries and 62 fatalities over the 78 month period. In Illinois, there were 144 collisions, 41 injuries and 25 fatalities during the study period. FRA determined that there were few differences in possible causes, except for whether a horn was sounded or not. "However, collisions that occurred when motorists drove around lowered gates accounted for 28 percent (265) of the cases when horns were banned and only 15 percent (142) when horns were sounded." (p. 3-11)

The *Florida Whistle Ban Study, Nationwide Study of Whistle Bans* and 1988-1994 accident analysis, when taken together, have led FRA to conclude that grade crossings which have a whistle ban in place are more dangerous than grade crossings where horns are sounded.

### **3.2 Noise**

FRA contracted with the Volpe Transportation Systems Research Center to perform analyses of the nature and performance characteristics of railroad locomotive horns. The first report, issued in 1993, focused on quantifying horn volume 100 feet from the locomotive and determining whether a three-chime or five-chime horn is more effective. The study published two primary conclusions; the first being that horns should be placed as far forward and as high as possible on the locomotive to be effective and that the five chime horn is more effective than a three-chime horn.

In the second report, published in 1999, researchers focused on the ability of motorists to perceive and recognize a train horn as a warning. The study also developed a method to measure potential community impact from horn noise and also examined whether a 20 or 15 second sounding period is preferred. The community impact model is a very important piece of the evaluation methodology being employed in the *Draft Environmental Impact Statement*.

#### ***Excerpt from the Executive Summary of Railroad Horn System Research***

Since the majority of highway-rail grade crossing accidents involve moving locomotives, acoustic data are presented for a conventional three-chime horn system on a moving locomotive. These data were obtained through wayside measurements of locomotives as they moved through the crossing at six different grade crossings. Sound levels were measured perpendicular to the track at two locations at each crossing to determine sound

attenuation effects of buildings and vegetation along the right-of-way on the warning signal strength. This information, coupled with the number of trains traversing the crossing during the daytime and nighttime hours, was used to compute the community noise exposure, measured in terms of an average day-night sound level, in the vicinity of the grade crossing. It was found that at locations less than 200 feet (61m) from the crossings, which have trains traversing the crossing at the rate of one per hour, the estimated day-night sound levels are greater than 65 Ldn. This sound level is characterized as “normally unacceptable” by the Department of Housing and Urban Development.

The report also found that average interior noise levels inside a variety of vehicles averaged between about 70dBA while moving at 30 miles per hour. (page 20) Insertion loss is typically about 5 to 15dBA. The report concludes that reducing the horn sounding period from 20 seconds to 15 seconds will reduce community noise exposure, but would require a different type of warning other than the traditional long/long/short/long horn sounding.

“FRA recognizes that railroad noise and locomotive horn noise in particular can exceed desirable sound levels near railroad tracks.” (p. 3-12) Noise is measured in several ways. The simplest measure is the maximum sound level expressed in decibels. Measurements of maximum sound level are presented in A-weighted sound levels (dBA). A-weighting removes very low and high frequencies from the measurement spectrum so that the value presented encompasses only the range of sound normally perceived by a human ear. Sound levels are also weighted to calculate an hourly or 24 hour day-night sound level. FRA uses the 24 hour day-night sound level (Ldn) in performing the following noise analysis.

The percentage of people who are highly annoyed by neighborhood noise has been studied extensively. “The percentage of high annoyance is approximately 0 percent at 45 Ldn, ten percent around 60 Ldn and approximately 70 percent at 85 Ldn.” (p. 3-15) This finding is applied in the DEIS and used to develop noise criteria that are applied to all types of transportation activities ranging from airplane noise to highway traffic noise. Most federal agencies use 65 Ldn as the threshold for determining when noise levels are acceptable in a “living environment”. (p. 3-16)

FRA used the available research to develop a noise impact model for train horns. The model assumed that a typical whistle ban grade crossing is located in an area with suburban residential landuse. FRA then developed a reference sound level of 107 dBA 100 feet perpendicular and 1/4 to 1/8 mile in advance of the grade crossing. The sound level maximizes at the edge of the crossing at

110dBA and declines once the train exits the crossing. The reference sound level was adjusted to account for the presence of attenuators. Attenuators that affect sound propagation include, divergence, ground effect, atmospheric effects, and shielding. Divergence reduces the reference sound level by approximately 3dBA, ground effect by 1.5 to 4.5dBA, and atmospheric effects do not decrease the reference sound level at all. Shielding reduces the reference sound level by 3dBA for the first row of structures encountered and an additional 1.5.dBA for each 200 foot increment away from the source. Once the reference sound level was determined, theoretical impact zones could then established.

The horn noise prediction model is implemented by:

- ◆ applying data from the national inventory for each crossing: train traffic by day and night, number of tracks, number of highway lanes, and longitude/latitude;
- ◆ applying attenuating values;
- ◆ calculation of sound level without horn sounding;
- ◆ calculation of sound level with horn sounding;
- ◆ sound level is calculated as a function of day-night Ldn and number of trains passing during day and night hours;
- ◆ program outputs coordinates to create severe and marginal impact area polygons for use in GIS;
- ◆ impact polygons are created in GIS and applied to Census data to estimate number of people and their ethnicity in the severe and marginal impact areas/ or was;

Using a national population density of 658 people per square mile within five miles of a grade crossing, FRA then determined the national value for people who are impacted by train horn noise at all grade crossings without a whistle ban. “Approximately 5,469,000 persons are impacted and of that group, 2,732,000 persons would be severely impacted.” (p. 3-24)

The results of the noise model indicate that nationally, 365,010 individuals would be impacted, and of that group, 151,400 individuals would be severely impacted. Illinois, Cook County and Chicago are the most impacted state, county and city, respectively. The model estimates that 177,110 individuals will be impacted in Illinois, of which 74,230 individuals will be severely impacted. This is 49 percent of the national total. Cook, DuPage, Lake and McHenry counties in northeastern

Illinois have 165,000 impacted residents, of which 69,620 would be severely impacted by the sounding of train horns. (p. 4-9)

The proposed rule will require that horns must not be sounded prior to a quarter mile to the crossing, and that the sound level 100 feet to the sides and rear of the locomotive will not exceed the value 100 feet in front of the locomotive. Changing the duration of the horn sounding from 20 seconds to 15 seconds is also discussed and estimated to bring a substantial impact reduction to nearby residents of all grade crossings. FRA also believes that a significant number of individuals will benefit from new horn directionality and intensity provisions.

FRA determined the horn sounding Rule will impact minority populations. Table 4-17 from page 4-17 presents a “nationwide summary of all counties with environmental justice impacts.” In Illinois, 72,720 persons will be impacted. FRA compares the percentage of minority population impacted with the percentage of each county’s baseline minority population to determine the severity of the potential impact. Cook County contains approximately 90 percent of the environmental justice population potentially impacted in Illinois.

### **3.3 Cost – Benefit Analysis**

The FRA evaluated the costs and benefits of the Proposed Rule and found that “the safety benefits alone, exceeding any benefits to railroads, exceed the most costly yet realistic scenario for community safety enhancements.” (p. 4-20) FRA developed two benefit scenarios; one assumes that collisions will continue to occur at their current rate, and the second scenario assumes that accidents will continue to decline on the same trend line that they have for the past 20 years.

Developing cost estimates is more problematic than developing the benefit estimate. FRA assumed that all communities would install the least cost supplemental safety measure, which is a detachable median barrier estimated by FRA to cost approximately \$11,070 per installation. Experience in Illinois indicates that this is not a realistic assumption. For a variety of physical and aesthetic reasons, communities will institute a mix of supplemental and alternative safety measures. FRA conducted a study of housing values to determine if there is any impact on housing values in order to estimate what the value for a unit of noise may be. Table 4-9 on page 4-22 of the DEIS provides

a summary of the costs FRA expects the proposed rule to generate. The estimated costs in Table 4-9 total \$116.4 million, well below the least optimistic benefit figure of \$188 million.

FRA summarizes the impacts on page 4-26. "The estimated benefits of the Proposed Action were found to exceed the estimated costs over a 20-year period at a seven percent discount rate. A scenario assuming median barriers are installed at each crossing, signs are installed at each crossing and crossing upgrades to a minimum of gates and lights for all passive crossings would be justified on the basis of casualties prevented alone with net benefits of \$255.2 million. A housing price analysis found that although the housing market is influenced by the proximity of rail lines and rail crossings, there does not appear to be a permanent impact resulting from the instances where Conrail resumed horn blowing." (p. 4-26) The DEIS concludes by reviewing each of the supplemental and alternative safety measures contained in the "mitigation tool box." (pages 4-26 through 4-39)

This concludes the review of the *Draft Environmental Impact Statement, Technical Supplement and Regulatory Evaluation*. Section 4.0 will provide an alternative approach to the noise impact analysis performed by FRA

#### **4.0 CATS NOISE IMPACT ANALYSIS**

CATS developed an alternative approach to measuring the potential noise impact on residents of Illinois from the Proposed Rule. CATS' analysis is not as detailed in consideration of the theoretical foundation of the approach. The science of noise impact estimation is not particularly well developed. The majority of analyses available address airplane/airport noise, highway traffic noise, or other types of non-punctuated exposure to noise. It is difficult to extrapolate the results of these previous studies to noise exposure at highway-rail grade crossings. Work conducted by the FRA in 1993 and 1999 indicated that train horns are reasonably effective as a warning device, however, their effectiveness is decreasing. Previous work does not permit the reasonable prediction of potential impacts to nearby residents of grade crossings with any degree of confidence.

CATS' approach was to rely on a simple measure of exposure based on spatial proximity to a grade crossing. No attenuation factors were considered. Development of critical noise thresholds for marginally and severely impacted population was based on an empirical study of a wayside horn in

Ames, Iowa, and published literature from Leslie Manufacturing Company. Leslie's sales literature indicated that the sound level of a popular horn in service on freight and passenger locomotives is approximately 114 dBA 100 feet from the locomotive. Table 3 indicates how the impact from sound theoretically decreases as distances doubles from the source.

Table 3. Noise Distance Decay Rate.

Distance	Decibels
Locomotive	144
100 feet away	114
200 feet away	108
400 feet away	102
800 feet away	96
1,600 feet away	90
3,200 feet away	84
6,400 feet away	78

The Illinois Department of Transportation's Traffic Noise and Vibration Manual provides guidance to traffic engineers as to when noise abatement procedures may be initiated. For sensitive open spaces, noise abatement is generally recommended when the hourly A-weighted sound level is 57 dBA or greater. For most developed lands and properties, the threshold for implementing noise abatement procedures is 72 dBA. IDOT's manual pertains to continuous noise and not intermittent sources of noise so the IDOT manual is useful only in setting general parameters for when noise becomes a nuisance.

Applying the distance decay function of Table 3, the sound level of a locomotive horn is approximately 86 dBA one-half mile from the locomotive and seems a reasonable threshold to apply in this study for setting the distance from the crossing at which a locomotive horn may be considered a nuisance. CATS Working Paper 99-04 summarizes the findings of this approach. Using the half-mile threshold, approximately 2.4 million residents and 1.5 million workers in northeastern Illinois would be impacted by the proposed rule. The population and employment database used in this analysis was Northeastern Illinois Planning Commission 1996 quarter-section estimates of population and employment.

CATS refined this approach after the Proposed Rule was published to take into consideration the thoughtful approach employed in the Draft Environmental Impact Statement and of research

presented at the Transportation Research Board’s Annual Meeting in January 2000. The Iowa study in particular was helpful in producing empirical sound measurements of horn sound around a grade crossing. Using the Iowa data, CATS revised the thresholds to reflect the better real world measurement provided by the Iowa study.

Table 4. Noise Thresholds

	Theoretical	Iowa
1/4 mile	92dBA	84dBA
1/2 mile	86dBA	72dBA

CATS estimated the impacted and severely impacted populations by using a 1/4 mile buffer area from the center-point of the grade crossing to represent the severely impacted population and a 1/2 mile buffer from the grade crossing center-point, to represent the population impacted. To place the absolute distance into a more meaningful context, it is easier to think of 1/4 mile as being two city blocks around a grade crossing and the 1/2 mile buffer as being four city blocks around a grade crossing.

The process of estimating the impacted population is similar to the FRA approach in that a geographic information system (GIS) was used to perform a spatial analysis to quantify the number of potentially impacted residents of Illinois. Table 5 describes the data required to perform the analysis. Most of the data was readily available from CATS GIS Data Library. The only source of data not ready at hand was FRA’s inventory of grade crossings. CATS staff spent a considerable

Table 5. Geographical Data Used.

Data Layer	Source	Source Scale
county lines	USGS DLG	1:100,000
state lines	USGS DLG	1:100,000
municipal boundaries	TIGER	1:100,000
railroads	USGS 7.5' Topos	1:24,000
railroad crossings	ETAK geography	1:24,000
US highways	USGS DLG	1:100,000
Interstate highways	USGS DLG	1:100,000
IL highways	USGS DLG	1:100,000
county roads	TIGER	1:100,000
Census block data	TIGER	1:100,000

amount of time reviewing the FRA inventory of grade crossings and “cleaned up” the file extensively. CATS provided new coordinate information for grade crossings missing coordinate data, updated Metra information, and updated the exempt and whistle ban status of each record as

well. CATS Working Paper 99-04 describes the process CATS employed to revise the FRA inventory of public at-grade highway-rail crossings in northeastern Illinois.

The analysis used three sets of grade crossings; all 9,890 public at-grade highway-rail crossings, 899 FRA identified whistle ban crossings, and 4,828 ILCC exempt crossings. Over 95 percent of all grade crossings were geocoded and were used in the spatial analysis, the geocoding rates for the three types of grade crossings are presented in Table 6. The high percentage of crossings geocoded means that most of the individuals who would be potentially impacted are accounted for in the spatial analysis.

Table 6. Geocoding Percentages.

Type of Crossing	Total	Geocoded	% Geocoded
All public	9,890	9,505	96.1
FRA ban	899	752	83.6
ILCC exempt	4,828	4,677	96.9

The result of the analysis indicates that 2.5 million residents of Illinois reside within 1/4 mile of a public at-grade crossing. 4.5 million people reside within 1/2 mile of a public at-grade crossing and 7.4 million, or 65 percent of the state's population, resides within 1 mile of a public at-grade highway-rail crossing. For whistle ban grade crossings, 757,609 individuals reside within 1/4 mile of a whistle ban grade crossing; 1,644,212 individuals live within 1/2 mile of a whistle ban grade crossing; and 3,333,195 individuals live with one mile of whistle ban grade crossing. The residents within 1/2 mile would be impacted by the horn noise and the residents within 1/4 mile would be severely impacted by the Proposed Rule. 96 percent of all Illinois residents impacted, reside in the six counties of northeastern Illinois; Cook, DuPage, Kane, Lake, McHenry and Will.

The Illinois Commerce Commission has excused railroads from routinely sounding their horn at grade crossings that are equipped with automatic warning devices and experienced less than three collisions in the past five years. According to the FRA inventory, 4,828 grade crossings met these criteria. Throughout the state, 1.9 million people reside within 1/4 mile of a Commerce Commission excused grade crossing; 3.8 million people reside within 1/2 mile and, 6.6 million people live within one mile of a Commerce Commission excused grade crossing. A potential problem exists in that FRA does not currently include the Commerce Commission set of 4,828 grade crossings as currently operating under a ban. This is important in that these crossings are

similar to a crossing that has a whistle ban in place, since the horn is not currently required to be sounded. Whether or not these crossings are included is critical when evaluating the cost – benefit of the Proposed Rule. The addition of 3,000 plus grade crossings to the cost side of the cost-benefit analysis is likely to indicate that the costs would exceed the benefits. Tables 7, 8 and 9 summarize the results of the spatial analysis.

Table 7. Population Potentially Impacted: ALL GRADE CROSSINGS

Region	1/4 mile	1/2 mile	1 mile
NE Illinois	1,232,860	2,506,355	4,539,830
Southern Illinois	688,995	1,138,825	1,581,358
Northern Illinois	554,829	895,012	1,332,181
<b>Illinois Total</b>	<b>2,476,684</b>	<b>4,540,192</b>	<b>7,453,369</b>

Table 8. Population Potentially Impacted: WHISTLE BAN GRADE CROSSINGS

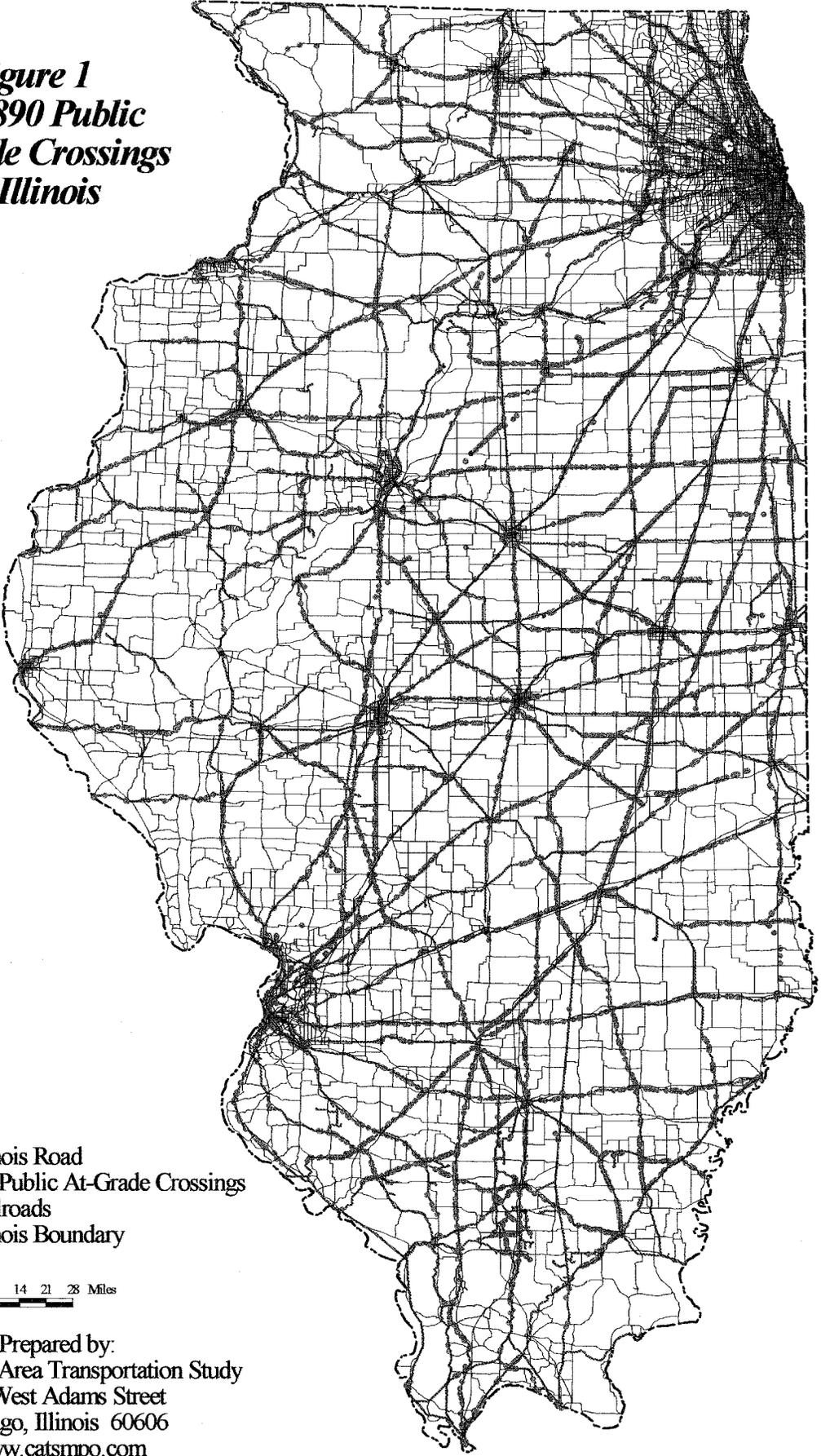
Region	1/4 mile	1/2 mile	1 mile
NE Illinois	738,486	1,592,093	3,183,029
Southern Illinois	10,354	31,691	102,475
Northern Illinois	8,819	20,428	47,691
<b>Illinois Total</b>	<b>757,659</b>	<b>1,644,212</b>	<b>3,333,195</b>

Table 9. Population Potentially Impacted: ILCC EXEMPT GRADE CROSSINGS

Region	1/4 mile	1/2 mile	1 mile
NE Illinois	1,046,061	2,144,479	3,995,818
Southern Illinois	522,148	959,216	1,448,270
Northern Illinois	427,396	741,335	1,171,564
<b>Illinois Total</b>	<b>1,995,605</b>	<b>3,845,030</b>	<b>6,615,652</b>

Figures 1, 2 and 3 on the following three pages, present maps of Illinois' railroad system with the appropriate type of grade crossing highlighted. Population density near all grade crossings statewide within 1/2 mile of the crossing is approximately 1,265 people per square mile. Population density for the whistle ban grade crossings in northeastern Illinois is approximately 9,000 people per square within 1/2 mile of the grade crossing. Whistle ban grade crossings in northeastern Illinois are found in densely settled urban areas of the region resulting in the high population density and consequently high number of individuals potentially impacted by the Proposed Rule. This figure contrasts significantly to the FRA's estimate of an average density of 658 people per square mile within five miles of all public at-grade crossings in the United States.

**Figure 1**  
**All 9,890 Public**  
**At-Grade Crossings**  
**In Illinois**

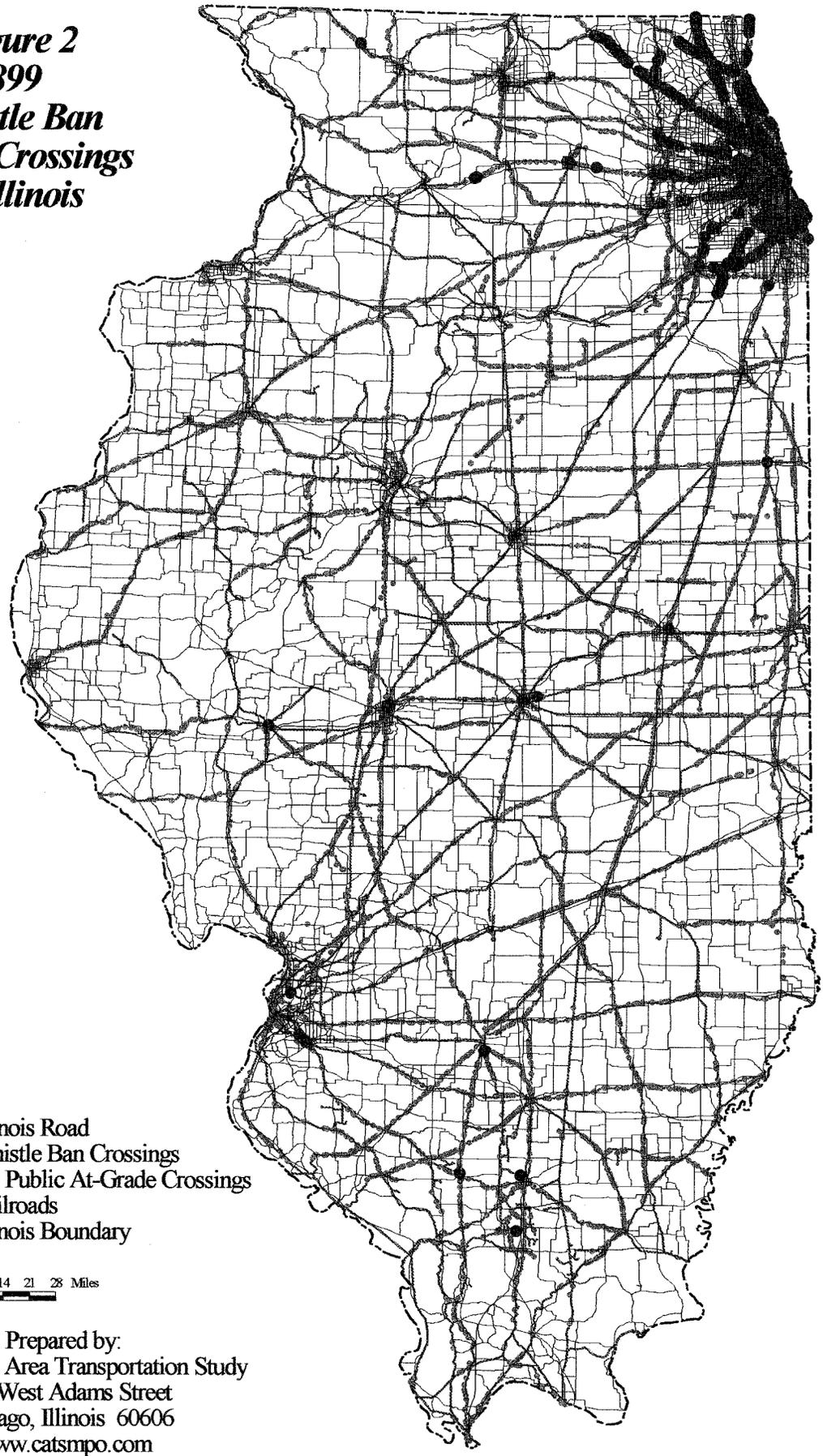


-  Illinois Road
-  All Public At-Grade Crossings
-  Railroads
-  Illinois Boundary

0 7 14 21 28 Miles

Prepared by:  
The Chicago Area Transportation Study  
300 West Adams Street  
Chicago, Illinois 60606  
[www.catsmpo.com](http://www.catsmpo.com)

**Figure 2**  
**899**  
**Whistle Ban**  
**Grade Crossings**  
**in Illinois**

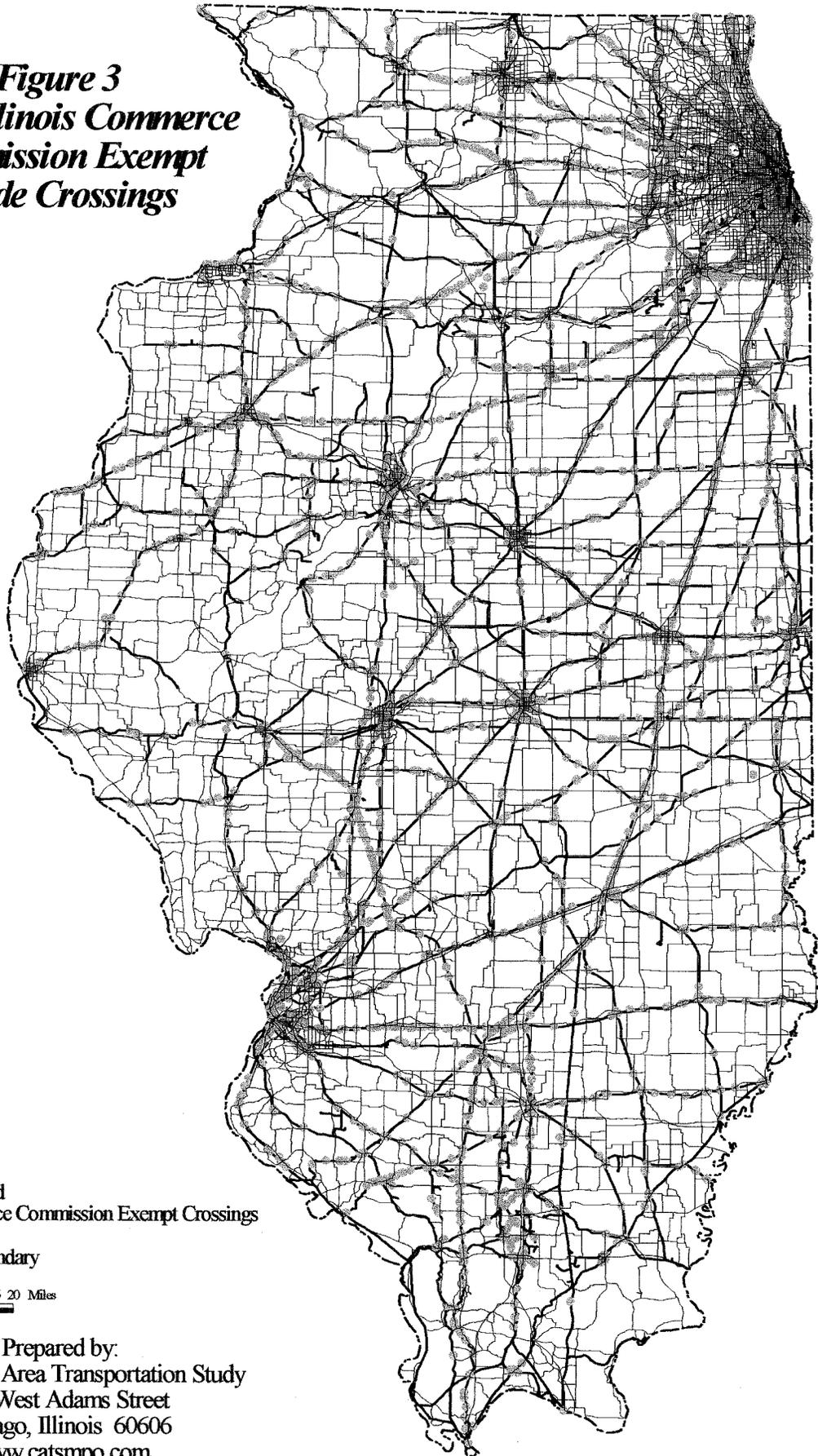


-  Illinois Road
-  Whistle Ban Crossings
-  All Public At-Grade Crossings
-  Railroads
-  Illinois Boundary

0 7 14 21 28 Miles

Prepared by:  
The Chicago Area Transportation Study  
300 West Adams Street  
Chicago, Illinois 60606  
[www.catsmpo.com](http://www.catsmpo.com)

**Figure 3**  
**4,828 Illinois Commerce**  
**Commission Exempt**  
**Grade Crossings**



-  Illinois Road
-  IL Commerce Commission Exempt Crossings
-  Railroads
-  Illinois Boundary

0 5 10 15 20 Miles

Prepared by:  
The Chicago Area Transportation Study  
300 West Adams Street  
Chicago, Illinois 60606  
[www.catsmpo.com](http://www.catsmpo.com)

Using 1990 Census data, CATS also summarized the number of potentially impacted individuals by US Congressional District for all FRA whistle ban grade crossings. Table 10 presents a summary of the number of individuals potentially impacted by the Proposed Rule for each of Illinois' 20 Congressional Districts.

Table 10. Population Impacted summarized by US Congressional District  
Impact from 899 Whistle Ban Grade Crossings

Representative	Within	
	1/4 Mile	1/2 Mile
	1990 Severely Impacted Population	1990 Impacted Population
Judy Biggert	29,643	69,298
Rod Blagojevich	55,576	142,299
Jerry Costello	3,581	10,384
Philip Crane	46,619	87,734
Danny Davis	22,980	75,237
Lane Evans	1,910	3,859
Thomas Ewing	3,614	10,390
Luis Gutierrez	82,540	201,766
Dennis Hastert	20,010	45,644
Henry Hyde	87,663	166,899
Jesse Jackson Jr	108,062	202,104
Ray LaHood	743	2,319
William Lipinski	67,620	147,038
Donald Manzullo	28,663	49,774
David Phelps	1,201	5,338
John Porter	82,208	174,620
Bobby Rush	66,130	131,536
Janice Schakowsky	29,310	75,750
John Shimkus	2,710	8,993
Jerry Weller	18,736	37,089
	<b>759,519</b>	<b>1,648,071</b>

Lastly, CATS identified the top 25 cities impacted in Illinois. This summary lists population figures for people who lived within either 1/4 or 1/2 mile of a whistle ban crossing in 1990. Table 11 presents the summary of the top 25 cities with substantial populations of people potentially impacted by the Proposed Rule.

**Table 11. Top 25 Illinois Cities potentially impacted.**

**Severely Impacted  
1/4 Mile**

Rank	City	# of Ban Crossings	1990 Population
1	Chicago	438	338,509
2	Des Plaines	27	24,417
3	Highland Park	4	11,007
4	Palatine	8	9,608
5	Arlington Heights	10	8,730
6	Bensenville	12	7,969
7	Grayslake	8	7,941
8	North Chicago	2	7,861
9	Cicero	1	7,569
10	Wheaton	9	7,567
11	Mount Prospect	3	7,470
12	Franklin Park	11	7,410
13	Blue Island	5	7,357
14	La Grange Park	0	7,195
15	La Grange	10	7,108
16	Park Ridge	4	6,923
17	Downers Grove	6	6,528
18	Elgin	8	6,406
19	Mundelein	4	6,339
20	Brookfield	3	6,327
21	Orland Park	8	6,319
22	Elmhurst	7	6,272
23	Oak Lawn	7	6,191
24	Berwyn	4	6,052
25	Elmwood Park	2	5,862
	<b>Total</b>	<b>601</b>	<b>530,937</b>

**Impacted  
1/2 Mile**

City	# of Ban Crossings	1990 Population
Chicago	438	725,336
Des Plaines	27	38,196
Cicero	1	25,909
Highland Park	4	22,655
Elgin	8	18,240
Park Ridge	4	18,152
Arlington Heights	10	18,130
Mount Prospect	3	17,482
North Chicago	2	17,142
Oak Lawn	7	16,426
Blue Island	5	15,900
Elmwood Park	2	14,739
Palatine	8	14,649
Brookfield	3	14,023
Mundelein	4	14,003
Maywood	6	13,960
Franklin Park	11	13,581
Wheaton	9	13,439
Downers Grove	6	13,193
Elmhurst	7	13,080
Naperville	2	13,014
Berwyn	4	12,934
Melrose Park	2	12,611
La Grange Park	0	12,029
Orland Park	8	12,009
<b>Total</b>	<b>581</b>	<b>1,120,832</b>

The top 25 cities account for 70 percent of all people severely impacted within a quarter mile, and 68 percent of all impacted people who reside within a half mile. The city of Chicago by itself represents 45 percent of all people severely impacted within a quarter mile, and 44 percent of all people impacted within a half mile of a whistle ban grade crossing.

This section provides an alternative approach to quantifying the number of people who may potentially be impacted by the Proposed Rule. CATS estimated approximately 757,609 residents in Illinois may be severely impacted, compared to the FRA total for Illinois of only 74,230. Likewise, CATS estimated that 1,644,212 Illinois residents may be impacted, compared to FRA's estimate of 177,110 Illinois residents. Appendices C - I present detailed summaries of potentially impacted population by race and ethnicity.

## **5.0 COST OF SUPPLEMENTAL SAFETY MEASURES**

This section reviews the costs of the approved supplemental safety measures. The benefits are primarily estimated to be the prevention of three fatalities and 39 injuries annually. Other benefits will accrue as communities install supplemental safety measures in order to create quiet zones, as well as from improvements made to current horn sounding practices. Costs are those costs that will be required for the 265 communities affected to maintain the peace and quiet they now enjoy. Some costs will be the responsibility of the railroad community, such as relocating horns and installing whistle boards. Railroads will also incur the additional maintenance costs associated with new high-tech warning devices. Determining all costs and benefits associated with the Proposed Rule is difficult since “noise” is not a commodity with a generally accepted value.

FRA assumes that communities “will choose to take actions that have the least cost.” This is a reasonable, but inaccurate assumption. Community decision making is also influenced by physical, engineering and aesthetic constraints and opportunities. A study made for the DuPage Mayors and Managers Conference in DuPage County, Illinois, a largely residential suburban area in northeastern Illinois, indicated that for a corridor of 30 grade crossings along Metra’s UP-West line, it would cost approximately \$15-\$20 million to maintain peace and quiet for seven communities. All crossings in this corridor already have gates as the standard warning device and all installations have constant warning time circuitry already in place. The range of improvements suggested include: one grade separation (\$15-\$20 million), four crossings that already have one-way streets with gates, six mountable barrier installations, six photo surveillance installations with one camera, and 23 grade crossings which would have increased programmatic law enforcement and public education/awareness.

CATS relied on sales literature from grade crossing manufacturers, estimates by the Illinois Commerce Commission, estimates by the FRA and any available empirical summaries available to derive average cost estimates for the seven approved supplemental and alternative safety devices. The initial assumption is that all grade crossings within a quiet zone will have to have; gates, constant warning time track circuitry, whistle boards and highway signs. The costs for the standard assumptions are as follows:

Upgrade to gates	\$250,000
Install constant warning time track circuitry	\$250,000
Install whistle boards	\$ 200
Install Highway signs	\$ 200

All grade crossings submitted for approval within a quiet zone must have the standard configuration described above.

### **5.1 Median Barriers**

There are two types of median barriers approved for installation, detachable and permanent. The detachable barrier is provided by firms such as Kwik Kurb, and are estimated by FRA to cost approximately \$11,070 per installation. Other estimates averaged about \$15,00 per installation. No reconstruction of the crossing would be required since the Kwik Kurb type of barrier maintains existing travel lane widths. CATS estimated that to install a 2-foot wide mountable concrete barrier will cost approximately \$600 per lineal foot. This figure includes essentially reconstructing the entire 200-foot section of roadway so that 12-foot travel lane widths may be maintained. Roadway cost for installation of a 2-foot wide mountable barrier 200 feet long is approximately \$120,000. This does not include the cost to relocate and rewire the railroad signal itself, which will have to be done. Estimated cost to relocate and rewire the railroad signal averaged about \$50,000. The total cost to install a detachable median barrier is approximately \$15,000 and the approximate cost to install a similar 2-foot wide mountable concrete barrier is \$120,000. These are the values that CATS will use in the revised cost-benefit estimate.

### **5.2 Temporary and Permanent Closure of a Street**

Grade crossings may be closed permanently or temporarily for specific times of the day. For a grade crossing to be closed temporarily, it may only be closed for one period of the day and the time period may not change. The Illinois Commerce Commission has estimated that it costs approximately \$5,000 to permanently close a grade crossing and approximately \$2,000 to temporarily close a crossing. CATS will use these values in preparation of a revised cost-benefit analysis. CATS does not have any indication as to how much the routine maintenance will cost of a temporarily closed crossing will cost. Grade separations are an alternative approach to permanently closing a grade crossing.

The preferred treatment for grade crossings that experience a high volume of combined rail and highway traffic is simply to grade separate the crossing. Grade separations in intensely developed areas, such as the inner core region of northeastern Illinois, may cost as much as \$20 million each. Grade separations in rural, undeveloped areas, may cost as little as \$100 thousand each. Several grade separation studies are underway in northeastern Illinois, including County Farm Road in DuPage County, which is estimated to cost \$10 million. Since grade separations were not considered by FRA as a safety measure, we will not include them when developing alternative cost estimates.

### **5.3 One Way Street with Full Gates**

Upgrading, or creating a one-way street with gates is another type of investment which is difficult to quantify. Costs may be very low if the treatment is to take an existing one-way street and simply extend the gate arms so that the roadway is fully blocked. Converting two nearby streets into a one-way pair of streets seems simple, but may involve many uncertainties which could affect the ultimate cost.

The Illinois Commerce Commission estimated it would cost \$250,000 to install gates on a one-way street that would fully block all lanes of travel. The FRA does not provide an estimate of how much a one-way conversion may cost. For the purpose of developing a unit cost for this analysis, CATS used the \$250,000 estimate provided by the Illinois Commerce Commission. Annual maintenance is estimated to approximately the national average cost of \$1,265 dollars. This maintenance value is calculated by dividing \$200 million (AAR estimate of what its member railroads spend on grade crossing maintenance) by the number of active public at-grade crossings (160,000).

### **5.4 Four Quad Gates**

Four quad gates do not have much history behind them. Four quad gates may be installed in conjunction with median barriers and may come equipped with vehicle presence detectors to alert an oncoming train that a vehicle is stalled in the crossing.

FRA estimates that four quad gates will cost approximately \$244,000 to \$318,000 and have an estimated annual maintenance cost of \$3,750. The Illinois Commerce Commission estimates an installation cost of approximately \$400,000 in urban areas and \$250,000 in rural areas. Most four

quad gates are likely to be installed at high volume/high exposure grade crossings located in northeastern Illinois. CATS assumed that vehicle presence detectors would be used. Vehicle presence detector technology is currently being tested by IDOT and the Village of Mundelein. If vehicle detection technology is incorporated, the cost per installation is likely to increase. The cost that CATS will base its estimate upon is \$440,000. The annual maintenance cost for four quad gates is estimated at \$3,500.

## **5.5 Photo Enforcement**

Photo enforcement involves placing video surveillance cameras at grade crossings to record and ticket individuals who violate grade crossing traffic safety laws. Drivers are prohibited from going around activated warning devices. FRA estimates cost of a video camera surveillance system at \$55,000 to \$75,000 to install. Illinois Commerce Commission estimates that photo enforcement may cost as much as \$300,000 to install. FRA estimates annual “operating” costs to be about \$20,000 to \$30,000 per crossing. Annual maintenance of a grade crossing with photo surveillance will cost more than a normal grade crossing with gates. CATS will use an average cost of \$300,000 per grade crossing for installation of photo enforcement. CATS estimates that the annual average per grade crossing cost of operation will be \$25,000. Photo enforcement and programmed law enforcement have the hidden advantage of being able to actually pay for themselves thanks to the revenue generated by ticketing violators.

Photo enforcement, programmed law enforcement, and public education and awareness campaigns all require perpetual effectiveness monitoring. Baseline violation rates per train before the installation of video surveillance or instituting programmed law enforcement or public education and awareness activities, must be determined. Quarterly performance evaluations must be for the first two quarters following installation, and then every other quarter thereafter, to ensure that the safety measure is maintaining effectiveness over time. Effectiveness is defined as meeting or exceeding the initial 49 percent reduction in violations per train. FRA can suspend a quiet zone if supplemental or alternative safety measures fail to maintain effectiveness. The cost of performing baseline violation calculation rates is estimated to be approximately \$1,100 per crossing and the cost of perpetual monitoring to be \$370 annually. Appendix B presents a detailed analysis of the data and information requirements of the Proposed Rule.

## **5.6 Programmatic Law Enforcement and Public Education and Awareness**

Programmed law enforcement and increased public education awareness activities must consist of programs with defined goals and measurable objectives. Quarterly violation rates per train must be measured prior to the start of any activity and violation rates per train must decrease by at least 49 percent for the program to be certified effective. Law enforcement or public education efforts must be “defined, established and continued along with continual or regular monitoring.”

FRA estimates that there is no cost to targeted law enforcement campaigns, but a surplus due to the revenue generated from tickets, however for the purpose of the revised cost-benefit estimate, CATS will use an annual cost of \$3,000 since collection of the revenue derived from violations is uncertain.

## **6.0 CATS COST ANALYSIS**

FRA has assumed that all communities will universally implement the lowest cost safety alternative available to communities who wish to maintain quiet zones. A more realistic assumption is that communities will implement a mix of available alternatives. In order to develop meaningful estimates of the potential costs associated with the Proposed Rule, CATS developed two scenarios for each of the three categories of grade crossings:

1. All 1,978 whistle ban grade crossings with an engineering based safety measure approach
2. All 1,978 whistle ban grade crossings with a performance based safety measure approach
3. 899 whistle ban grade crossings in northeast Illinois with an engineering approach
4. 899 whistle ban grade crossings in northeast Illinois with a performance based approach
5. 4,828 whistle exempt crossings in Illinois with an engineering based approach
6. 4,828 whistle exempt crossings in Illinois with a performance based approach

The engineering based approach uses only temporary closure (2.5%), one-way with full gates (2.5%), permanent closure (5%), four quad gates (10%) and median barriers (80%) which must be applied to all grade crossings within a proposed quiet zone. The performance based approach assumes targeted implementation at only enough grade crossings (50% of set) to permit a quiet zone to achieve and maintain the mitigation goal. Photo enforcement will be applied at 20 percent of the treated grade crossings, programmed law enforcement at 40 percent, and public education at the remaining 40 percent of crossings to be treated. Both approaches assume that all crossings within either type of quiet zone will be upgraded to automatic flashing lights, plus gates, plus constant warning time circuitry.

## 6.1 Application of the Revised Costs to the Six Scenarios

**Scenario 1. All 1,978 whistle ban grade crossings with an engineering based safety measure approach.**

Table 12. CATS Cost Analysis: ALL WHISTLE BAN GRADE CROSSINGS - ENGINEERING TREATMENTS

<b>Improvement</b>	<b>Relative Distribution</b>	<b>Estimated Unit Cost</b>	<b>1,978 #Gxing</b>	<b>USA BAN \$</b>
upgrade passive & AFLS to gates	xx	\$250,000	878	\$219,500,000
upgrade circuitry to gates w/o constant time warning	0.280	\$250,000	554	\$138,460,000
detachable median barrier @ 200'	0.400	\$15,000	791	\$11,868,000
permanent median island @ 200'	0.400	\$120,000	791	\$94,944,000
close existing crossing	0.050	\$5,000	99	\$494,500
temporarily close crossing	0.025	\$2,000	49	\$98,900
build new grade separation	0.000	\$15,000,000	0	\$0
install gates on 1 way street	0.025	\$250,000	49	\$12,362,500
4 quad gates	0.100	\$440,000	198	\$87,032,000
photo enforcement	0.000	\$300,000	0	\$0
maintenance and analysis on photo enforcement	0.000	\$25,000	0	\$0
programmed enforcement	0.000	\$3,000	0	\$0
public education & awareness	0.000	\$3,000	0	\$0
highway no-horn signs	1.000	\$200	1,978	\$395,600
increased maintenance cost for supplemental safety	1.000	\$3,500	1,978	\$6,923,000
baseline calculation for performance safety measures	0.000	\$1,100	0	\$0
quarterly monitoring for performance safety measures	0.000	\$370	0	\$0
community planning & analysis	1.000	\$550	1,978	\$1,087,900
FRA planning & analysis	1.000	\$550	1,978	\$1,087,900
directionality provision	1.000	\$5,500	1,978	\$10,879,000
whistle boards	1.000	\$200	1,978	\$395,600
				\$585,528,900

**Scenario 2. All 1,978 whistle ban grade crossings with a performance based safety measure approach.**

Table 13. CATS Cost Analysis: ALL WHISTLE BAN GRADE CROSSINGS - PERFORMANCE BASED TREATMENTS

<b>Improvement</b>	<b>Relative Distribution</b>	<b>Estimated Unit Cost</b>	<b>989 (.50% OF 1,978) #Gxing</b>	<b>USA BAN \$</b>
upgrade passive & AFLS to gates	xx	\$250,000	878	\$219,500,000
upgrade circuitry to gates w/o constant time warning	0.280	\$250,000	554	\$138,500,000
detachable median barrier @ 200'	0.000	\$15,000	0	\$0
permanent median island @ 200'	0.000	\$120,000	0	\$0
close existing crossing	0.000	\$5,000	0	\$0
temporarily close crossing	0.000	\$2,000	0	\$0
build new grade separation	0.000	\$15,000,000	0	\$0
install gates on 1 way street	0.000	\$250,000	0	\$0
4 quad gates	0.000	\$440,000	0	\$0
photo enforcement	0.200	\$300,000	198	\$59,340,000
maintenance and analysis on photo enforcement	0.200	\$25,000	198	\$4,945,000
programmed enforcement	0.400	\$3,000	396	\$1,186,800
public education & awareness	0.400	\$3,000	396	\$1,186,800
highway no-horn signs	1.000	\$200	1,978	\$395,600
increased maintenance cost for supplemental safety	1.000	\$3,500	989	\$3,461,500
baseline calculation for performance safety measures	1.000	\$1,100	989	\$1,087,900
quarterly monitoring for performance safety measures	1.000	\$370	989	\$365,930
community planning & analysis	1.000	\$550	1,978	\$1,087,900
FRA planning & analysis	1.000	\$550	1,978	\$1,087,900
directionality provision	1.000	\$5,500	1,978	\$10,879,000
whistle boards	1.000	\$200	1,978	\$395,600
				\$443,419,930

**Scenario 3. 899 whistle ban grade crossings with an engineering based safety measure approach.**

Table 14. CATS Cost Analysis: ILLINOIS WHISTLE BAN GRADE CROSSINGS - ENGINEERING TREATMENTS

<b>Improvement</b>	<b>Relative Distribution</b>	<b>Estimated Unit Cost</b>	<b>899 #Gxing</b>	<b>ILL BAN \$</b>
upgrade passive & AFLS to gates	xx	\$250,000	270	\$67,500,000
upgrade circuitry to gates w/o constant time warning	0.280	\$250,000	255	\$63,750,000
detachable median barrier @ 200'	0.400	\$15,000	360	\$5,394,000
permanent median island @ 200'	0.400	\$120,000	360	\$43,152,000
close existing crossing	0.050	\$5,000	45	\$224,750
temporarily close crossing	0.025	\$2,000	22	\$44,950
build new grade separation	0.000	\$15,000,000	0	\$0
install gates on 1 way street	0.025	\$250,000	22	\$5,618,750
4 quad gates	0.100	\$440,000	90	\$39,556,000
photo enforcement	0.000	\$300,000	0	\$0
maintenance and analysis on photo enforcement	0.000	\$25,000	0	\$0
programmed enforcement	0.000	\$3,000	0	\$0
public education & awareness	0.000	\$3,000	0	\$0
highway no-horn signs	1.000	\$200	899	\$179,800
increased maintenance cost for supplemental safety	1.000	\$3,500	899	\$3,146,500
baseline calculation for performance safety measures	0.000	\$1,100	0	\$0
quarterly monitoring for performance safety measures	0.000	\$370	0	\$0
community planning & analysis	1.000	\$550	899	\$494,450
FRA planning & analysis	1.000	\$550	899	\$494,450
directionality provision	1.000	\$5,500	899	\$4,944,500
whistle boards	1.000	\$200	899	\$179,800
				<b>\$234,679,950</b>

**Scenario 4. 899 whistle ban grade crossings with a performance based safety measure approach.**

Table 15. CATS Cost Analysis: ILLINOIS WHISTLE BAN GRADE CROSSINGS - PERFORMANCE BASED TREATMENTS

<b>Improvement</b>	<b>Relative Distribution</b>	<b>Estimated Unit Cost</b>	<b>450 (.50% OF 899) #Gxing</b>	<b>ILL BAN \$</b>
upgrade passive & AFLS to gates	xx	\$250,000	270	\$67,500,000
upgrade circuitry to gates w/o constant time warning	0.280	\$250,000	255	\$63,750,000
detachable median barrier @ 200'	0.000	\$15,000	0	\$0
permanent median island @ 200'	0.000	\$120,000	0	\$0
close existing crossing	0.000	\$5,000	0	\$0
temporarily close crossing	0.000	\$2,000	0	\$0
build new grade separation	0.000	\$15,000,000	0	\$0
install gates on 1 way street	0.000	\$250,000	0	\$0
4 quad gates	0.000	\$440,000	0	\$0
photo enforcement	0.200	\$300,000	90	\$27,000,000
maintenance and analysis on photo enforcement	0.200	\$25,000	90	\$2,250,000
programmed enforcement	0.400	\$3,000	180	\$540,000
public education & awareness	0.400	\$3,000	180	\$540,000
highway no-horn signs	1.000	\$200	899	\$179,800
increased maintenance cost for supplemental safety	1.000	\$3,500	450	\$1,575,000
baseline calculation for performance safety measures	1.000	\$1,100	450	\$495,000
quarterly monitoring for performance safety measures	1.000	\$370	450	\$166,500
community planning & analysis	1.000	\$550	899	\$494,450
FRA planning & analysis	1.000	\$550	899	\$494,450
directionality provision	1.000	\$5,500	899	\$4,944,500
whistle boards	1.000	\$200	899	\$179,800
				<b>\$170,109,500</b>

**Scenario 5. 4,828 Illinois Commerce Commission Exempt crossings with an engineering based safety measure approach.**

Table 16. CATS Cost Analysis: ILLINOIS COMMERCE COMMISSION EXEMPT CROSSINGS - ENGINEERING

<b>Improvement</b>	<b>Relative Distribution</b>	<b>Estimated Unit Cost</b>	<b>4,828 #Gxing</b>	<b>ILL EXEMPT \$</b>
upgrade passive & AFLS to gates	xx	\$250,000	2,588	\$647,000,000
upgrade circuitry to gates w/o constant time warning	0.280	\$250,000	1,373	\$343,250,000
detachable median barrier @ 200'	0.400	\$15,000	1,931	\$28,968,000
permanent median island @ 200'	0.400	\$120,000	1,931	\$231,744,000
close existing crossing	0.050	\$5,000	241	\$1,207,000
temporarily close crossing	0.025	\$2,000	121	\$241,400
build new grade separation	0.000	\$15,000,000	0	\$0
install gates on 1 way street	0.025	\$250,000	121	\$30,175,000
4 quad gates	0.100	\$440,000	483	\$212,432,000
photo enforcement	0.000	\$300,000	0	\$0
maintenance and analysis on photo enforcement	0.000	\$25,000	0	\$0
programmed enforcement	0.000	\$3,000	0	\$0
public education & awareness	0.000	\$3,000	0	\$0
highway no-horn signs	1.000	\$200	4,828	\$965,600
increased maintenance cost for supplemental safety	1.000	\$3,500	4,828	\$16,898,000
baseline calculation for performance safety measures	0.000	\$1,100	0	\$0
quarterly monitoring for performance safety measures	0.000	\$370	0	\$0
community planning & analysis	1.000	\$550	4,828	\$2,655,400
FRA planning & analysis	1.000	\$550	4,828	\$2,655,400
directionality provision	1.000	\$2,250	4,828	\$10,879,000
whistle boards	1.000	\$200	4,828	\$965,600
				\$1,530,036,400

**Scenario 6. 4,828 Illinois Commerce Commission Exempt crossings with a performance based safety measure approach.**

Table 17. CATS Cost Analysis: ILLINOIS COMMERCE COMMISSION EXEMPT CROSSINGS - PERFORMANCE BASED

<b>Improvement</b>	<b>Relative Distribution</b>	<b>Estimated Unit Cost</b>	<b>2,414 (.50% OF 2,414) #Gxing</b>	<b>ILL EXEMPT \$</b>
upgrade passive & AFLS to gates	xx	\$250,000	2,588	\$647,000,000
upgrade circuitry to gates w/o constant time warning	0.280	\$250,000	1,373	\$343,250,000
detachable median barrier @ 200'	0.000	\$15,000	0	\$0
permanent median island @ 200'	0.000	\$120,000	0	\$0
close existing crossing	0.000	\$5,000	0	\$0
temporarily close crossing	0.000	\$2,000	0	\$0
build new grade separation	0.000	\$15,000,000	0	\$0
install gates on 1 way street	0.000	\$250,000	0	\$0
4 quad gates	0.000	\$440,000	0	\$0
photo enforcement	0.200	\$300,000	483	\$144,840,000
maintenance and analysis on photo enforcement	0.200	\$25,000	483	\$12,070,000
programmed enforcement	0.400	\$3,000	966	\$2,896,800
public education & awareness	0.400	\$3,000	966	\$2,896,800
highway no-horn signs	1.000	\$200	4,828	\$965,600
increased maintenance cost for supplemental safety	1.000	\$3,500	2,414	\$8,449,000
baseline calculation for performance safety measures	1.000	\$1,100	2,414	\$2,655,400
quarterly monitoring for performance safety measures	1.000	\$370	2,414	\$893,180
community planning & analysis	1.000	\$550	4,828	\$2,655,400
FRA planning & analysis	1.000	\$550	4,828	\$2,655,400
directionality provision	1.000	\$2,250	4,828	\$10,863,000
whistle boards	1.000	\$200	4,828	\$965,600
				\$1,183,056,180

## **6.2 Comparison of CATS and FRA Cost Estimates**

CATS estimated the total cost at \$585 million if engineering fixes are applied, \$443 million if performance based measures are implemented for the set of 1,978 grade crossings which form the basis of the FRA's cost estimate. CATS' estimate is considerably higher than the FRA estimate of \$116 million. The cost estimate for Illinois' 899 whistle ban grade crossings ranges from \$170 to \$234 million. Ninety-seven percent of Illinois' cost will be shouldered by the six counties of northeastern Illinois; Cook, DuPage, Kane, Lake, McHenry and Will.

## **7.0 CONCLUSION**

The conclusion to this report is a series of bullet points each of which represents a significant finding of the analysis. This report focused on three main areas: reviewing the Proposed Rule and highlighting 40 areas where FRA is seeking comment; the review and development of an alternative noise impact analysis; and the review and development of an alternative cost estimate.

### ***Under Estimated Noise Impact***

The CATS noise impact analysis estimated that approximately 757,609 individuals will be severely impacted by the Proposed Rule and 1,644,212 individuals will be impacted compared to the FRA estimates of 74,230 Illinois residents being severely impacted and 177,110 simply being impacted by the Proposed Rule.

### ***Under Estimated Economic Cost***

CATS' cost analysis also indicates that the FRA underestimated the potential cost of the Proposed Rule. CATS estimated that it could cost as much as \$585 million to redesign and reequip the 1,978 grade crossings that currently have a whistle ban. FRA estimated that the cost would be \$116 million. The benefits from the Proposed Rule are the prevention of three fatalities and 39 injuries annually. The benefit is valued at \$188 million over 20 years.

### ***Preemption of State Role in Grade Crossing Safety***

The Illinois Commerce Commission currently regulates safety of railroad operation. The Commerce Commission's history has demonstrated that Illinois has a very effective grade crossing safety program in place. Between the Illinois Commerce Commission and the Illinois Department of Transportation, Illinois spends about \$40 million making improvements to about 200 of Illinois'

9,890 public grade crossings each year. Illinois is second to only Texas in the amount of railroad trackage, number of grade crossings, and number of grade crossing collisions.

### ***Disproportionate Impact to Illinois***

The state of Illinois, where 64% of the state's population lives within 1 mile of a public at-grade rail-highway crossing, will be significantly impacted by the proposed rule. Illinois has approximately 46 percent of the nation's severely impacted population and northeast Illinois alone accounts for 40 percent of the impacted population nationally.

### ***Effectiveness Measure Calculations***

All effectiveness measures are based upon one or two studies which relied on very small sample sizes. The statistical soundness of this approach is questionable. This leads to further complication when deciding whether or not to use single nationwide effectiveness values or effectiveness values tailored to each individual region.

### ***Data and Information Requirements***

For photo enforcement, programmed enforcement and educational awareness programs, data collection and analysis will be required "forever." Baseline violation rates must be ascertained and continual quarterly monitoring is required for the life of the safety measure. Photo enforcement, increased law enforcement and educational programs will all require ascertaining baseline violation rates and subsequent perpetual monitoring. Calculating baseline violation rates may cost as much as \$1,100 and the perpetual quarterly monitoring is likely to cost \$300, per year, per grade crossing.

### ***FRA Approach to Grade Crossing Safety: Florida and Nationwide Studies***

What is the relative accuracy of the FRA approach? There is no mention of error for the spatial analyses or for any other data items. The *Nationwide Study* was based upon the national inventory of grade crossings containing data that is generally out of date, if not simply incorrect. A significant flaw in FRA analysis is that they do not indicate how many crossings were geocoded and form the base of their spatial analysis. The FRA inventory has virtually no grade crossings geocoded within the city limits of Chicago. If the FRA inventory was the source of the geocodes used in their analysis, then they omitted many crossings. Railroads should be required to update and assist in

maintaining the grade crossing inventory. The average age of a grade crossing inventory record is about 11 years and the median age about 13 years.

### ***The Chicago Anomaly***

FRA's suggestion that the anomaly exists because of failure to report closed crossings is not likely, since the one class of crossing identified as being suspect, is grade crossings with automatic flashing lights, but not gates. Of the 84 grade crossings closed recently, only 14 had automatic flashing lights, the vast majority were grade crossings with no protection or crossbucks only. As research by the Northwest Municipal Conference indicates – grade crossings in northeastern Illinois with a whistle ban are generally as safe, if not safer than those without a whistle ban.

### ***Future Research***

The big picture question is will this approach truly increase safety and prevent injuries and fatalities? When one normalizes the potential for any one grade crossing of experiencing an accident by taking into account the amount of daily train and vehicle traffic, a conclusion opposite to FRA's approach is reached. After normalization, the most dangerous crossings are generally those that have passive warning devices such as crossbucks and have actually experienced one or two accidents over the past five or ten year span.

<b>LIST OF APPENDICES</b>	<b>PAGE</b>
A. 49 CFR Part 222 – Use of Locomotive Horns at Highway-Rail Crossings	37-44
B. Data and Information Requirements Analysis	45-50
C. Summary of Population Potentially Impacted - All Grade Crossings	51
D. Summary of Population Potentially Impacted - Whistle Ban Grade Crossings	52
E. Summary of Population Potentially Impacted – ICC Exempt Crossings	53
F. Summary of Population Potentially Impacted – by US Congressional District	54
G. Summary of Population Potentially Impacted – ICC Exempt Crossings – by US Congressional District	55
H. Summary of Population Potentially Impacted – Whistle Ban Grade Crossings ¼ Mile Impacts Summarized by City	56-58
I. Summary of Population Potentially Impacted – Whistle Ban Grade Crossings ½ Mile Impacts Summarized by City	59-61

**A note on how to interpret Appendices C - I**

The appendices which present information summarizing the potential population impacted by the Proposed Rule contain race and ethnicity estimates based upon the 1990 Census of Population. In order to accurately interpret the data, be aware that Hispanic is not a race, but an indication of ethnic heritage. As such, Hispanics may be counted under White, African American or Other. The 1990 total population consists of 5 racial categories: White, African American, Native American, Pacific Asian and other.

For example, to determine if any one category of race or ethnicity is adversely impacted in relation to the whole, simply compare the impacted subcategory's percentage to the statewide subcategory percentage. In the case of Appendix B the percentage of African American's who reside within ¼ mile of all public grade crossings is 12.9 percent and the statewide average is 14.8 percent, thus one would conclude that African Americans are not adversely affected by the presence of a grade crossing.

State, local and tribal governments and the private sector. The proposed rules issued today will not result in the expenditure, in the aggregate, of \$100,000,000 or more in any one year, and thus preparation of a statement is not required.

#### List of Subjects

##### 49 CFR Part 222

Administrative practice and procedure, Penalties, Railroad safety, Reporting and recordkeeping requirements.

##### 49 CFR Part 229

Locomotives, Penalties, Railroad safety.

#### The Proposed Rule

In consideration of the foregoing, FRA proposes to amend chapter II of title 49, Code of Federal Regulations as follows:

1. Part 222 is added to read as follows:

#### **PART 222—USE OF LOCOMOTIVE HORNS AT PUBLIC HIGHWAY-RAIL GRADE CROSSINGS**

##### **Subpart A—General**

###### Sec.

- 222.1 Purpose and scope.
- 222.3 Application.
- 222.5 Preemptive effect.
- 222.7 Definitions.
- 222.9 Penalties.
- 222.11 Petitions for waivers.
- 222.13 Responsibility for compliance.

##### **Subpart B—Use of Locomotive Horns**

- 222.21 When to use locomotive horns.
- 222.23 Emergency and other uses of locomotive horns.

##### **Subpart C—Exceptions to Use of the Locomotive Horn**

- 222.31 Train operations which do not require sounding of locomotive horns at individual public highway-rail grade crossings.
- 222.33 Establishment of quiet zones.
- 222.35 Notice and information requirements.
- 222.37 Quiet zone implementation.
- 222.39 Quiet zone duration.
- 222.41 Supplementary and alternative safety measures.
- 222.43 Development and approval of new supplementary safety measures.
- 222.45 Communities with pre-existing restriction on use of locomotive horns.

##### **Appendix A to Part 222—Approved Supplemental Safety Measures**

##### **Appendix B to Part 222—Alternative Safety Measures**

##### **Appendix C to Part 222—Conditions Not Requiring Additional Safety Measures**

Authority: 49 U.S.C. 20103, 20107 and 20153; 28 U.S.C. 2461 note; and 49 CFR 1.49.

#### **Subpart A—General**

##### **§ 222.1 Purpose and scope.**

(a) The purpose of this part is to increase safety at public highway-rail grade crossings by ensuring that locomotive horns are sounded when trains approach and pass through public highway-rail grade crossings.

(b) This part prescribes standards for sounding locomotive horns when locomotives approach and pass through public highway-rail grade crossings. This part further provides standards for exempting from the requirement to sound the locomotive horn certain categories of rail operations and categories of public highway-rail grade crossings.

##### **§ 222.3 Application.**

This part applies to every railroad with public highway-rail grade crossings on its line of railroad, except:

- (a) A railroad that exclusively operates freight trains exclusively on track which is not part of the general railroad system of transportation; and
- (b) Rapid transit operations within an urban area that are not connected to the general railroad system of transportation.

##### **§ 222.5 Preemptive effect.**

Under 49 U.S.C. 20106, issuance of this part preempts any State law, rule, regulation, or order covering the same subject matter, except an additional or more stringent law, regulation, or order that is necessary to eliminate or reduce an essentially local safety hazard; is not incompatible with a law, regulation, or order of the United States Government; and does not unreasonably burden interstate commerce.

##### **§ 222.7 Definitions.**

As used in this part—

*Administrator* means the Administrator of the Federal Railroad Administration or the Administrator's delegate.

*Barrier curb* means a highway curb designed to discourage a motor vehicle from leaving the roadway. Such curb is more than six inches but not more than nine inches high with a rounded top edge and is used where highway speeds do not exceed 40 miles per hour. The barrier curb is highly visible and provided with sloped end treatments. Additional design specifications are determined by the standard traffic design specifications used by the governmental entity constructing the barrier curb.

*Channelization device* means one of a continuous series of highly visible obstacles placed between opposing

highway lanes designed to alert or guide traffic around an obstacle or to direct traffic in a particular direction. Channelization devices must be at least 2.5 feet high and placed at least every seven feet. End treatments, in the case of rigid channelization devices, should be determined by reference to the governmental entity's own standard traffic design specifications.

*Effectiveness rate* means the effectiveness of a supplementary safety measure in reducing the probability of a collision at a public highway-rail grade crossing. (Effectiveness is indicated by a number between zero and one which represents the reduction of the probability of a collision as a result of the installation of a supplementary safety measure when compared to the same crossing equipped with conventional automated warning systems of flashing lights, gates and bells. Zero effectiveness means that the supplementary safety measure provides no reduction in the probability of a collision (there is no effectiveness) while an effectiveness rating of one means that the supplementary safety measure is totally effective in reducing collisions. Measurements between zero and one reflect the percentage by which the supplementary safety measure reduces the probability of a collision. Thus, a supplementary safety measure with an effectiveness of .38 reduces the probability of a collision by 38 percent.) FRA has determined that collision probabilities increase an average of 62 percent when locomotive horns are silenced. Thus, generally, a supplementary safety measure should have an effectiveness of at least .38 (reducing the probability of a collision by at least 38 percent) in order to compensate for this 62 percent increase.

*FRA* means the Federal Railroad Administration.

*Locomotive horn* means a locomotive air horn, steam whistle, or similar audible warning device mounted on a locomotive or control cab car. The terms "locomotive horn", "train whistle", "locomotive whistle", and "train horn" are used interchangeably in the railroad industry.

*Median* means the portion of a divided highway separating the travel ways for traffic in opposite directions. A median is bounded by mountable or barrier curbs.

*Mountable curb* means a highway curb designed to permit a motor vehicle to leave a roadway when required. It is a curb not more than six inches high, with a well rounded top edge.

Additional design specifications are determined by the standard traffic design specifications used by the

governmental entity constructing the mountable curb.

*Positive train control territory* means a line of railroad on which railroad operations are governed by a train control system capable of determining the position of the train in relation to a public highway-rail grade crossing and capable of computing the time of arrival of the train at the crossing, resulting in the automatic operation of the locomotive horn (or automatic prompting of the locomotive engineer) such that the horn is sounded at a predetermined time prior to the locomotive's arrival at the crossing.

*Public highway-rail grade crossing* means a location where a public highway, road, or street, including associated sidewalks or pathways crosses one or more active railroad tracks at grade.

*Quiet zone* means a segment of a rail line within which is situated one, or a number of consecutive public highway-rail crossings at which locomotive horns may not be routinely sounded.

*Railroad* means any form of nonhighway ground transportation that runs on rails or electromagnetic guideways and any entity providing such transportation, including:

(1) Commuter or other short-haul railroad passenger service in a metropolitan or suburban area and commuter railroad service that was operated by the Consolidated Rail Corporation on January 1, 1979; and

(2) High speed ground transportation systems that connect metropolitan areas, without regard to whether those systems use new technologies not associated with traditional railroads; but does not include rapid transit operations in an urban area that are not connected to the general railroad system of transportation.

*Supplementary safety measure* means a safety system or procedure established in accordance with this part which is provided by the appropriate traffic control authority or law enforcement authority and that is determined by the Administrator to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties. Appendix A to this part lists such measures.

*Whistle board* means a post or sign directed toward oncoming trains and bearing the letter "W" or equivalent symbol, erected at a distance from the next public highway-rail grade crossing which indicates to the locomotive engineer that the locomotive horn should be sounded beginning at that point.

#### § 222.9 Penalties.

Any person who violates any requirement of this part or causes the violation of any such requirement is subject to a civil penalty of least \$500 and not more than \$11,000 per violation, except that: Penalties may be assessed against individuals only for willful violations, and, where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury, a penalty not to exceed \$22,000 per violation may be assessed. Each day a violation continues shall constitute a separate offense. Any person who knowingly and willfully falsifies a record or report required by this part may be subject to criminal penalties under 49 U.S.C. 21311 (formerly codified in 45 U.S.C. 438(e)).

#### § 222.11 Petitions for waivers.

(a) Except for petitions filed pursuant to paragraph (b) of this section, all petitions for a waiver of any provision of this part must be submitted jointly by the railroad owning, or controlling operations of the railroad tracks crossing the public highway-rail grade crossing and by the appropriate traffic control authority or law enforcement authority (public authority) having jurisdiction over the public highway, street, road, pedestrian sidewalk or pathway crossing the railroad tracks.

(b) If the railroad and the appropriate public authority can not reach agreement to file a joint petition, either party may file a petition for a waiver, however the filing party shall, in its petition, specify the steps it has taken in an attempt to reach agreement with the other party and shall provide the other party with a copy of the petition filed with the FRA.

(c) Each petition for a waiver of this part must be filed in the manner required by 49 CFR Part 211.

(d) If the Administrator finds that a waiver of compliance with a provision of this part is in the public interest and that safety of highway and railroad users will not be diminished if the petition is granted, the Administrator may grant the waiver subject to any conditions the Administrator deems necessary.

#### § 222.13 Responsibility for compliance.

Although duties imposed by this part are generally stated in terms of the duty of a railroad, any person, including a contractor for a railroad, or a local or state governmental entity that performs any function covered by this part, must perform that function in accordance with this part.

### Subpart B—Use of Locomotive Horns

#### § 222.21 When to use locomotive horns.

(a) Except as provided in this part, the locomotive horn on the lead locomotive of a train, lite locomotive consist, individual locomotive or lead cab car shall be sounded when such locomotive or lead car is approaching and passes through each public highway-rail grade crossing. Sounding of the locomotive horn with two long, one short, and one long blast shall be initiated at the location required in paragraph (b) of this section and shall be repeated or prolonged until the locomotive or train occupies the crossing.

(b) Although preempted by this part, state requirements in effect on [the effective date of the final rule] which govern the location where, or time in which, locomotive horns must be sounded in advance of a public highway-rail grade crossing, shall be used as guidelines under this rule until such time as the railroad changes the maximum authorized speed for that portion of track at the grade crossing. At that time the railroad shall, subject to the one-quarter mile limitation contained in paragraph (e) of this section, either:

(1) Place whistle boards at a distance from the next crossing equal to the distance traveled by a train in 20 seconds while operating at the maximum speed allowed for any train operating on the track in that direction of movement; or

(2) Ensure by other methods that the locomotive horn is sounded no less than 20, nor more than 24 seconds before the locomotive enters the crossing.

(c) If, as of [the effective date of the final rule], there are no state requirements that locomotive horns be sounded at a specific distance in advance of the public highway-rail grade crossing, railroads shall, subject to the ¼ mile limitation contained in paragraph (e) of this section, either:

(1) Place whistle boards at a distance from the next crossing equal to the distance traveled by a train in 20 seconds while operating at the maximum speed allowed for any train operating on the track in that direction of movement; or

(2) Ensure by other methods that the locomotive horn is sounded no less than 20, nor more than 24 seconds before the locomotive enters the crossing.

(d) Each railroad shall, in the manner provided in paragraph (c) of this section, promptly adjust the location of each whistle board to reflect changes in maximum authorized track speeds, except where all trains operating over that public highway-rail grade crossing

are equipped to be responsive to a positive train control system.

(e) In no event shall a locomotive horn sounded in accordance with paragraph (a) of this section be sounded more than one-quarter mile (1,320 feet or 403 meters) in advance of a public highway-rail grade crossing.

**§ 222.23 Emergency and other uses of locomotive horns.**

(a)(1) Nothing in this part is intended to prevent an engineer from sounding the locomotive horn to provide a warning to vehicle operators, pedestrians, trespassers or crews on other trains in an emergency situation if, in the engineer's sole judgment, such action is appropriate in order to prevent imminent injury, death or property damage.

(2) Establishment of a quiet zone does not preclude the sounding of locomotive horns in emergency situations, nor does it impose a legal duty to sound the locomotive horn in such situations.

(b) Nothing in this part restricts the use of the locomotive horn to announce the approach of the train to roadway workers in accordance with a program adopted under part 214 of this Chapter, or where active warning devices have malfunctioned and use of the horn is required by one of the following sections of this Chapter: §§ 234.105; 234.106; or 234.107.

**Subpart C—Exceptions to Use of the Locomotive Horn**

**§ 222.31 Train operations which do not require sounding of horns at individual public highway-rail grade crossings.**

(a) Locomotive horns need not be sounded at individual public highway-rail grade crossings if the maximum authorized operating speed (as established by the railroad) for that segment of track is 15 miles per hour or less and properly equipped flaggers (as defined in 49 CFR 234.5) provide warning of approaching trains to motorists.

(b) This paragraph does not apply where active warning devices have malfunctioned and use of the horn is required by 49 CFR 234.105, 234.106, or 234.107.

**§ 222.33 Establishment of quiet zones.**

(a) *Community designation.* A state or local government may designate a quiet zone by implementing one or more supplementary safety measures identified in Appendix A of this part at each public highway-rail grade crossing within the quiet zone and by providing the information and notifications described under § 222.35.

(b) *FRA acceptance.* (1) A state or local government may apply to FRA's Associate Administrator for Safety for acceptance of a quiet zone, within which one or more safety measures identified in Appendix A or Appendix B of this part will be implemented. The state or local government's application to FRA's Associate Administrator for Safety must contain sufficient detail concerning the present engineering improvements at the public highway-rail grade crossings proposed to be included in the quiet zone, together with detailed information pertaining to the proposed supplementary and alternative safety measures to be implemented at each crossing. The application must conform with the requirements contained in Appendix B of this part, and must be based on the calculations discussed in the Introduction to Appendices A and B of this part. The application must also contain a commitment to implement the proposed safety measures within the proposed quiet zone. The state or local government must demonstrate through data and analysis that implementation of these measures will effect a reduction in risk at public highway-rail grade crossings within the quiet zone (viewing risk in the aggregate rather than on a crossing-by-crossing basis) sufficient to fully compensate for the absence of the warning provided by the locomotive horn. For purposes of this paragraph, risk will be viewed in terms of the quiet zone as a whole, rather than at each individual grade crossing. The aggregate reduction in predicted collision risk for the quiet zone as a whole must be shown to compensate for the lack of a locomotive horn.

(2) The FRA Associate Administrator for Safety may accept the proposed quiet zone, may accept the proposed quiet zone under additional conditions designed to ensure that the safety measures fully compensate for the absence of the warning provided by the locomotive horn, or may reject the proposed quiet zone if, in the Associate Administrator's judgment, the proposed safety measures do not fully compensate for the absence of the warning provided by the locomotive horn.

(c) *Quiet zone in which supplementary or alternative safety measures are not necessary.* A state or local government may create a quiet zone under this paragraph if the crossings within the quiet zone conform to the requirements contained in Appendix C of this part. Appendix C of this part describes those categories of crossings which the Administrator has determined do not present a significant risk with respect to loss of life or serious

personal injury if the locomotive horn is not sounded.

(d) *Minimum length.* The minimum length of a quiet zone established under this part shall be one-half mile (2,640 feet or 805 meters) along the length of railroad right-of-way.

(e) *Requirement for active grade crossing warning devices.* Except as provided in § 222.31, and paragraph (c) of this section, each public highway-rail grade crossing in a quiet zone established or accepted under this section must be equipped with active grade crossing warning devices comprising both flashing lights and gates which control traffic over the crossing and that conform to the standards contained in the Manual on Uniform Traffic Control Devices issued by the Federal Highway Administration. Installation or upgrading of such devices is not regarded as implementation of supplementary safety measures under this part and is not credited toward the compensating reduction in risk referenced in paragraph (b) of this section, except to the extent the new warning systems exceed the standards of the MUTCD and conform to requirements for supplementary safety measures contained in Appendix A of this part.

(f) *Requirement for advance warning signs.* Each highway approach to each public highway-rail grade crossing at which locomotive horns are not routinely sounded pursuant to this part shall be equipped with an advance warning sign advising the motorist that train horns are not sounded at the crossing.

**§ 222.35 Notice and information requirements.**

(a) A state or local government designating a quiet zone under § 222.33(a) shall provide written notice, by certified mail, return receipt requested, of such designation to: all railroads operating over the public highway-rail grade crossings within the quiet zone; the highway or traffic control authority or law enforcement authority having control over vehicular traffic at the crossings within the quiet zone; the state agency responsible for highway and road safety; and the FRA Associate Administrator for Safety.

(b) Upon acceptance by the FRA Associate Administrator for Safety of a quiet zone proposed by a state or local government under § 222.33(b), such state or local government shall provide written notice, by certified mail, return receipt requested, of such acceptance to: all railroads operating over the public highway-rail grade crossings within the quiet zone; the highway or traffic

control authority or law enforcement authority having control over vehicular traffic at the crossings within the quiet zone; and the state agency responsible for highway and road safety.

(c) A state or local government creating a quiet zone under § 222.33(c), shall provide written notice, by certified mail, return receipt requested, of such designation to: all railroads operating over the public highway-rail grade crossings within the quiet zone; the highway or traffic control authority or law enforcement authority having control over vehicular traffic at the crossings within the quiet zone; the state agency responsible for highway and road safety; and the FRA Associate Administrator for Safety.

(d) The following information pertaining to every quiet zone must be submitted to the FRA Associate Administrator for Safety:

(1) An accurate and complete U.S. DOT-AAR National Highway-Rail Grade Crossing Inventory Form, FRA F6180.71, (Inventory Form) (available through the FRA Office of Safety Analysis, Mail Stop 17, 1120 Vermont Avenue, NW., Washington, DC 20590) for each public highway-rail grade crossing within the quiet zone dated within six months prior to designation or FRA acceptance of the quiet zone;

(2) An accurate, complete and current Inventory Form reflecting supplementary and alternative safety measures in place upon establishment of the quiet zone; and

(3) The name and title of the state or local officer responsible for monitoring compliance with the requirements of this part and the manner in which that person can be contacted.

#### § 222.37 Quiet zone implementation.

(a) A quiet zone established under this part shall not be implemented until:

(1) All requirements of § 222.35 are complied with; and

(2) At least 14 days have elapsed since receipt of all of the notifications required by § 222.35.

(b) All railroads operating over public highway-rail grade crossings within a quiet zone established in accordance with this part shall cease routine use of the locomotive horn at public highway-rail crossings upon the date set by the state or local government which has established such quiet zone.

#### § 222.39 Quiet zone duration.

(a) Subject to paragraph (d) of this section, a quiet zone designated by a state or local government under § 222.33(a) may remain in effect indefinitely, provided that all requirements of this part continue to be

met and that within six months before the expiration of five years from the original designation made to FRA, or within six months of the expiration of five years from the last affirmation, the designating entity affirms in writing to the FRA Associate Administrator for Safety that the supplementary safety measures implemented within the quiet zone continue to conform with the requirements of Appendix A of this part. Copies of such notification must be provided to the parties identified in § 222.35(a) by certified mail, return receipt requested. In addition to its affirmation, the designating entity must send to the FRA Associate Administrator for Safety an accurate and complete U.S. DOT-AAR National Highway-Rail Grade Crossing Inventory Form, FRA F6180.71, for each public highway-rail grade crossing within the quiet zone.

(b) Subject to paragraph (d) of this section, a quiet zone accepted by FRA under § 221.33(b) shall remain in effect indefinitely, provided that all requirements of this part continue to be met and that within six months before the expiration of three years from the original designation made to FRA, or within six months of the expiration of three years from the last affirmation, the state or local government affirms in writing (with notification by certified mail, return receipt requested, of such affirmation provided to the parties identified in § 222.35(b)) that the supplementary safety measures installed and implemented in the quiet zone continue to be effective and continue to fully compensate for the absence of the warning provided by the locomotive horn. In addition to its affirmation, the governmental entity must send to the FRA Associate Administrator for Safety an accurate and complete U.S. DOT-AAR National Highway-Rail Grade Crossing Inventory Form, FRA F6180.71, for each public highway-rail grade crossing within the quiet zone.

(c) Subject to paragraph (d) of this section, a quiet zone created by a state or local government under § 222.33(c) may remain in effect indefinitely, provided that all requirements of this part continue to be met and that within six months before the expiration of five years from the original designation made to FRA, or within six months of the expiration of five years from the last affirmation, the state or local government affirms in writing to the FRA Associate Administrator for Safety that the conditions contained in Appendix C of this part continue to be met. Copies of such notification must be provided to the parties identified in § 222.35(a) by certified mail, return

receipt requested. In addition to its affirmation, the designating entity must send to the FRA Associate Administrator for Safety an accurate and complete U.S. DOT-AAR National Highway-Rail Grade Crossing Inventory Form, FRA F6180.71, for each public highway-rail grade crossing within the quiet zone.

(d) The FRA Associate Administrator for Safety may, at any time, review the status of any quiet zone and determine whether, under the conditions then present, supplementary and alternative safety measures in place fully compensate for the absence of the warning provided by the locomotive horn, or in the case of quiet zones created under § 222.33(c), whether there is a significant risk with respect to loss of life or serious personal injury. If the FRA Associate Administrator for Safety makes a preliminary determination that such safety measures do not fully compensate for the absence of the locomotive horn, or that there is a significant risk with respect to loss of life or serious personal injury, he or she will publish notice of the determination in the *Federal Register* and provide an opportunity for comment and informal hearing. The FRA Associate Administrator for Safety may require that additional safety measures be taken or that the quiet zone be terminated.

#### § 222.41 Supplementary and alternative safety measures.

(a) Approved supplementary safety measures determined to be at least as effective as the locomotive horn when each public highway-rail grade crossing is equipped, and standards for their implementation, are listed in Appendix A of this part.

(b) Additional, alternative safety measures that may be included in a request for FRA acceptance of a quiet zone under § 222.33(b) are listed in Appendix B of this part.

(c) Appendix C of this part describes those situations in which the Administrator has determined do not present a significant risk with respect to loss of life or serious personal injury from establishment of a quiet zone. In the situations listed, supplementary safety measures are not required.

(d) The Administrator will add new supplementary safety measures and standards to Appendix A or B of this part when the Administrator determines that such measures or standards are an effective substitute for the locomotive horn in the prevention of collisions and casualties at public highway-rail grade crossings. The Administrator will add new listings to Appendix C of this part when the Administrator determines that

no negative safety consequences result from establishment of a quiet zone under the listed conditions.

(e) The following do not, individually or in combination, constitute supplementary or alternative safety measures: standard traffic control devices arrangements such as reflectorized crossbucks, STOP signs, flashing lights, or flashing lights with gates that do not completely block travel over the line of railroad, or traffic signals.

**§ 222.43 Development and approval of new supplementary safety measures.**

(a) Interested parties may demonstrate proposed new supplementary safety systems or procedures to determine if they are an effective substitute for the locomotive horn in the prevention of collisions and casualties at public highway-rail grade crossings.

(b) The Administrator may order railroad carriers operating over a public highway-rail grade crossing or crossings to temporarily cease the sounding of locomotive horns at such crossings to demonstrate proposed new supplementary safety measures, provided that such proposed new supplementary safety systems or procedures have been subject to prior testing and evaluation. In issuing such order, the Administrator may impose any conditions or limitations on such use of the proposed new supplementary safety measures which he or she deems necessary in order provide the highest level of safety.

(c) Upon successful completion of a demonstration of proposed new supplementary safety measures, interested parties may apply to the FRA Associate Administrator for Safety for approval of the new supplementary safety measures. Applications for approval shall be in writing and shall include the following:

- (1) The name and address of the applicant;
- (2) A description and design of the proposed new supplementary safety measure;
- (3) A description and results of the demonstration project in which the proposed supplementary safety measures were tested;
- (4) Estimated costs of the proposed new supplementary safety measure; and
- (5) Any other information deemed necessary.

(d) If the FRA Associate Administrator for Safety is satisfied that the proposed supplementary safety measure fully compensates for the absence of the warning provided by the locomotive horn, he or she will approve its use as a supplementary safety

measure to be used in the same manner as the measures listed in Appendix A of this part. The Associate Administrator may impose any conditions or limitations on use of the supplementary safety measures which he or she deems necessary in order to provide the highest level of safety.

(e) If the FRA Associate Administrator for Safety approves a new supplementary safety measure he or she will notify the applicant and shall add the measure to the list of approved supplementary safety measures contained in Appendix A of this part.

(f) The party applying for approval of a supplementary safety measure may appeal to the Administrator from a decision by the FRA Associate Administrator for Safety rejecting a proposed supplementary safety measure or the conditions or limitations imposed on use.

**§ 222.45 - Communities with pre-existing restrictions on use of locomotive horns.**

(a) Subject to paragraph (b) of this section, communities which, as of October 9, 1996, have enacted ordinances restricting the sounding of a locomotive horn, or communities which, as of October 9, 1996, have not been subject to sounding of locomotive horns at highway-rail crossings due to formal or informal agreements between the community and the railroad or railroads may continue those restrictions for a period of up to three years from [the date of publication of the final rule] in order to provide time for the community to plan for, and implement supplementary safety measures at the affected crossings.

(b) If a quiet zone has not been created pursuant to § 222.33 by [two years after date of publication of the final rule], a community with a pre-existing restriction on locomotive horns as of October 9, 1996, must initiate or increase both grade crossing safety public awareness initiatives and public highway-rail grade crossing traffic law enforcement programs in an effort to offset the lack of supplementary safety measures at affected crossings. The community must document in writing the steps taken to comply with this provision. The FRA Associate Administrator for Safety reserves the right to determine whether the steps taken are sufficient to temporarily offset the lack of supplementary safety measures. If such public awareness initiatives and traffic law enforcement programs are not initiated or increased, or if the FRA Associate Administrator for Safety determines that the steps taken are not sufficient to temporarily offset the lack of supplementary safety

measures, locomotive horns must be sounded in accordance with § 222.21.

(c) Quiet zones which have been established by communities prior to issuance of this NPRM and which have been determined by the FRA Associate Administrator for Safety to be substantially in accord with this part shall be deemed to comply with the requirements of Appendix B of this part.

**Appendix A to Part 222—Approved Supplementary Safety Measures Community Guide**

The following discussion is intended to help guide state and local governments through the decision making process in determining whether to designate a quiet zone under § 222.33(a) or to apply for acceptance of a quiet zone under § 222.33(b). The suggested steps and "checklist" items are not meant to supersede or amend the regulatory requirements. They are included to provide a general guide. However, use of FRA's DOT Highway-Rail Crossing Accident Prediction Formula to determine the "mitigation goal" together with the figures to be used in performing local calculations is required. The suggested steps are as follows:

a. Define the subject corridor and the involved crossings. Obtain the U.S. DOT/AAR Crossing Inventory Number of each crossing within the proposed quiet zone. The corridor must be at least one-half mile in length (805 meters) measured along the rail right-of-way, and all highway-rail crossings within the entire length of the quiet zone corridor must be included.

b. Ensure that current data, especially public or private status, highway and rail traffic counts and at least five years of collision history, is available. Current highway and rail traffic counts must be submitted to the Federal Railroad Administration (FRA) for inclusion in the U.S. DOT/AAR National Highway-Rail Crossing Inventory. A record of collisions can be obtained from the FRA (Office of Safety Analysis (RRS-22) Mail Stop 17, 1120 Vermont Avenue, NW., Washington, DC 20590 or on the internet at <http://safetydata.fra.dot.gov/officeofsafety>.

c. Determine the presence of minimum requirements. The minimum traffic control requirement for each public highway-rail grade crossing within a quiet zone is flashing lights, automatic gates, and bell and a special advance warning sign (in accordance with standards contained in the Manual on Uniform Traffic Control Devices) on each highway approach which advises approaching highway users that the train horn will not be sounded.

d. Account for private and pedestrian crossings. Private highway-rail crossings do not need to be addressed by supplementary or alternative safety measures to be included within a quiet zone. Calculations of violation rates and collision rates should not include such crossings. The minimum traffic control requirement for each private highway-rail grade crossing and pedestrian at-grade crossing within a quiet zone is a special warning sign on each approach which

advises users of the crossing that the train horn will not be sounded.

e. In order to establish a quiet zone that includes private crossings, the jurisdiction establishing the quiet zone must notify all land owners using the crossing that train horns will not be routinely sounded at crossings within the quiet zone.

f. Determine which crossings can be addressed by the engineering-based supplementary safety measures of this Appendix A. If all crossings can be so addressed without changing any requirements of the supplementary safety measures, the road authorities and the railroad(s) should proceed to implement the appropriate measures and make the applicable notifications.

g. If any of the crossings will be addressed with a non-engineering-based supplementary safety measure from this Appendix A (currently, only Photo Enforcement is included), a baseline violation rate for each crossing to be so addressed must be determined for subsequent assessment purposes:

1. In the case where train horns are routinely being sounded within the proposed quiet zone: once baseline violation rates have been determined, and before the quiet zone has been implemented, Photo Enforcement should be initiated. In the calendar quarter following initiation, a new violation rate should be determined and compared to the baseline violation rate. If and when the new violation rates at all crossings in the quiet zone at which Photo Enforcement is to be used are at least 49 percent below the baseline violation rates, and all the other crossings in the quiet zone have been addressed with Appendix A options, the community and the railroad may proceed with notifications and implementation of the quiet zone. Violation rates must be monitored for the next two calendar quarters and every other quarter thereafter. If the violation rate is ever greater than the baseline violation rate, the procedures for dealing with unacceptable effectiveness after establishment of a quiet zone should be followed.

2. In the case where the routine use of train horns within the proposed quiet zone is already prohibited: Once baseline violation rates have been determined and all the other crossings in the quiet zone have been addressed with other Appendix A options, the community and the railroad may proceed with initiation of Photo Enforcement and notification and implementation of the quiet zone. Violation rates must be monitored for the next two calendar quarters and every other quarter thereafter. If the violation rate is ever greater than a value less than 49 percent below the baseline violation rate, the procedures for dealing with unacceptable effectiveness after establishment of a quiet zone should be followed.

h. Where one or more crossings in the proposed quiet zone corridor can not be addressed with a supplementary safety measure from this Appendix A, the applicant must use the DOT Highway-Rail Crossing Accident Prediction Formula to determine the total of predicted accidents at all of the public crossings within the quiet zone

assuming that each crossing is equipped with lights, automatic gates, and a bell. If a ban is not in effect, this total becomes the "mitigation goal" for the corridor, i.e., the predicted accident total which the community's proposal must show will not be exceeded once the quiet zone is implemented. The mitigation goal must be multiplied by 1.62 (communities subject to FRA's Emergency Order No. #15 (EO15) should multiply by 3.125) to establish the 'expected accident total without horns,' i.e., the expected accident total once horns are banned if no supplementary safety measures are applied. If a ban is in effect, this total is the expected accident total without horns. The mitigation goal is realized by multiplying this total by .62 (communities subject to EO15 should multiply by .32).

i. The accident prediction for any crossing(s) to be closed prior to implementation of the quiet zone should be subtracted from the "expected accident total without horns." The highway traffic counts for crossings to be closed must be added to the traffic counts of the crossings which will be used by the displaced vehicles and the accident prediction for these impacted crossings must be recalculated and multiplied by 1.62 (3.125 for communities subject to EO15) to establish a new "expected accident total without horns."

j. For each crossing to be addressed, the effectiveness of the supplementary safety measure to be applied, as set forth above, should be multiplied times that crossing's accident prediction and the product should be subtracted from the "expected accident total without horns." For the non-engineering-based measures, an effectiveness of .38 may be assumed until analysis of the specific crossing and applied mitigation measure has been assessed.

k. Once it can be shown that the "expected accident total without horns" will be reduced to or below the mitigation goal, the quiet zone proposal may be submitted for approval to FRA's Associate Administrator for Safety.

#### *Approved Supplementary Safety Measures*

##### **1. Temporary Closure of a Public Highway-Rail Grade Crossing**

Close the crossing to highway and pedestrian traffic during whistle-ban periods.

#### *Required*

a. The closure system must completely block highway and pedestrian traffic from entering the crossing.

b. The crossing must be closed during the same hours every day.

c. The crossing may only be closed during one period each 24-hours.

d. Daily activation and deactivation of the system is the responsibility of the traffic control authority or governmental authority responsible for maintenance of the street or highway crossing the railroad. The entity may provide for third party activation and deactivation; however, the governmental entity shall remain fully responsible for compliance with the requirements of this part.

e. The system must be tamper and vandal resistant to the same extent as other traffic control devices.

#### *Recommended*

Manual on Uniform Traffic Control Devices (MUTCD) standards should be met for any barricades and signs used in the closure of the facility. Signs for alternate highway traffic routes should be erected in accordance with MUTCD and state and local standards and should inform pedestrians and motorists that the streets are closed, the period for which they are closed, and that alternate routes must be used.

##### **2. Four-Quadrant Gate System**

Install gates at a crossing sufficient to fully block highway traffic from entering the crossing when the gates are lowered, including at least one gate for each direction of traffic on each approach.

#### *Required*

a. When a train is approaching, all highway approach and exit lanes on both sides of the highway-rail crossing must be spanned by gates, thus denying to the highway user the option of circumventing the conventional approach lane gates by switching into the opposing (oncoming) traffic lane in order to enter the crossing and cross the tracks.

b. Gates must be activated by use of constant warning time devices.

c. The gap between the ends of the entrance and exit gates (on the same side of the railroad tracks) when both are in the fully lowered, or down, position must be less than two feet if no median is present. If the highway approach is equipped with a median or a channelization device between the approach and exit lanes, the lowered gates must reach to within one foot of the median or channelization device, measured horizontally across the road from the end of the lowered gate to the median or channelization device or to a point over the edge of the median or channelization device. The gate and the median top or channelization device do not have to be at the same elevation.

d. "Break-away" channelization devices must be frequently monitored to replace broken elements.

e. Signs must be posted alerting motorists to the fact that the train horn does not sound.

#### *Recommendations for new installations only*

f. Gate timing should be established by a qualified traffic engineer based on site specific determinations. Such determination should consider the need for and timing of a delay in the descent of the exit gates (following descent of the conventional entrance gates). Factors to be considered may include available storage space between the gates that is outside the fouling limits of the track(s) and the possibility that traffic flows may be interrupted as a result of nearby intersections.

g. When operating in the failure (fail-safe) mode, exit gates should remain in the raised, or up, position.

h. A determination should be made as to whether it is necessary to provide vehicle presence detectors (VPDs) to open or keep open the exit gates until all vehicles are clear of the crossing. VPD should be installed on one or both sides of the crossing and/or in the surface between the rails closest to the

field. Among the factors that should be considered are the presence of intersecting roadways near the crossing, the priority that the traffic crossing the railroad is given at such intersections, the types of traffic control devices at those intersections, and the presence and timing of traffic signal preemption.

i. Highway approaches on one or both sides of the highway-rail crossing may be provided with medians or channelization devices between the opposing lanes. Medians should be defined by a barrier curb or mountable curb, or by reflectorized channelization devices, or by both.

j. Remote monitoring of the status of these crossing systems is preferable. This is especially important in those areas in which qualified railroad signal department personnel are not readily available.

### 3. Gates With Medians or Channelization Devices

Install medians or channelization devices on both highway approaches to a public highway-rail grade crossing denying to the highway user the option of circumventing the approach lane gates by switching into the opposing (oncoming) traffic lane in order to drive around lowered gates to cross the tracks.

#### Required

a. Opposing traffic lanes on both highway approaches to the crossing must be separated by either: (1) Medians bounded by barrier curbs, or (2) medians bounded by mountable curbs if equipped with channelization devices.

b. Medians must extend at least 100 feet, or if there is an intersection within 100 feet of the gate, the median must extend at least 60 feet from the gate.

c. Intersections within 60 feet of the crossing must be closed or moved.

d. Crossing warning system must be equipped with constant warning time devices.

e. The gap between the lowered gate and the barrier curb or channelization device must be one foot or less, measured horizontally across the road from the end of the lowered gate to the barrier curb or channelization device or to a point over the curb edge or channelization device. The gate and the curb top or channelization device do not have to be at the same elevation.

f. "Break-away" channelization devices must be frequently monitored to replace broken elements.

g. Signs must be posted alerting motorists to the fact that the train horn does not sound.

### 4. One Way Street With Gate(s)

Gate(s) must be installed such that all approaching highway lanes to the public highway-rail grade crossing are completely blocked.

#### Required

a. Gate arms on the approach side of the crossing should extend across the road to within one foot of the far edge of the pavement. If a gate is used on each side of the road, the gap between the ends of the gates when both are in the lowered, or down, position should be no more than two feet.

b. If only one gate is used, the edge of the road opposite the gate mechanism must be configured with a barrier curb extending at least 100 feet.

c. Crossing warning system must be equipped with constant warning time devices.

d. Signs must be posted alerting motorists to the fact that the train horn does not sound.

### 5. Photo Enforcement

The alternative entails automated means of gathering valid photographic or video evidence of traffic law violations together with follow-through by law enforcement and the judiciary.

#### Required

a. State law authorizing use of photographic or video evidence both to bring charges and sustain the burden of proof that a violation of traffic laws concerning public highway-rail grade crossings has occurred, accompanied by commitment of administrative, law enforcement and judicial officers to enforce the law.

b. Sanction includes sufficient minimum fine (e.g., \$100 for a first offense) to deter violations.

c. Means to reliably detect violations (e.g., loop detectors, video imaging technology).

d. Photographic or video equipment deployed to capture images sufficient to document the violation (including the face of the driver, if required to charge or convict under state law).

Note to 5.d.: This does not require that each crossing be continually monitored. The objective of this option is deterrence, which may be accomplished by moving photo/video equipment among several crossing locations, as long as the motorist perceives the strong possibility that a violation will lead to sanctions. Each location must appear identical to the motorist, whether or not surveillance equipment is actually placed there at the particular time. Surveillance equipment should be in place and operating at each crossing at least 25 percent of each calendar quarter.

e. Appropriate integration, testing and maintenance of the system to provide evidence supporting enforcement.

f. Semi-annual analysis verifying that the last quarter's violation rates remain at or below the acceptable levels established prior to initiation of photo enforcement.

g. Signs must be posted alerting motorists to the fact that the train horn does not sound.

h. Public awareness efforts designed to reinforce photo enforcement and alert motorists to the absence of train horns.

### Appendix B to Part 222—Alternative Safety Measures

a. Please refer to the section entitled "Community guide" at the beginning of Appendix A of this part for a discussion intended to help guide state and local governments through the decision making process in determining whether to designate a quiet zone under § 222.33(a) (implementing supplementary safety measures) or to apply for acceptance of a quiet zone under § 222.33(b) (implementing alternative safety measures or a combination of alternative and supplementary safety measures).

b. A state or local government seeking acceptance of a quiet zone under § 222.33(b) may include in its proposal alternative safety measures listed in this appendix. Credit may be proposed for closing of public highway-rail grade crossings provided the baseline risk at other crossings is appropriately adjusted by increasing traffic counts at neighboring crossings as input data to the prediction formula (except to the extent that nearby grade separations are expected to carry that traffic).

c. The following alternative safety measures may be proposed to be employed in the same manner as stated in Appendix A of this part. Unlike application of the supplementary safety measures in Appendix A of this part, if there are unique circumstances pertaining to a specific crossing or number of crossings, the specific requirements associated with a particular supplementary safety measure may be adjusted or revised. In addition, as provided for in § 222.33(b), using the alternative safety measures contained in this Appendix B will enable a locality to tailor the use and application of various supplementary safety measures to a specific set of circumstances. Thus, a locality may institute alternative or supplementary measures on a number of crossings within a quiet zone but due to specific circumstances a crossing or a number of crossings may be omitted from the list of crossings to receive those safety measures. FRA will review the proposed plan, and will approve the proposal if it finds that the predicted collision rate applied to the quiet zone as a whole, is reduced to the required level.

d. The following alternative safety measures may be included in a proposal for acceptance by FRA for creation of a quiet zone. Approved supplementary safety measures which are listed in Appendix A of this part may be used for purposes of alternative supplementary safety measures. The requirements for the first five measures listed below are found in Appendix A of this part. If one or more of the requirements associated with that supplementary safety measure as listed in Appendix A of this part is revised or deleted, data or analysis supporting the revision or deletion must be provided to FRA for review.

#### 1. Temporary Closure of a Public Highway-Rail Grade Crossing

Close the crossing to highway and pedestrian traffic during whistle-ban periods.

#### 2. Four-Quadrant Gate System

Install sufficient gates at a public highway-rail grade crossing to fully block highway traffic from entering the crossing when the gates are lowered, including at least one gate per each direction of traffic on each approach.

#### 3. Gates With Medians or Channelization Devices

Install medians or channelization devices on both highway approaches to a public highway-rail grade crossing which prevent highway traffic from driving around lowered gates.

**4. One-Way Street With Gate(s)**

Gate(s) are installed such that all approaching highway lanes to a public highway-rail grade crossing are completely blocked.

**5. Photo Enforcement**

Automated means of gathering valid photographic evidence of traffic law violations at a public highway-rail grade crossing together with follow-through by law enforcement and judicial personnel.

The following alternatives may be proposed for inclusion in a proposed program of alternative safety measures within specific quiet zone proposals:

**16. Programmed Enforcement**

Community and law enforcement officials commit to a systematic and measurable crossing monitoring and traffic law enforcement program at the public highway-rail grade crossing, alone or in combination with the Public Education and Awareness option.

**Required**

a. Subject to audit, a statistically valid baseline violation rate must be established through automated or systematic manual monitoring or sampling at the subject crossing(s). See Appendix A of this part (Photo Enforcement) for treatment of effectiveness with or without prior whistle ban.

b. A law enforcement effort must be defined, established and continued along with continual or regular monitoring.

c. Following implementation of the quiet zone, results of monitoring for not less than two full calendar quarters must show that the violation rate has been reduced sufficiently to compensate for the lack of train horns, (i.e., a reduction of at least 49 percent), and the railroad shall be notified (to resume sounding of the train horn if results are not acceptable).

d. Subsequent semi-annual sampling must indicate that this reduction is being sustained. If the reduction is not sustained, the state or municipality may continue the quiet zone for a maximum of one calendar quarter and shall increase the frequency of sampling to verify improved effectiveness. If, in the second calendar quarter following the quarter for which results were not acceptable, the rate is not acceptable, the quiet zone shall be terminated until requalified and accepted by FRA.

e. Signs alerting motorists to the fact that the train horn does not sound.

**7. Public Education and Awareness**

Conduct, alone or in combination with programmed law enforcement, a program of

public education and awareness directed at motor vehicle drivers, pedestrians and residents near the railroad to emphasize the risks associated with public highway-rail grade crossings and applicable requirements of state and local traffic laws at those crossings.

**Requirements**

a. Subject to audit, a statistically valid baseline violation rate must be established through automated or systematic manual monitoring or sampling at the subject crossing(s). See Appendix A of this part (Photo Enforcement) for treatment of effectiveness with or without prior whistle ban.

b. A sustainable public education and awareness program must be defined, established and continued concurrent with continued monitoring. This program shall be provided and supported primarily through local resources.

c. Following implementation of the quiet zone, results of monitoring for not less than two full calendar quarters must show that the violation rate has been reduced sufficiently to compensate for the lack of train horns (i.e., a reduction of at least 49 percent with statistical confidence of .95). The railroad (with a copy of such notification sent to FRA's Associate Administrator for Safety) shall be notified to resume sounding of the train horn if results are not acceptable.

d. Subsequent semi-annual sampling must indicate that this reduction is being sustained. If the reduction is not sustained, the state or municipality may continue the quiet zone for a maximum of one calendar quarter and shall increase the frequency of sampling to verify improved effectiveness. If, in the second calendar quarter following the quarter for which results were not acceptable, the rate is not acceptable, the quiet zone shall be terminated until requalified and accepted by FRA.

e. Signs alerting motorists to the fact that the train horn does not sound.

**Appendix C to Part 222—Conditions Not Requiring Additional Safety Measures**

No negative safety consequences result from establishment of a quiet zone under the following conditions:

1. Train speed does not exceed 15 miles per hour;
2. Train travels between traffic lanes of a public street or on an essentially parallel course within 30 feet of the street;
3. Signs are posted at every grade crossing indicating that locomotive horns do not sound;
4. Unless the railroad is actually situated on the surface of the public street, traffic on

all crossing streets is controlled by STOP signs or traffic lights which are interconnected with automatic crossing warning devices; and

5. The locomotive bell will ring when approaching and traveling through the crossing.

**PART 229—[AMENDED]**

2. The authority citation for part 229 continues to read as follows:

**Authority:** 49 U.S.C. 20103, 20107, 20701–20703, and 49 CFR 1.49.

3. Section 229.129 is revised to read as follows:

**§ 229.129 Audible warning device.**

(a) Each lead locomotive shall be provided with an audible warning device that produces a minimum sound level of 96dB(A) and a maximum sound level of [Option 1—104 dB(A); Option 2—111 dB(A)] at 100 feet forward of the locomotive in its direction of travel. The sound level of the device as measured 100 feet from the locomotive to the right and left of the center of the locomotive shall not exceed the permissible value measured at 100 feet forward of the locomotive. The device shall be arranged so that it can be conveniently operated from the engineer's normal position in the cab.

(b) Measurement of the sound level shall be made using a sound level meter conforming, at a minimum, to the requirements of ANSI S1.4–1971, Type 2, and set to an A-weighted slow response. While the locomotive is on level tangent track, the microphone shall be positioned 4 feet above the ground at the center line of the track, and shall be oriented with respect to the sound source in accordance with the manufacturer's recommendations. Measurements verifying compliance shall be taken only while the ambient temperature is in the range between 36 and 95 degrees Fahrenheit and the relative humidity is in the range between 20 and 90 percent. The test site shall be free of reflective structures (including buildings, natural barriers, and other rolling stock) within a 200 foot radius of the horn system.

Issued in Washington, D.C. on December 16, 1999.

**Jolene M. Molitoris,**  
Federal Railroad Administrator.  
[FR Doc. 00–4 Filed 1–12–00; 8:45 am]  
BILLING CODE 4910–06–P

## **Information and Data Requirements of the Proposed Rule**

### **March 27, 2000**

Page 2261 of the Federal Register from January 13, 2000 indicates that the Office of Management and Budget, is seeking comments regarding the information and data collection requirements of the Proposed Rule requiring locomotive horn sounding at public grade crossings. Comments are due to the Office of Management and Budget by March 13, 2000. Copies of comments submitted to OMB should also be sent to Robert Brogan of the FRA. It is probably a good idea to submit comments to the FRA docket FRA-1999-6439 as well.

#### **FRA is seeking comments concerning:**

- Whether the information collection requirements are necessary for the proper performance of the function of the FRA.
- The practical utility of the information collected.
- The accuracy of FRA's estimate of the burden of collection of information requirements.
- The quality, utility and clarity of the information to be collected.
- Whether the burden of collection of information on those who are to respond, including through the use of automated collection techniques or other forms of information technology may be minimized.

#### **The FRA's goal in seeking comments is to:**

- Reduce reporting burdens.
- Ensure that FRA organizes information collection requirements in a user-friendly manner.
- Accurately assess the resources expended to retrieve and produce information requested.

#### **Comments should be sent to:**

Office of Management and Budget  
Attention: Desk Officer for FRA  
Office of Information & Regulatory Affairs  
Washington, DC 20503

Federal Railroad Administration  
Robert Brogan, RRS-211, Mail Stop 25  
400 7<sup>th</sup> Street SW  
Washington, DC 20590

#### **Data and information is required in three general areas of the Proposed Rule:**

- Seeking a petition for a waiver.
- Establishing quiet zones:
  - Update of the FRA grade crossing inventory.
  - Notification requirements.
  - The two year status report required to receive three year grace period.
  - Creation of a quiet zone plan. General planning activities and analysis requirements, not including the establishment of baseline violation rates or the perpetual quarterly monitoring for performance based safety measures.
- Installation of signs at temporarily closed crossings and highway signs at all quiet zone grade crossings.

This paper will briefly present FRA's estimate of the information and data collection requirements for each of the three areas indicated above. The paper will conclude by presenting an alternative estimate of the cost of collecting and preparing the data and information required to implement the Proposed Rule.

### *Seeking a Petition for Waiver*

Page 2243 of the Federal register explains when waivers may be sought. Waivers may be granted when:

- Circumstances may make application of the regulation counterproductive;
- An extension of time to comply with regulation may be needed;
- Technological advances may result in a portion of a regulation being inappropriate in a certain situation; or
- The Administrator finds that a waiver from compliance to all or a part of the regulation, is in the public interest and the safety of highway and railroad users will not be diminished.

Waivers must be submitted jointly by the affected railroad and the appropriate traffic control authority with jurisdiction for the highway. FRA estimates that of the 270 communities potentially impacted by the Proposed Rule, 92 will seek a waiver. FRA does not estimate the potential burden or difficulty that may be encountered by the community/railroad seeking a waiver. However, FRA does estimate that it will take FRA staff only one hour to respond to the waiver petition. FRA's estimated cost to respond to the petitions for a waiver is \$2,208 which is an average hourly cost of \$24.

The failure of FRA to estimate and include the cost to the community/railroad seeking a waiver is significant. Typically, the development of any type of intergovernmental or interagency agreement requires negotiation between the parties to establish a joint vision and goal. Negotiation, preparation of the waiver documentation and testimony before FRA may easily consume a staff person's time for a full week. An alternative estimates this cost to be between \$4,000 and \$8,000 for each waiver petition. The cost is derived by assuming a forty-hour work-week, at a minimum hourly rate of \$100 and a maximum hourly rate of \$200 per hour. The hourly cost includes salary plus benefits plus overhead for a senior municipal staff person in the city engineering and/or law department.

In summary, FRA's estimate of the time required for the waiver process and the hourly unit cost of \$24, seems underestimated. Applying the alternative hourly rates suggests that the cost may be as high as \$754,400 to develop petition waivers and for FRA to respond to 92 petitions, in comparison to FRA's estimate of \$2,208.

### *Establishing Quiet Zones*

Since FRA is estimating that 92 of the 270 communities will seek a waiver, the remaining 178 communities will be creating some sort of quiet zone. FRA estimates it will take each community approximately 40 hours to develop a quiet zone plan and that the unit cost per hour is \$30. Each plan includes; baseline and improvement grade crossing inventory updates; contact information; a two year status report for communities with pre-existing restrictions on use of horns; plan preparation; plan review and public comment; notification of the concerned parties; and, planning for the installation of warning signs. This estimate does not include the cost to establish baseline violation rates or the perpetual monitoring required to verify that photo enforcement, programmatic law enforcement, or public education/awareness measures remain effective.

The **first information requirement** of creating a quiet zone plan is updating the grade crossing inventory by completing a new inventory form. Two forms must be filled out for each crossing; one reflecting the current condition, and an additional inventory form reflecting the actual supplemental and alternative safety devices to be installed. FRA estimates that it will take about one hour to inventory the grade crossings and that the unit cost per hour is \$30. FRA estimates 800 forms will have to be completed and that it will take one hour to complete each form. *FRA's total cost estimate for 800 updated inventory forms is 800 hours and \$24,000.* Here again, FRA's estimate of the hourly

cost of labor, seems low. This study applied the alternative hourly labor rates discussed previously to estimate the cost between \$80,000 and \$160,000.

The **second information requirement** is the preparation of a two-year status report. The status report is required to be submitted at the two year point, in order to verify to FRA that communities are developing a quiet zone and that they will begin some sort of education and/or law enforcement program. This is the verification that FRA requires so that communities may be granted the third year time extension. FRA estimates that the cost to prepare a status report is approximately 8 hours at a unit cost of \$30 per hour. *FRA estimates that 73 reports will be submitted and that the total cost is 584 hours and \$17,520.* An alternative estimate based on the \$100-\$200 per hour cost of labor ranges between \$58,400 and \$116,800.

The **third information requirement** is the preparation, review and public comment of a quiet zone plan. 178 communities are estimated to be preparing a quiet zone plan, although FRA only accounts for 166 of those communities and associated costs in the NPRM. FRA estimates that it will take approximately forty hours at a unit cost of \$30 per hour to prepare a quiet zone plan. *FRA has estimated that it will require approximately 6,641 hours to plan for 166 of the 178 quiet zones at a total cost of approximately \$199,230.*

We agree that forty hours is a reasonable estimate of the time required for a community to develop a plan, but that the unit cost per hour, is not. Applying the \$100-\$200 per hour cost results in an alternative estimate of \$664,000 to \$1,328,000 for planning 166 of the initial quiet zones. *Adding in the cost for the twelve missing quiet zone plans of \$48,000 to \$96,000 brings the total cost for hours to 7,120 and expense to between \$712,000 and \$1,424,000.*

The **fourth information requirement** is the cost to notify all concerned parties. FRA requires that all railroads that operate at each grade crossing, the appropriate traffic control authorities, each municipality involved, and the state authority responsible for highway safety, be notified. FRA estimates notification costs to be 20 minutes to write each letter at an hourly cost of \$30. *FRA estimates that 383 letters will need to be prepared at a total cost of 128 hours and \$3,840.* CATS agrees with the time estimate but not the hourly rate for labor.

The **fifth information requirement** is the planning for the installation of warning signs at grade crossings that will be temporarily closed, and of highway signs at all grade crossings where train horns will not be routinely sounded. FRA estimates that 60 of 1,978 grade crossings will be closed temporarily for some part of the day. The cost of planning for the provision of warning signs at those locations is estimated by FRA to be one hour at a unit cost of \$24 per hour. Likewise, FRA estimates that 800 grade crossings will require a pair of highway warning signs indicating that train horns do not routinely sound. The cost of planning for these signs is also estimated to be one hour at a unit cost of \$24 per hour.

The discussion of costs here appears to be limited to the cost of planning where the signs are to be installed and the nature of the sign. The cost of purchasing and installing the signs, does not appear to be included. *If this reading of the sign requirement is correct, then FRA's cost estimate of 1,600 signs at a total cost of \$38,400 seems low.* Applying the \$100 to \$200 hourly cost of labor, produces an estimate ranging between \$166,00 to \$332,000.

**In summary,** FRA's estimate of the cost to update the inventory of grade crossings appears low. FRA's estimate of the cost to prepare 73 two-year status reports for communities with pre-existing

restrictions on horn use, also appears low. FRA's estimate of the time required to plan and create a quiet zone, as well as the hourly unit cost of \$30, also appears underestimated. FRA also does not include the cost of calculating baseline violation rates or performing quarterly monitoring.

### ***Additional Cost of Performance Based Safety Measures***

Two significant data and information requirements not addressed in the Proposed Rule, are the cost of calculating baseline violation rates and the cost of quarterly effectiveness monitoring for the performance based safety measures. Photo enforcement, programmatic law enforcement and public education and awareness are the three approved performance based safety measures so far. It is likely that additional performance based safety measures approved for use by FRA, will also require determining the baseline violation and subsequent quarterly effectiveness monitoring. This section will briefly summarize the potential cost of acquiring baseline violation rate data and the cost of quarterly effectiveness monitoring.

### ***Measurement of Baseline Violation Rate and Quarterly Effectiveness Rates***

The process of determining baseline violation rates for the performance based safety measures is complex. Calculating valid baseline violation rates in communities that have had long standing education and law enforcement programs in place, will be challenging.

Data must be collected for four weeks if there is no public awareness that a violation counting program or supplemental safety measure is to be installed. If there will be public awareness that a violation counting program or supplemental safety measure is to be installed, then 16 weeks of data will be required. The data collected must be statistically reliable at a .95 confidence level. Data collection methods are not discussed in the Proposed Rule. When estimating the burden and cost of information requirements associated with calculation of baseline violation rates, this analysis assumes that the public will be aware of this action and a 16 week data capture period will be required.

The cost of data collection will vary with the overall utilization of a particular grade crossing. Data collection at high volume expressway locations using automatic recording equipment may cost as much as \$5,000 per location to install and process the results. Data collection at similar high volume grade crossings that rely on automatic recording techniques may cost a similar amount. Many of the grade crossings in Illinois that currently have a whistle ban, experience upwards of 100 trains every day. Fifty-three of 899 whistle ban grade crossings in Illinois have a combined AADT-daily train frequency exposure of over 1,000,000 exposures per day. An additional 242 whistle ban grade crossings, experience between 100,000 and 1,000,000 exposures per day.

Not all grade crossings will require baseline calculation or continual monitoring. In previous work, we estimated that 25 percent of all 899 whistle ban grade crossings in Illinois, will have photo enforcement installed. CATS also estimated that an additional 20 percent of whistle ban grade crossings will benefit from programmatic law enforcement or public education and awareness programs. The two tables on the next page estimate the economic and time costs of calculating the baseline violation rate for 405 (45% of 899) whistle ban grade crossings in Illinois.

Estimated Economic Cost to Establish Baseline Violation Rate at 405 Whistle Ban Grade Crossings.

Daily Exposure	Cost Per Crossing	Number of Crossings	Total Cost of Baseline
2,000,000 or more	\$5,000	6	\$30,000
1,000,000 to 2,000,000	\$4,000	45	\$180,000
500,000 to 1,000,000	\$3,000	50	\$150,000
100,000 to 500,000	\$2,000	80	\$160,000
50,000 to 100,000	\$1,000	15	\$15,000
25,000 to 50,000	\$500	30	\$15,000
less than 25,000	\$100	179	\$17,900
		405	\$567,900

The sheer magnitude of calculating the baseline violation rate at 405 grade crossings is daunting. If the cost to conduct a baseline violation rate analysis ranges between \$100 at the low end and \$5,000 at the high end, we can apply a range of likely costs to Illinois whistle ban grade crossings. To simply calculate the baseline violation rates for the 405 of Illinois' 899 grade crossings that currently have a whistle ban, will cost approximately \$568,000. To estimate the number of person hours required to collect, process, analyze and present the results of the baseline analysis one can assume that each \$100 of expense is equal to .5 person hours of labor. The table below indicates that collecting and processing the information required to calculate baseline violation rates will require an estimated 2,840 person hours of labor.

Estimated Time Cost to Establish Baseline Violation Rate at 405 Whistle Ban Grade Crossings.

Daily Exposure	Hours Per Crossing	Number of Crossings	Total Hours for Baseline
2,000,000 or more	25.0	6	150
1,000,000 to 2,000,000	20.0	45	900
500,000 to 1,000,000	15.0	50	750
100,000 to 500,000	10.0	80	800
50,000 to 100,000	5.0	15	75
25,000 to 50,000	2.5	30	75
less than 25,000	0.5	179	90
Total		405	2,840

Regular monitoring must indicate that photo enforcement, programmatic law enforcement and public education and awareness programs maintain effectiveness. Estimating the cost of the routine monitoring required to accomplish this task is difficult. One approach is to estimate the expense based upon a percentage of the cost to calculate the baseline violation rate. A complicating factor, is that the first two quarters after installation of photo enforcement or establishment of a law enforcement or education program, require more rigorous analysis than subsequent quarters. For this analysis, CATS will assume that the annual cost of routine monitoring is equal to one-third of the cost of calculating the baseline violation rates. This estimate equals 947 hours per year at an annual cost of \$189,300.

**Conclusion**

The Office of Management and Budget is seeking comments regarding the information and data requirements of the Proposed Rule. FRA indicated that the Proposed Rule will have impacts in eight specific areas of the Proposed Rule. FRA's estimate of the total cost was 9,926 hours of labor and \$287,268.

FRA used a unit cost per hour for labor of only \$30. This analysis used a range of \$100 and \$200 per hour to estimate a likely range for the potential costs. This cost is for a senior staff person in a municipal engineering or law department and includes benefits and overhead. The two tables on this page summarize both FRA's and CATS' estimate of the burden and cost of the information requirements of the Proposed Rule. FRA's failure to include baseline calculation rate and perpetual monitoring information requirements, resulted in FRA significantly underestimating the ultimate cost for information. The ability of communities to meet the costs of the estimated information requirements is unknown.

**FRA Estimate of Data and Information Requirements Cost for all 1,978 Whistle Ban Crossings**

Data & Information Requirement	Total Hours	Total Cost \$	Cost per Hour
waiver data & information: 92 petitions at 1 hour each	92	\$2,208	\$24
community designation: 97 analyses at 40 hours each	3,880	\$116,400	\$30
App A photo enforcement: 10 analyses at 40 hours each	400	\$12,000	\$30
App B law enforcement & education: 5 analyses at 40 hours each	200	\$6,000	\$30
App B new measures: 54 analyses at 40 hours each	2,161	\$64,830	\$30
Inventory update: 800 crossings at 1 hour each	800	\$24,000	\$30
Inventory update cover letters: 85 at 15 minutes each	21	\$630	\$30
quiet zone notification: 383 letters at 20 minutes each	128	\$3,840	\$30
quiet zone 2 year status reports: 73 at 8 hours each	584	\$17,520	\$30
signs - temp closure of grade crossing: 60 at 1 hour each	60	\$1,440	\$24
signs - no horns sounded: 1600 at 1 hour each	1,600	\$38,400	\$24
<b>Total data &amp; info requirements cost</b>	<b>9,926</b>	<b>\$287,268</b>	

**CATS Estimate of Data and Information Requirements Cost for all 1,978 Whistle Ban Crossings**

Data & Information Requirement	Total Minimum Hours	Minimum Cost per Hour	Minimum Total Cost \$	Total Maximum Hours	Maximum Cost per Hour	Maximum Total Cost \$
waiver data & information: 92 petitions at 41 hours each	3,772	\$100	\$377,200	3,772	\$200	\$754,400
community designation: 109 analyses at 40 hours each	4,360	\$100	\$436,000	4,360	\$200	\$872,000
App A photo enforcement: 10 analyses at 40 hours each	400	\$100	\$40,000	400	\$200	\$80,000
App B law enforcement & education: 5 analyses at 40 hours each	200	\$100	\$20,000	200	\$200	\$40,000
App B new measures: 54 analyses at 40 hours each	2,160	\$100	\$216,000	2,160	\$200	\$432,000
Inventory update: 800 crossings at 1 hour each	800	\$100	\$80,000	800	\$200	\$160,000
Inventory update cover letters: 85 at 15 minutes each	21	\$100	\$2,100	21	\$200	\$4,200
quiet zone notification: 383 letters at 20 minutes each	128	\$100	\$12,800	128	\$200	\$25,600
quiet zone 2 year status reports: 73 at 8 hours each	584	\$100	\$58,400	584	\$200	\$116,800
signs - temp closure of grade crossing: 60 at 1 hour each	60	\$100	\$6,000	60	\$200	\$12,000
signs - no horns sounded: 1600 at 1 hour each	1,600	\$100	\$160,000	1,600	\$200	\$320,000
calculation of baseline violation rate at 890 crossings	3,264	n/a	\$652,875	5,441	n/a	\$1,088,125
perpetual monitoring at 890 crossings - annual cost	1,088	n/a	\$217,603	1,814	n/a	\$362,672
<b>Total data &amp; info requirements cost</b>	<b>18,437</b>		<b>\$2,278,978</b>	<b>21,340</b>		<b>\$4,267,797</b>

Appendix C. Summary of Population Potentially Impacted - All Public Grade Crossings.

*.25 mile buffer on ALL PUBLIC grade crossings.*

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	1,232,860	881,000	222,240	2,384	30,293	96,943	171,296
Southern Illinois	688,995	617,654	64,424	1,393	3,738	1,786	5,303
Northern Illinois	554,829	510,500	31,821	1,131	3,699	7,678	16,225
Illinois Total	2,476,684	2,009,154	318,485	4,908	37,730	106,407	192,824
Relative %	100.0	81.1	12.9	0.2	1.5	4.3	7.8

*.50 mile buffer on ALL PUBLIC grade crossings.*

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	2,506,355	1,771,448	465,473	5,023	66,222	198,189	347,535
Southern Illinois	1,138,825	1,010,824	112,915	2,212	9,339	3,535	9,962
Northern Illinois	895,012	822,333	53,017	1,743	5,904	12,015	25,725
Illinois Total	4,540,192	3,604,605	631,405	8,978	81,465	213,739	383,222
Relative %	100.0	79.4	13.9	0.2	1.8	4.7	8.4

*1 mile buffer on ALL PUBLIC grade crossings.*

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	4,539,830	3,164,998	918,383	8,788	136,571	311,090	562,091
Southern Illinois	1,581,358	1,409,110	149,695	3,004	14,132	5,417	14,978
Northern Illinois	1,332,181	1,220,645	82,926	2,556	9,559	16,495	36,065
Illinois Total	7,453,369	5,794,753	1,151,004	14,348	160,262	333,002	613,134
Relative %	100.0	77.7	15.4	0.2	2.2	4.5	8.2

Note: 9,505 of 9,890 public at-grade rail-highway crossings are geocoded and form the base for this analysis.

Data source: 1990 Census of Population. GIS tabulation units are census blocks.

**Summary:**

- Within .25 miles of a grade crossing resides 21% of Illinois' population.**
- Average population density within the 1/4 mile is 2,131 people per square mile.**
- Within .5 miles of a grade crossing resides 39% of Illinois' population.**
- Average population density within the 1/2 mile is 1,265 people per square mile.**
- Within 1 mile of a grade crossing resides 64% of Illinois' population.**
- Average population density within the 1 mile area is 773 people per square mile.**

**Illinois Totals for 1990 Population**

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	7,264,234	5,124,676	1,425,666	14,080	251,471	448,341	837,123
Southern Illinois	2,163,406	1,962,006	171,564	4,134	18,847	6,855	20,197
Northern Illinois	2,009,859	1,871,287	98,632	3,642	15,165	21,133	47,367
Illinois Total	11,437,499	8,957,969	1,695,862	21,856	285,483	476,329	904,687
Relative %	100.0	78.3	14.8	0.2	2.5	4.2	7.9

Appendix D. Summary of Population Potentially Impacted - Whistle Ban Grade Crossings

.25 mile buffer on all WHISTLE BAN grade crossings.

SEVERE IMPACT ZONE = 84dBA

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	738,436	494,593	159,998	1,449	18,372	64,024	111,542
Southern Illinois	10,354	8,049	2,222	17	33	33	81
Northern Illinois	8,819	8,067	439	20	127	166	354
Illinois Total	757,609	510,709	162,659	1,486	18,532	64,223	111,977
Relative %	100.0	67.4	21.5	0.2	2.4	8.5	14.8

.50 mile buffer on all WHISTLE BAN grade crossings.

IMPACT ZONE = 72dBA

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	1,592,093	1,070,581	324,777	3,230	43,088	150,417	254,422
Southern Illinois	31,691	25,610	5,790	88	96	107	275
Northern Illinois	20,428	18,761	1,058	44	227	338	778
Illinois Total	1,644,212	1,114,952	331,625	3,362	43,411	150,862	255,475
Relative %	100.0	67.8	20.2	0.2	2.6	9.2	15.5

1 mile buffer on all WHISTLE BAN grade crossings

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	3,183,029	2,167,343	644,978	6,425	103,110	261,173	457,236
Southern Illinois	102,475	82,645	18,301	227	974	328	920
Northern Illinois	47,691	43,462	2,611	98	822	698	1,629
Illinois Total	3,333,195	2,293,450	665,890	6,750	104,906	262,199	459,785
Relative %	100.0	68.8	20.0	0.2	3.1	7.9	13.8

Note: 752 of 892 Whistle Ban at-grade rail-highway crossings are geocoded and form the base for this analysis.

Note: Severe and Impact zone dBA values are derived from Iowa DOT Wayside Horn Study (TRB Jan 2000)

Data source: 1990 Census of Population. GIS tabulation units are census blocks.

Illinois Totals for 1990 Population

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	7,264,234	5,124,676	1,425,666	14,080	251,471	448,341	837,123
Southern Illinois	2,163,406	1,962,006	171,564	4,134	18,847	6,855	20,197
Northern Illinois	2,009,859	1,871,287	98,632	3,642	15,165	21,133	47,367
Illinois Total	11,437,499	8,957,969	1,695,862	21,856	285,483	476,329	904,687
Relative %	100.0	78.3	14.8	0.2	2.5	4.2	7.9

Appendix E. Summary of Population Potentially Impacted - ICC Exempt Crossings

*.25 mile buffer on all WHISTLE BAN grade crossings.*

**SEVERE IMPACT ZONE = 84dBA**

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	1,046,061	761,041	183,656	2,007	26,692	72,665	132,357
Southern Illinois	522,148	464,585	52,021	1,085	3,025	1,432	4,281
Northern Illinois	427,396	390,377	26,742	904	2,722	6,651	13,798
Illinois Total	1,995,605	1,616,003	262,419	3,996	32,439	80,748	150,436
Relative %	100.0	81.0	13.1	0.2	1.6	4.0	7.5

*.50 mile buffer on all WHISTLE BAN grade crossings.*

**IMPACT ZONE = 72dBA**

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	2,144,479	1,546,246	377,321	4,066	57,269	159,577	280,082
Southern Illinois	959,216	844,552	101,716	1,886	7,915	3,147	8,731
Northern Illinois	741,335	677,942	46,543	1,466	4,689	10,695	22,522
Illinois Total	3,845,030	3,068,740	525,580	7,418	69,873	173,419	311,335
Relative %	100.0	79.8	13.7	0.2	1.8	4.5	8.1

*1 mile buffer on all WHISTLE BAN grade crossings*

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	3,995,818	2,857,612	743,247	7,494	119,168	268,297	485,749
Southern Illinois	1,448,270	1,281,458	145,434	2,747	13,513	5,118	14,072
Northern Illinois	1,171,564	1,067,209	79,167	2,255	8,513	14,420	31,989
Illinois Total	6,615,652	5,206,279	967,848	12,496	141,194	287,835	531,810
Relative %	100.0	78.7	14.6	0.2	2.1	4.4	8.0

Note: 4,677 of 4,828 ILCC Exempt at-grade rail-highway crossings are geocoded and form the base for this analysis.

Note: Severe and Impact zone dBA values are derived from Iowa DOT Wayside Horn Study (TRB Jan 2000)

Data source: 1990 Census of Population. GIS tabulation units are census blocks.

**Illinois Totals for 1990 Population**

Region	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
6 County NE ILL	7,264,234	5,124,676	1,425,666	14,080	251,471	448,341	837,123
Southern Illinois	2,163,406	1,962,006	171,564	4,134	18,847	6,855	20,197
Northern Illinois	2,009,859	1,871,287	98,632	3,642	15,165	21,133	47,367
Illinois Total	11,437,499	8,957,969	1,695,862	21,856	285,483	476,329	904,687
Relative %	100.0	78.3	14.8	0.2	2.5	4.2	7.9

Appendix F. Summary of Population Impacted - By US Congressional District.

899 Whistle Ban Crossings

Severe Impact

Representative	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
Bobby Rush	66,130	23,937	41,424	96	242	330	1,123
Danny Davis	22,980	5,622	16,079	14	299	904	1,861
Dennis Hastert	20,010	16,183	1,467	52	311	1,950	3,873
Donald Manzullo	28,663	27,491	96	64	157	834	1,554
Thomas Ewing	1,704	1,353	317	2	2	29	49
Henry Hyde	87,663	81,430	998	139	3,060	1,797	5,663
Janice Schakowsky	29,310	25,873	192	42	2,496	523	1,547
Jerry Weller	18,736	15,195	528	52	49	2,876	4,900
Jesse Jackson Jr	108,062	13,971	85,624	130	181	7,895	13,593
John Porter	82,208	74,833	4,021	146	3,309	1,958	5,592
Judy Biggert	29,643	28,494	304	46	549	207	766
Luis Gutierrez	82,540	32,358	6,787	352	3,351	39,023	57,182
Philip Crane	46,619	45,077	277	94	592	530	1,834
David Phelps	1,201	823	368	4	5	1	2
Jerry Costello	3,581	3,378	180	5	6	12	28
John Shimkus	2,710	2,626	81	2	0	1	21
Ray LaHood	743	663	64	3	1	12	10
Lane Evans	1,910	397	1,481	3	18	7	17
Rod Blagojevich	55,576	47,047	1,223	144	3,242	3,647	8,381
William Lipinski	67,620	63,956	1,150	98	660	1,689	3,982
	<b>757,609</b>	<b>510,709</b>	<b>162,659</b>	<b>1,486</b>	<b>18,532</b>	<b>64,223</b>	<b>111,977</b>

Impact

Representative	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
Bobby Rush	131,536	50,120	80,136	180	438	768	2,503
Danny Davis	75,237	17,509	50,807	92	4,045	2,546	4,897
Dennis Hastert	45,644	36,335	2,665	108	895	5,673	10,329
Donald Manzullo	49,774	48,345	136	79	284	1,105	2,238
Thomas Ewing	6,531	5,600	823	13	12	106	180
Henry Hyde	166,899	157,491	1,451	221	4,983	3,088	9,377
Janice Schakowsky	75,750	66,262	724	156	6,439	2,046	5,101
Jerry Weller	37,089	28,943	2,523	88	128	5,455	9,011
Jesse Jackson Jr	202,104	27,410	160,374	283	291	13,540	23,203
John Porter	174,620	153,754	9,832	260	5,891	5,064	11,802
Judy Biggert	69,298	66,971	746	83	1,314	385	1,600
Luis Gutierrez	201,766	88,638	10,574	855	6,633	93,905	137,303
Philip Crane	87,734	85,156	431	182	1,031	1,218	3,659
David Phelps	5,338	3,709	1,599	19	10	14	29
Jerry Costello	10,384	9,873	463	32	33	23	91
John Shimkus	8,993	8,612	365	18	13	20	83
Ray LaHood	2,319	2,007	284	5	2	30	25
Lane Evans	3,859	875	2,928	11	30	15	36
Rod Blagojevich	142,299	117,676	3,498	466	9,552	10,906	23,403
William Lipinski	147,038	139,666	1,267	212	1,386	4,955	10,605
	<b>1,644,212</b>	<b>1,114,952</b>	<b>331,625</b>	<b>3,362</b>	<b>43,411</b>	<b>150,862</b>	<b>255,475</b>

Note: The severely impacted population is a subset of the marginally impacted population.

Note: 752 of 899 whistle ban crossings are geocoded and form the base of this analysis.

Date source: 1990 Census of Population. GIS tabulation units are census blocks.

Appendix G. Summary of Population Potentially Impacted - By US Congressional District.

4,828 Illinois Commerce Commission Exempt Crossings

Severe Impact

Representative	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
Bobby Rush	81,723	43,115	37,342	105	470	691	2,270
Danny Davis	22,273	9,430	11,322	12	521	988	2,030
Dennis Hastert	101,717	90,513	5,240	238	1,308	4,418	9,597
Donald Manzullo	97,043	87,310	5,843	266	999	2,625	4,911
Thomas Ewing	173,137	150,927	18,852	348	1,534	1,476	3,033
Henry Hyde	98,991	91,061	1,268	161	4,073	2,428	6,801
Janice Schakowsky	50,590	43,852	283	39	5,957	459	1,763
Jerry Weller	158,245	139,438	9,071	320	821	8,595	15,928
Jesse Jackson Jr	142,661	27,003	104,297	218	302	10,841	18,663
John Porter	120,562	106,404	6,049	225	5,084	2,800	7,461
Judy Biggert	46,008	43,854	723	72	1,021	338	1,265
Luis Gutierrez	87,234	36,085	10,345	393	3,797	36,614	55,207
Philip Crane	63,163	61,015	344	109	970	725	2,345
David Phelps	136,086	126,455	8,783	262	404	182	648
Jerry Costello	128,055	105,016	21,517	288	824	410	1,407
John Shimkus	142,127	130,055	10,888	293	620	271	889
Ray LaHood	120,376	111,837	7,238	255	534	512	1,447
Lane Evans	108,608	100,416	5,083	199	646	2,264	4,733
Rod Blagojevich	47,362	39,863	1,045	115	3,271	3,068	7,377
William Lipinski	92,429	86,453	1,824	121	980	3,051	6,751
<b>Total</b>	<b>2,018,390</b>	<b>1,630,102</b>	<b>267,357</b>	<b>4,039</b>	<b>34,136</b>	<b>82,756</b>	<b>154,526</b>

Impact

Representative	1990 Pop Total	White	African American	Native American	Pacific Asian	Other	Hispanic
Bobby Rush	148,407	71,686	73,845	212	801	1,863	4,826
Danny Davis	83,339	28,863	46,954	106	4,820	2,596	5,438
Dennis Hastert	199,142	176,718	8,157	456	3,370	10,441	20,861
Donald Manzullo	184,921	165,296	12,690	404	1,745	4,786	9,112
Thomas Ewing	294,276	255,216	31,853	523	4,080	14,016	29,600
Henry Hyde	193,796	181,277	1,900	266	6,694	3,659	11,217
Janice Schakowsky	103,555	91,720	487	85	10,501	762	3,479
Jerry Weller	289,788	254,927	18,909	512	1,726	13,714	26,265
Jesse Jackson Jr	274,348	50,137	205,207	438	580	17,986	30,530
John Porter	252,120	220,028	14,440	511	10,403	6,738	16,080
Judy Biggert	95,755	91,140	1,801	134	2,045	635	2,525
Luis Gutierrez	185,004	81,186	8,761	739	6,780	87,538	127,209
Philip Crane	124,297	118,947	1,334	235	20,790	1,702	5,343
David Phelps	257,441	240,228	15,542	438	859	374	1,274
Jerry Costello	247,040	193,092	50,030	591	2,399	928	2,878
John Shimkus	245,129	226,264	16,857	481	1,089	438	1,542
Ray LaHood	211,780	198,075	11,437	390	1,037	841	2,146
Lane Evans	190,059	176,673	8,731	377	1,081	3,197	7,173
Rod Blagojevich	124,737	101,399	3,276	372	9,425	10,265	21,871
William Lipinski	195,761	181,890	3,394	267	2,030	8,180	17,088
<b>Total</b>	<b>3,900,695</b>	<b>3,104,762</b>	<b>535,605</b>	<b>7,537</b>	<b>92,255</b>	<b>190,659</b>	<b>346,457</b>

Note: The severely impacted population is a subset of the marginally impacted population.  
Date source: 1990 Census of Population. GIS tabulation units are census blocks.

Appendix H. Summary by City of Severely Impacted Population from 899 Whistle Ban Grade Crossings (1/4 Mile).

City	# of Ban Crossings	1990 Total Pop	White	African American	Native American	Pacific Asian	Other	Hispanic
Alsip	3	2,731	2,661	23	3	23	21	123
Antioch	6	2,584	2,529	5	7	21	22	72
Arlington Heights	10	8,730	8,265	44	11	304	106	332
Ashton	3	1,054	1,034	0	0	16	4	10
Aurora	1	47	38	9	0	0	0	4
Bannockburn	1	127	115	4	0	7	1	1
Barrington	6	2,425	2,363	7	2	43	10	66
Barrington Hills	0	169	169	0	0	0	0	0
Bartlett	4	3,493	3,333	63	12	66	19	59
Beach Park	0	275	235	27	1	12	0	7
Belleville	2	3,100	2,934	147	5	3	11	25
Bellwood	1	2,078	233	1,697	0	8	140	198
Bensenville	12	7,969	6,424	50	23	791	681	2,018
Berwyn	4	6,052	5,877	4	20	78	73	284
Bloomington	1	963	612	322	2	2	25	37
Blue Island	5	7,357	4,984	1,583	11	29	750	1,953
Brookfield	3	6,327	6,194	24	3	51	55	221
Buffalo Grove	0	2,169	2,002	31	0	132	4	26
Calumet City	0	39	39	0	0	0	0	0
Calumet Park	4	1,922	698	1,048	3	2	171	373
Cary	4	5,698	5,579	27	8	34	50	124
Champaign	1	1,949	405	1,514	3	20	7	18
Chicago	438	338,509	136,226	143,020	771	8,048	50,444	78,882
Chicago Ridge	2	4,897	4,724	41	7	75	50	186
Cicero	1	7,569	4,720	12	32	93	2,712	4,280
Clarendon Hills	2	2,074	2,037	17	1	18	1	32
Crystal Lake	10	4,172	4,046	12	13	62	39	159
De Kalb	7	4,519	4,178	103	9	107	122	277
Decatur	2	1,047	663	376	3	4	1	2
Deerfield	4	4,708	4,569	28	5	91	15	126
Des Plaines	27	24,417	22,217	230	38	1,124	808	1,916
Dixmoor	2	167	0	167	0	0	0	0
Downers Grove	6	6,528	6,283	93	15	111	26	157
Du Quoin	1	339	299	37	0	2	1	3
Elgin	8	6,406	4,098	938	24	167	1,179	1,988
Elmhurst	7	6,272	6,065	57	4	127	19	130
Elmwood Park	2	5,862	5,680	2	3	53	124	372
Evanston	0	214	211	2	0	1	0	1
Evergreen Park	1	2,466	2,371	5	1	64	25	90
Fox Lake	3	1,579	1,535	5	4	10	25	60
Fox River Grove	2	3,138	3,088	10	8	16	16	91
Franklin Park	11	7,410	6,956	2	9	80	363	793
Geneva	3	537	535	0	2	0	0	0
Glen Ellyn	3	2,945	2,881	24	0	35	5	43
Glencoe	4	3,707	3,382	229	1	87	8	83
Glenview	3	3,492	3,231	57	4	181	19	78
Golf	1	273	261	0	0	11	1	6
Grandview	0	914	900	14	0	0	0	1
Grayslake	8	7,941	7,731	73	20	71	46	226
Green Oaks	0	1,251	1,194	6	1	43	7	15
Hainesville	1	96	96	0	0	0	0	8

Appendix H. Summary by City of Severely Impacted Population from 899 Whistle Ban Grade Crossings (1/4 Mile).

Harvard	12	2,404	1,912	18	6	5	463	622
Highland Park	4	11,007	9,939	558	12	254	244	1,000
Highwood	3	5,478	4,529	347	17	118	467	1,254
Hinsdale	4	3,065	2,959	17	2	85	2	30
Hometown	2	4,196	4,163	2	10	12	9	80
Indian Creek	0	90	90	0	0	0	0	1
Inverness	0	976	941	4	0	31	0	6
Itasca	4	3,022	2,938	2	1	69	12	140
Jacksonville	1	758	677	65	3	1	12	10
Joliet	1	896	225	454	3	0	214	287
Kenilworth	1	1,262	1,232	2	1	26	1	6
La Grange	10	7,108	5,977	997	7	71	56	128
La Grange Park	0	7,195	6,916	71	13	153	42	160
Lake Barrington	0	100	100	0	0	0	0	0
Lake Forest	7	5,160	4,980	61	6	72	41	103
Lake Villa	3	2,896	2,828	24	11	19	14	81
Lemont	5	1,700	1,645	2	15	17	21	54
Lena	1	1,249	1,246	0	0	2	1	5
Libertyville	7	5,486	4,987	37	3	421	38	125
Lincolnwood	0	1,763	1,430	5	0	315	13	55
Lockport	6	2,669	2,604	23	2	3	37	117
Lombard	3	5,767	5,625	18	8	90	26	111
Long Lake	1	531	530	0	0	1	0	10
Lyons	0	154	151	0	1	2	0	2
Manhattan	7	1,086	1,077	0	8	0	1	26
Maple Park	0	580	579	0	0	0	1	5
Maywood	6	4,540	909	3,024	1	57	549	1,012
McHenry	4	3,142	3,106	6	3	11	16	88
Medinah	1	746	722	0	0	23	1	12
Melrose Park	2	3,450	2,412	65	2	80	891	2,179
Merrionette Park	0	290	289	1	0	0	0	10
Midlothian	2	2,900	2,837	15	4	16	28	139
Mokena	5	4,321	4,283	2	13	15	8	60
Morton Grove	5	3,019	2,558	12	4	394	51	121
Mount Prospect	3	7,470	7,022	30	8	387	23	112
Mundelein	4	6,339	5,787	44	16	156	336	615
Naperville	2	3,768	3,497	102	7	121	41	129
New Lenox	7	2,998	2,973	3	2	4	16	61
Niles	4	3	3	0	0	0	0	0
North Chicago	2	7,861	5,541	1,648	47	316	309	571
Northbrook	4	2,814	2,635	2	7	164	6	44
Northlake	0	193	179	2	0	2	10	24
Oak Lawn	7	6,191	6,035	12	7	90	47	194
Orland Park	8	6,319	6,072	26	0	146	75	225
Palatine	8	9,608	9,237	66	21	162	122	367
Palos Park	1	306	298	0	0	2	6	22
Park Ridge	4	6,923	6,735	5	1	175	7	76
Prospect Heights	0	4,114	3,524	119	3	157	311	931
River Forest	4	1,786	1,685	42	2	31	26	61
River Grove	4	3,780	3,668	2	2	71	37	152
Riverside	3	4,490	4,396	1	5	56	32	169
Robbins	1	1,056	84	965	0	1	6	12
Rockford	1	173	143	12	9	0	9	11

Appendix H. Summary by City of Severely Impacted Population from 899 Whistle Ban Grade Crossings (1/4 Mile).

Romeoville	1	65	65	0	0	0	0	0
Roselle	4	1,896	1,876	2	0	17	1	41
Round Lake	2	1,813	1,750	0	1	13	49	232
Round Lake Beach	3	874	809	3	2	0	60	162
Round Lake Park	1	1,593	1,530	2	4	2	55	215
Skokie	1	2,804	2,284	35	3	459	23	137
South Elgin	2	141	141	0	0	0	0	5
Springfield	0	1,789	1,717	69	2	0	1	21
St. Johns	0	90	90	0	0	0	0	0
Summit	1	1,124	924	11	6	11	172	324
Swansea	0	89	89	0	0	0	0	1
Tinley Park	5	3,758	3,652	24	1	67	14	53
Venetian Village	0	193	193	0	0	0	0	0
Vernon Hills	2	4,194	3,750	39	4	377	24	96
Villa Park	3	5,028	4,699	100	5	171	53	264
Watseka	1	776	769	2	0	0	5	14
Waukegan	1	889	171	668	0	7	43	97
West Chicago	6	3,720	3,198	31	8	38	445	1,237
Western Springs	4	2,687	2,656	4	1	20	6	23
Westmont	1	1,480	1,416	27	5	27	5	16
Wheaton	9	7,567	6,898	377	19	230	43	179
Wheeling	4	1,225	1,078	46	9	88	4	31
Willow Springs	1	759	735	0	1	1	22	43
Wilmette	7	4,426	4,297	36	4	80	9	72
Winthrop Harbor	1	548	524	0	3	16	5	10
Wood Dale	3	4,411	4,208	17	7	123	56	419
Woodstock	6	4,571	4,326	2	15	23	205	381
Worth	1	2,315	2,242	16	4	27	26	86
Zion	5	879	812	46	0	8	13	47
Total	879	757,609	510,709	162,659	1,486	18,532	64,223	111,977

Note: 20 crossings are in unincorporated portions of the state.

Note: 752 of 899 whistle ban crossings are geocoded and form the base for this analysis.

Appendix I. Summary by City of Marginally Impacted Population from 899 Whistle Ban Grade Crossings (1/2 Mile).

City	# of Ban Crossings	1990 Total Pop	White	African American	Native American	Pacific Asian	Other	Hispanic
Alsip	3	7,885	7,307	400	11	100	67	299
Antioch	6	5,540	5,421	9	10	60	40	110
Arlington Heights	10	18,130	17,455	57	13	449	156	563
Ashton	3	1,044	1,030	0	0	10	4	10
Aurora	1	809	419	257	0	3	130	300
Bannockburn	1	1,186	933	95	1	155	2	12
Barrington	6	7,565	7,413	15	9	103	25	123
Barrington Hills	0	849	847	0	0	2	0	2
Bartlett	4	7,701	7,404	124	18	107	48	184
Beach Park	0	1,273	1,184	61	2	21	5	56
Belleville	2	7,908	7,460	381	26	18	23	78
Bellwood	1	6,724	947	5,492	1	46	238	336
Bensenville	12	10,722	8,921	61	33	888	819	2,606
Berwyn	4	12,934	12,533	4	28	144	225	765
Bloomington	1	3,894	2,946	841	11	6	90	150
Blue Island	5	15,900	11,650	2,450	20	55	1,725	4,263
Brookfield	3	14,023	13,752	29	18	115	109	432
Buffalo Grove	0	2,236	2,069	31	0	132	4	31
Calumet City	0	35	35	0	0	0	0	0
Calumet Park	4	5,358	1,517	3,504	11	2	324	633
Cary	4	11,912	11,710	37	11	59	95	252
Centralia	1	247	247	0	0	0	0	0
Champaign	1	3,716	892	2,764	11	33	16	38
Chicago	438	725,336	306,244	280,509	1,871	22,388	114,324	177,453
Chicago Ridge	2	7,230	7,035	45	9	81	60	253
Cicero	1	25,909	16,575	43	135	325	8,831	13,734
Clarendon Hills	2	5,203	5,095	17	2	85	4	97
Crystal Lake	10	5,151	4,997	14	10	73	57	210
De Kalb	7	9,354	8,756	190	21	192	195	507
Decatur	2	5,186	3,501	1,641	19	10	15	30
Deerfield	4	9,158	8,859	42	8	223	26	188
Des Plaines	27	38,196	35,191	248	42	1,620	1,095	2,833
Dixmoor	2	1,647	1,212	250	4	1	180	241
Downers Grove	6	13,193	12,835	121	27	165	45	281
Du Quoin	1	809	726	77	3	2	1	7
Elgin	8	18,240	11,572	1,847	56	646	4,119	6,462
Elmhurst	7	13,080	12,581	104	9	302	84	377
Elmwood Park	2	14,739	14,298	3	20	162	256	755
Evanston	0	2,108	2,037	24	0	45	2	34
Evergreen Park	1	7,585	7,338	64	10	117	56	218
Fox Lake	3	5,157	5,019	29	8	19	82	201
Fox River Grove	2	2,870	2,817	8	4	27	14	91
Franklin Park	11	13,581	12,512	33	15	250	771	1,615
Geneva	3	2,194	2,182	1	3	7	1	21
Glen Ellyn	3	8,113	7,933	60	2	86	32	105
Glencoe	4	7,875	7,435	257	1	159	23	125
Glenview	3	10,137	9,636	88	13	354	46	223
Golf	1	454	441	0	0	11	2	21
Grandview	0	1,661	1,626	27	0	6	2	6
Grayslake	8	10,664	10,429	58	39	83	55	270
Green Oaks	0	657	625	1	0	25	6	6

Appendix I. Summary by City of Marginally Impacted Population from 899 Whistle Ban Grade Crossings (1/2 Mile).

City	# of Ban Crossings	1990 Total Pop	White	African American	Native American	Pacific Asian	Other	Hispanic
Hainesville	1	284	282	0	0	0	2	15
Harvard	12	4,513	3,918	20	10	12	553	761
Highland Park	4	22,655	21,103	700	14	445	393	1,351
Highwood	3	5,416	4,621	223	12	94	466	1,285
Hinsdale	4	7,057	6,823	44	7	179	4	84
Hodgkins	0	0	0	0	0	0	0	0
Hometown	2	4,553	4,510	2	9	22	10	75
Indian Creek	0	287	275	6	0	6	0	5
Inverness	0	754	729	3	0	22	0	8
Itasca	4	6,301	5,977	48	7	212	57	330
Jacksonville	1	2,379	2,049	292	5	2	31	26
Joliet	1	6,699	2,420	2,436	23	59	1,761	2,378
Kenilworth	1	2,243	2,193	5	2	39	4	25
La Grange	10	10,629	9,533	942	10	92	52	150
La Grange Park	0	12,029	11,642	90	16	227	54	263
Lake Barrington	0	208	208	0	0	0	0	0
Lake Forest	7	8,825	8,413	137	9	179	87	211
Lake Villa	3	3,347	3,270	28	15	19	15	103
Lakemoor	0	1,231	1,216	1	2	9	3	23
Lemont	5	4,864	4,785	1	15	40	23	131
Lena	1	2,255	2,252	0	0	2	1	7
Libertyville	7	8,921	8,254	74	3	530	60	200
Lincolnshire	0	13	13	0	0	0	0	1
Lincolnwood	0	5,563	4,697	8	1	826	31	164
Lockport	6	5,418	5,320	26	2	14	56	200
Lombard	3	11,018	10,764	29	10	165	50	216
Long Grove	0	438	430	0	0	8	0	2
Long Lake	1	1,572	1,558	0	4	1	9	44
Lyons	0	1,067	1,054	1	2	9	1	31
Manhattan	7	2,915	2,888	0	12	9	6	39
Maple Park	0	730	729	0	0	0	1	5
Maywood	6	13,960	2,283	10,610	11	79	977	1,731
McHenry	4	6,869	6,796	7	10	31	25	189
Medinah	1	1,144	1,120	0	0	23	1	28
Melrose Park	2	12,611	9,812	189	26	291	2,293	5,962
Merrionette Park	0	437	435	1	0	0	1	3
Midlothian	2	7,932	7,738	40	11	62	81	349
Mokena	5	6,521	6,464	2	17	18	20	103
Morton Grove	5	7,069	5,988	21	6	978	76	218
Mount Prospect	3	17,482	16,796	51	15	555	65	298
Mundelein	4	14,003	12,360	104	21	353	1,165	2,107
Naperville	2	13,014	12,073	280	18	559	84	307
New Lenox	7	6,234	6,185	3	5	10	31	117
Niles	4	771	734	20	0	14	3	64
North Chicago	2	17,142	10,983	4,536	97	561	965	1,778
Northbrook	4	8,032	7,585	21	8	394	24	96
Northlake	0	2,190	2,094	11	1	30	54	179
Oak Forest	0	863	857	0	0	4	2	10
Oak Lawn	7	16,426	16,118	22	12	190	84	406
Orland Park	8	12,009	11,609	46	3	252	99	346
Palatine	8	14,649	13,830	90	23	287	419	824

Appendix I. Summary by City of Marginally Impacted Population from 899 Whistle Ban Grade Crossings (1/2 Mile).

City	# of Ban Crossings	1990 Total Pop	White	African American	Native American	Pacific Asian	Other	Hispanic
Palos Park	1	776	754	1	0	12	9	26
Park Ridge	4	18,152	17,735	6	13	368	30	209
Pontoon Beach	0	159	157	2	0	0	0	0
Posen	0	213	196	6	0	0	11	32
Prairie Grove	0	90	74	0	0	0	16	34
Prospect Heights	0	6,603	5,839	154	2	255	353	1,099
River Forest	4	5,049	4,819	65	4	124	37	109
River Grove	4	8,897	8,668	4	14	128	83	372
Riverside	3	7,222	7,102	2	5	77	36	220
Robbins	1	2,666	87	2,569	1	1	8	14
Rockford	1	712	651	18	10	10	23	40
Rolling Meadows	0	246	242	0	0	4	0	1
Romeoville	1	70	70	0	0	0	0	0
Roselle	4	6,124	5,934	31	4	134	21	122
Rosemont	0	1,550	871	19	1	157	502	666
Round Lake	2	3,223	3,085	13	16	24	85	383
Round Lake Beach	3	3,317	3,095	23	11	13	175	556
Round Lake Park	1	2,846	2,699	6	11	3	127	392
Schiller Park	0	640	629	0	0	0	11	67
Skokie	1	8,698	7,105	76	8	1,406	103	432
South Elgin	0	242	234	2	1	5	0	17
Springfield	2	7,184	6,790	348	19	8	19	77
St. Johns	0	256	254	0	1	1	0	0
Stone Park	0	607	321	14	0	8	264	380
Summit	1	5,003	3,810	125	14	41	1,013	1,654
Swansea	0	1,047	1,016	15	3	13	0	8
Tinley Park	5	9,436	9,059	218	8	84	67	180
Urbana	0	503	1	502	0	0	0	9
Venetian Village	0	1,637	1,618	6	2	6	5	23
Vernon Hills	2	8,597	7,685	108	8	713	83	277
Villa Park	3	9,220	8,751	87	15	292	75	400
Wamac	0	248	248	0	0	0	0	3
Watseka	1	2,789	2,756	4	2	7	20	38
Waukegan	1	4,602	1,028	2,572	14	17	971	1,476
West Chicago	6	8,214	6,936	91	21	69	1,097	2,520
Westchester	0	106	99	0	2	5	0	7
Western Springs	4	6,526	6,469	13	3	32	9	54
Westmont	1	4,893	4,717	36	10	92	38	121
Wheaton	9	13,439	12,585	446	27	319	62	275
Wheeling	4	6,725	6,116	118	13	347	131	435
Willow Springs	1	1,686	1,634	1	1	25	25	57
Wilmette	7	9,330	8,952	57	4	287	30	149
Winnetka	0	988	961	3	2	19	3	10
Winthrop Harbor	1	2,345	2,277	0	3	53	12	36
Wood Dale	3	8,267	7,849	16	8	218	176	741
Woodstock	6	8,128	7,751	16	18	54	289	561
Worth	1	4,498	4,388	16	6	41	47	157
Zion	5	3,823	3,450	233	18	54	68	181
<b>Total</b>	<b>880</b>	<b>1,644,212</b>	<b>1,114,952</b>	<b>331,625</b>	<b>3,362</b>	<b>43,411</b>	<b>150,862</b>	<b>255,475</b>

Note: 19 crossings are in unincorporated portions of the state.

Note: 752 of 899 whistle ban crossings are geocoded and form the base for this analysis.