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Dick Schiefelbein and Woodharbor Associates have a history of accomplishments covering a wide range of negotiation, policy, and planning situations.

Negotiation

- Negotiated an agreement between the Port of Houston Authority and Union Pacific Railroad to allow the Port Authority to construct a 12-mile mainline track on Union Pacific's right-of-way to introduce direct rail competition into the Port Authority's container terminal.
- Negotiated an agreement between the state-owned North Carolina Railroad and Norfolk Southern Railway establishing the compensation and conditions under which Norfolk Southern operates over North Carolina Railroad's right-of-way.
- Negotiated a series of agreements between the Fort Worth Transportation Authority and Burlington Northern Santa Fe Railway, including agreements to construct a bridge under active BNSF tracks and to modify the trackage rights agreement that permits BNSF to operate over the city-owned railroad line.
- Negotiated an agreement reestablishing after 25 years the Port of Houston Authority's voting status on the Board of the Port Terminal RR Association.
- Negotiated a series of agreements between Fort Worth Transportation Authority and Union Pacific Railroad involving construction projects and permanent traffic routing changes related to the initiation of commuter service and the construction of a pedestrian tunnel under Union Pacific main lines.

Negotiation . . .

Negotiation
Strategy
Policy
Planning
Economic Analysis
Labor Relations
Expert Witness

Strategic Policy Development

- Directed the federal government's emergency operation of the bankrupt Rock Island Railroad, while developing financially sound, long-term, private sector solutions.
- Developed and implemented the Port of Houston Authority's first comprehensive intermodal railroad service improvement action plan.
- Directed federal policy development on railroad safety, the privatization of Conrail, the reduction in Amtrak subsidies, the $2.5 billion reconstruction of the high-speed rail corridor between Washington and New York, and state grant and loan programs.
- Testified before Congressional committees on transportation policy issues, including Amtrak route restructuring, Conrail, and the northeast high-speed rail corridor.
- Developed the first federal regulations permitting contract railroad rates.
- Developed Burlington Northern's strategic plans following deregulation, strengthening marketing and creating a customer service orientation.

. . . transportation strategy . . .

Planning and Economic Analysis

- Conducted merger analyses and negotiations for Burlington Northern Railroad.
- Prepared a pro-forma financial analysis of potential commuter rail operations on the North Carolina Railroad.
- Developed cost reimbursement formulas for commuter services and branch line operations, eliminating $75 million in annual cross subsidies between public and private services.
- Created a train dispatching computer simulation model to determine railroad line capacity.

. . . intermodal transportation solutions . . .

Labor Relations

- Negotiated with a major railroad labor union on economic and work rule issues, developing a unique economic package including employee stock ownership and a supplemental pension plan.
- Reversed Burlington Northern's negotiating strategy on train crew size by analyzing comparative financial outcomes of alternative strategies, resulting in an agreement that reduced costs by $250 million per year.
- Prepared testimony and supporting material presented to presidential emergency boards.

Expert Witness

- Testified in Federal District Court on behalf of the City of West Palm Beach, which was sued by a railroad claiming that federal preemption prevented the City from enforcing zoning restrictions on land the railroad leased to one of its customers. The City won the case and the judge quoted Dick Schiefelbein's testimony extensively in his reasoning. (110 F.Supp.2d 1367)
- Testified in Federal District Court in the Milwaukee Road bankruptcy proceedings, presenting the federal government's plan to have other railroads operate portions of the Milwaukee Road if it ceased operation.

Policy Advice

Dick Schiefelbein's appointments have included:

- University of Dallas MBA Program Advisory Board
- Chair, Rail Committee, Greater Houston Partnership
- Policy Advisory Board for the Texas Transportation Plan
- Federal Advisory Task Force for Rural Transportation Policy
- Head of US delegation to the Pan American Railway Congress in Mexico City

. . . cooperative public/private sector solutions.

WOODHARBOR ASSOCIATES

Transportation Consultants

Founded in 1995 by Richard J. Schiefelbein, a former Deputy Federal Railroad Administrator, Woodharbor Associates has assisted clients in a broad range of railroad transportation issues and in negotiations with railroad companies.

With executive experience in both federal government and private corporations, Dick Schiefelbein and Woodharbor Associates bring a broad perspective to strategic issues.

Woodharbor Associates is uniquely positioned to create and negotiate mutually-beneficial solutions to today's strategic transportation issues, particularly issues requiring cooperation and agreement between the public and private sector organizations.

WOODHARBOR ASSOCIATES

Specialists in:

Negotiation
Strategy
Policy
Planning
Economic Analysis
Labor Relations
Expert Witness

If you would like more information about how Woodharbor Associates can help solve your transportation problems, contact us at:

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RAILROAD CROSSING QUIET ZONE CONSULTING

New federal rules permit communities nationwide to reduce the noise level at railroad crossings when they become effective December 18, 2004. *Is your community ready?*

Maintain Safety While Reducing Noise

Local communities can establish "quiet zones" in areas where train noise is a nuisance to residents. To maintain safety, each crossing in the quiet zone must be equipped with one of three safety devices:

- Crossing gates that block traffic in both directions
- An approved median divider to prevent motorists from crossing lanes
- An automated horn system installed at the crossing as a train horn substitute

The Process

In addition to selecting the appropriate safety equipment, determining the budget and scheduling the public works components, establishing a quiet zone and installing the safety equipment correctly involves several steps.

- Signal work or automated horn installation must be scheduled with the railroads involved
- Notifications must be filed with the government and the railroads involved
- The public must be notified according to government standards

From the time the decision is made to establish a quiet zone and install a specific safety option, the process takes an average of nine months and involves several channels of communication to complete.

Put Our Expertise To Work

You understand the needs of your community and how best to respond to them. Evaluating quiet zone safety options and managing the complexities of railroad and government bureaucracies can take valuable time away from your community focus.

With Woodharbor Associates as your partner, you can...

- Count on expert advice regarding the best safety option for your location and budget
- Rest assured that your needs are being coordinated with the railroad(s) in the most efficient manner possible
- Benefit from years of expertise interacting with railroads and appropriate government agencies
- Access an on-call network of railroad signal and crossing expertise
- Streamline the project's timeline...bringing your residents quieter crossings as quickly as possible

Typical Quiet Zone Activities

- Identify target crossing(s)
- Evaluate safety options
- Finalize budget needed for project
- Meet with railroad
- Update federal railroad crossing inventory
- Execute agreement with railroad
- Order non-railroad equipment for selected safety option
- Schedule installation with railroad
- File public notice
- File required notices with railroad, Federal Railroad Administration and local agencies
- Begin railroad signal and installation work
- Advise residents of new quiet zone
- Initiate quiet zone operation

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RAILROAD CROSSING QUIET ZONE INTERIM FINAL RULE

Rule requires that the locomotive horn be sounded at public highway-rail crossings, but provides exceptions to that requirement.

Local public authorities may establish, or request the approval of, quiet zones in which trains horns may not be routinely sounded.

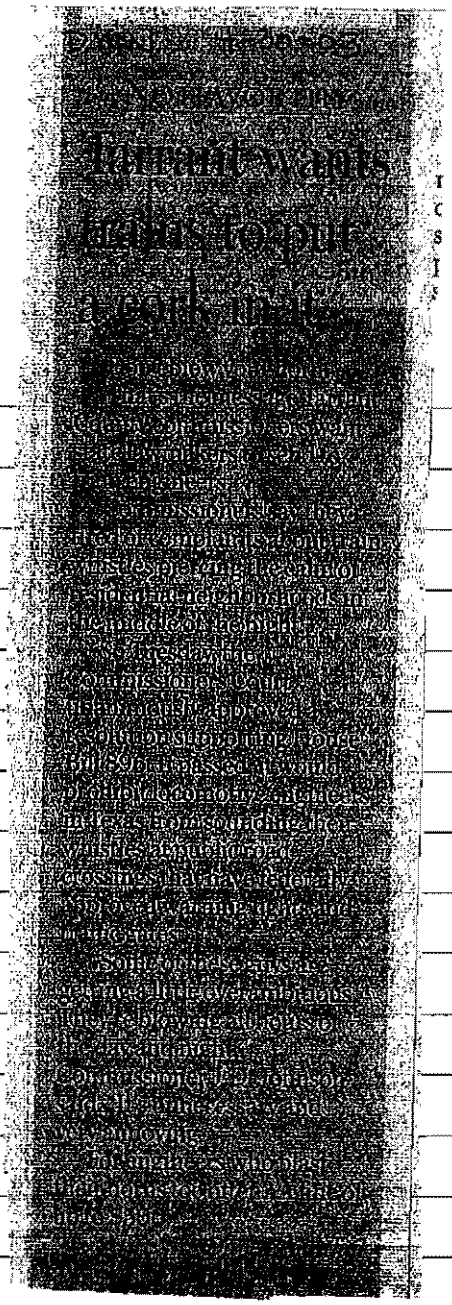
Details for the establishment of the quiet zone differ depending on the type of quiet zone being created (Pre-Rule or New) and the type of safety improvements implemented (if required).

By law the rule may not go into effect until December 18, 2004.

Federal Railroad Administration (FRA) will take comments until February 17, 2004.

For more information, see http://www.fra.dot.gov or call Rachel Harshman at (817) 608-2395.

ADDISON CONFERENCE & THEATRE CENTRE



5-14-03

Ron: I spoke ~~to~~ Robert Albritton today. HB896 was approved by the Transportation committee and allows cities of greater than 1000 people to pass local ordinances. The bill will probably pass the house. No idea what the Senate will do.

all this is subject to the FRA's rulemaking (maybe by the end of the year).

Jim

BNSF, FRA begin quiet-zone pilot project in Southern California *(3/19/03)*

Burlington Northern Santa Fe, Federal Railroad Administration, California Public Utilities Commission (CPUC) and the city of Placentia, Calif., have begun a three-phase quiet-zone pilot project involving 11 of the city's grade crossings.

During each four-month phase, video cameras will record pedestrian and vehicle traffic and behavior, including any warning-gate violations.

Under phase one — which will serve as a baseline — BNSF will sound train whistles at the crossings, and cameras will record driver and pedestrian behavior.

Once BNSF, FRA, CPUC and the city determine which supplemental safety measures (SSM) to install at the crossings, they'll will begin to analyze driver and pedestrian behavior with SSMs in place and whistle warnings.

If the parties agree that SSMs met or exceeded the success of whistle-only warnings under phase one, they'll study driver and pedestrian behavior with SSMs only.

After completing the pilot project, FRA — which is in the final stages of a quiet-zone rulemaking process — plans to evaluate all data to determine if SSMs provide equal or added safety compared with whistles. If SSMs are deemed safer, BNSF would stop sounding whistles in the pilot quiet-zone area.

Currently, BNSF and FRA are studying other quiet-zone pilot projects in Spokane County and Yakima, Wash., and Coon Rapids, Minn.

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Quiet Zones 4-1-02

Don't need Fed Regs for quiet zones
Fed Regs may never come out
Lonnie recommends moving forward
Quad Gates & non-mountable barriers
Irving is moving ahead on QZs

Need a "Quiet Zone Implementation Agreement" with DGNO. DGNO must agree to honor the Quiet Zone
Do not want a "checkerboard" system -

Review crossings as to where non mountable barriers can be used

* Copy of RCL report to Lonnie
Call COG for regional funding
Town must accept some liability

Printable (MS Word) version is available (1.1 Mb)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

HIGHWAY/RAIL GRADE CROSSING TECHNICAL WORKING GROUP (TWG)

NOVEMBER 2002

GUIDANCE ON TRAFFIC CONTROL DEVICES AT HIGHWAY-RAIL GRADE CROSSINGS

EXECUTIVE SUMMARY

The Technical Working Group (TWG) established by the U.S. Department of Transportation, is led by representatives from the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), and the National Highway Traffic Safety Administration (NHTSA). The cooperation among the various representatives of the TWG represents a landmark effort to enhance communication between highway agencies, railroad companies and authorities, and governmental agencies involved with developing and implementing policies, rules and regulations.

The report is intended to provide guidance to assist engineers in selection of traffic control devices or other measures at highway-rail grade crossings. It is not to be interpreted as policy or standards. Any requirements that may be noted in this guidance are taken from the Manual on Uniform Traffic Control Devices (MUTCD) or other document identified by footnotes. These authorities should be followed. This guide merely tries to incorporate some of the requirements found in those documents. A number of measures are included which may not have been supported by quantitative research, but are being used by States and local agencies. These are included to inform practitioners of an array of tools used or being explored.

The goal is to provide a guidance document for users who understand general engineering and operational concepts of highway-rail grade crossings. The Guide serves as a reference to aid in decisions to install traffic control devices or otherwise improve such crossings. Additional references are provided as resource for further information.

The Guide discusses a number of existing laws, regulations and policies of the FHWA and FRA concerning highway-rail grade crossings and railroad operations, driver needs concerning various sight distance, and highway and rail system operational requirements and functional classification. There is an extensive description of passive and active traffic control devices, including supplemental devices used in conjunction with active controls. Traffic control devices in the 2000 edition of the MUTCD are listed, together with a few experimental devices. An appendix provides limited discussion on the complex topic of interconnection and preemption of traffic signals near highway-rail grade crossings. There is also discussion concerning closure, grade separation and consideration for installing new grade crossings. A glossary defines a few less familiar and technical terms. (Please note that the term grade crossings is synonymous with both the terms "highway-rail grade crossings" and "highway-rail intersections" in this document.)

A traffic control device selection procedure and extensive list of quantitative guidance are the specific products of this document. However, due to the unique characteristics of each individual crossing, these procedures and practices should not be considered as warrants or standards. Therefore, selection decisions must be made based on engineering studies.

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U.S. Department of Transportation
Highway-Railroad Grade Crossing Technical Working Group

Guidance on Traffic Control at Highway-Rail Grade Crossings

INTRODUCTION

The Technical Working Group (TWG) established by the U.S. Department of Transportation, is led by representatives from the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), and the National Highway Traffic Safety Administration (NHTSA). The cooperation among the various representatives of the TWG represents a landmark effort to enhance communication between highway agencies, railroad companies and authorities, and governmental agencies involved with developing and implementing policies, rules and regulations.

The report is intended to provide guidance to assist engineers in selection of traffic control devices or other measures at highway-rail grade crossings. It is not to be interpreted as policy or standards and is not mandatory. Any requirements that may be noted in the report are taken from the Manual on Uniform Traffic Control Devices (MUTCD) [1] or other document identified by footnotes. A number of measures are included which may not have been supported by quantitative research, but are being used by States and local agencies. These are included to inform practitioners of an array of tools used or being explored.

The goal is to provide a guidance document for users who understand general engineering and operational concepts of public highway-rail grade crossings. The document will serve as a reference to aid in decisions to install traffic control devices or otherwise improve such crossings, and also provide information on additional references.

The report includes discussion of a number of existing laws, regulations and policies of the FHWA and FRA concerning highway-rail grade crossings and railroad operations, driver needs concerning various sight distance, and highway and rail system operational requirements and functional classification. There is extensive description of

passive and active traffic control devices, including supplemental devices used in conjunction with active controls. Traffic control devices in the 2000 edition of the MUTCD are listed, together with a few experimental devices. An appendix provides limited discussion on the complex topic of interconnection and preemption of traffic signals near highway-rail grade crossings. There is also discussion concerning closure, grade separation and consideration for installing new grade crossings. Finally, an extensive list of quantitative recommend guidance is provided. (Please note that the term grade crossings is synonymous with highway-rail grade crossings in this document.)

EXISTING LAWS, RULES, REGULATIONS AND POLICIES

Several documents provided by the Federal Highway Administration, the Federal Railroad Administration, and other organizations, provide some guidelines for selecting traffic control devices. For example, the MUTCD, published by the Federal Highway Administration, contains detailed guidance on the design and placement of traffic control devices. The MUTCD is a Federal standard under title 23, United States Code 109(d) and is incorporated by reference into the Code of Federal Regulations (CFR). If a particular device is selected for use, the MUTCD will indicate what the size, color, and placement of that device should be. Considered by the FHWA as a national standard, the MUTCD has the force of law. Another document frequently used to assist in determining the need for certain traffic control devices is the *Railroad-Highway Grade Crossing Handbook - Second Edition, (RHGCH)*[2] , also published by the FHWA. The handbook draws on a number of different sources (including the MUTCD and the AASHTO *A Policy on Geometric Design of Highways and Streets*[3] [Greenbook]) to provide an overview of highway-rail grade crossing legal and jurisdictional considerations. Included is a brief discussion of grade crossing design issues involving the physical and geometric characteristics of the crossing, and risk assessment formulas. The *RHGCH* provides guidelines for the identification and selection of active control devices. Also included are discussions of issues surrounding shortline railroads, high-speed rail corridors, and special vehicles such as trucks carrying hazardous materials and trucks having low-ground clearance.

These source documents provide limited guidance, mostly in the form of lists of factors "to be considered " for installing either flashing-lights or flashing-lights and gates; however, they lack specific guidance on how to determine the most appropriate type of highway traffic control at a given highway-rail crossing. For example, the *RHGCH* cites "high speed trains " as a factor, but does not define the conditions under which a train is considered "high speed. " In another instance, the presence of school buses or vehicles carrying hazardous materials is cited as a factor, but every public crossing has the potential to carry both of these types of traffic. "Past collision history " is also frequently cited as a rationale for upgrading passive grade crossings to active control, or adding gates to "flasher only" grade crossings, but no specific guidance is provided.

Several previous attempts have been made to quantify the relative emphasis these factors should have in evaluating the need to improve a crossing. The *RHGCH* contains several examples of formulae that have been developed to help determine the likelihood of a collision occurring at a particular crossing. Use of these formulae, however, is far from universal. Some States use either exposure factors or a minimum expected accident frequency (EAF) to determine whether a given crossing "qualifies " for public funding for improved traffic control devices. Illinois, for example, uses a modified New Hampshire formula to "qualify " crossings for improvement or upgrade whenever the EAF exceeds 0.02; Iowa gives "priority " to those crossings having a USDOT Accident Predictor Model EAF of 0.075 or higher. A number of States have established their own criteria for determining when or where active devices are deployed, but their rationale for establishing such criteria is not commonly known nor is there much consistency from State to State.

Current FHWA regulations specifically prohibit at-grade intersections on highways with full access control. The FRA's rail safety regulations require that crossings be separated or closed where trains operate at speeds above 125 mph (49 CFR 213.347(a)). Additionally, if train operation is projected at FRA track class 7 (111 - 125mph) an application must be made to the FRA for approval of the type of warning/barrier system. The regulation does not specify the type of system, but allows the petitioner to propose a suitable system for FRA review.

In 1998, the FRA issued an Order of Particular Applicability for high-speed rail service on the Northeast Corridor. In the Order, the FRA set a maximum operating speed of 80 mph over any highway-rail crossing where only conventional warning systems are in place and a maximum operating speed of 95 mph where 4-quadrant gates and presence detection are provided and tied into the signal system. Grade crossings are prohibited on the Northeast Corridor if maximum operating speeds exceed 95 mph.

Current statutory, regulatory and Federal policy requirements are summarized in Table 1.

TABLE 1
FEDERAL LAWS, RULES, REGULATION & POLICIES

	Active	Warning/Barrier W/FRA Approval	Grade Separate or Close
Controlled Access Highways	Not allowed	Not allowed	Required
High Speed Rail	> 79 MPH	111-125 MPH	> 125 MPH

Note: 1 mph = 1.61 km/h

HIGHWAY-RAIL GRADE CROSSING PERSPECTIVE

A highway-rail grade crossing **differs** from a highway/highway intersection in that the train always has the right of way. From this perspective, the process for deciding what type of highway traffic control device is to be installed, or to even allow that a highway-rail grade crossing should exist is essentially a two-step process: 1) What information does the vehicle driver need to be able to cross safely? and, 2) Is the resulting driver response to a traffic control device "compatible" with the intended system operating characteristics of the highway and railroad facility?

MOTOR VEHICLE DRIVER NEEDS ON THE APPROACH

The first step involves three essential elements required for "safe" passage through the crossing, which are the **same** elements a driver needs for crossing a highway-highway intersection:

ADVANCE NOTICE - STOPPING SIGHT DISTANCE

The first element pertains to "stopping " or "braking " sight distance, which is the ability to see a train and/or the traffic control device at the crossing ahead sufficiently in advance so that a driver can bring the vehicle to a safe, controlled stop at least 4.5 m (15 ft) short of the near rail, if necessary. This applies to either a passive or active controlled crossing. Stopping sight distance is measured along the roadway and is a function of the distance required for the "design" vehicle, traveling at the posted speed limit to safely stop[4]. Insufficient stopping sight distance is often due to poor roadway geometry and/or surrounding topography.

TRAFFIC CONTROL DEVICE COMPREHENSION

The second element is a function of the type of traffic control device at the highway-rail crossing. There are typically three types of control devices, each requiring a distinct compliance response per the Uniform Vehicle Code[5], various Model Traffic Ordinances and State regulations.

1. A crossbuck is a type of YIELD sign: the driver should be prepared to stop at least 4.5 m (15 ft) before the near rail if necessary, unless and until the driver can make a reasonable decision that there are no trains in hazardous proximity to the crossing, and it is safe to cross.

2. Operating flashing lights have the same function as a STOP sign: a vehicle is required to stop completely at least 4.5 m (15 ft) short of the near rail. Then, even though the flashing lights may still be operating, the driver is allowed to proceed after stopping (subject to State or local laws), when safe to do so.

3. Flashing lights with lowered gates are equivalent to a red vehicular traffic signal indication: a vehicle is required to stop short of the gate and remain stopped until the gates go up.

Motorist comprehension and compliance with each of these devices is mainly a function of education and enforcement. The traffic engineer should make full use of the various traffic control devices as prescribed in the MUTCD to convey a clear, concise and easily understood message to the driver, which should facilitate education and enforcement.

DECIDING TO PROCEED

The third element concerns the driver's decision to safely proceed through the grade crossing. It involves sight distance available both on the approach and at the crossing itself.

Approach (Corner) Sight Distance

On the approach to the crossing with no train activated traffic control devices (or STOP sign) present, in order to proceed at the posted speed limit, a driver would need to be able to see an approaching train, from either the left or right, in sufficient time to stop safely 4.5 m (15 ft) before the near rail. This would require an unobstructed field of vision along the approach sight triangle, the extent of which is dependent upon train and vehicle speed. These sight distances are available in the RHGCH. However, view obstructions often exist within the sight triangle, typically caused by structures, topography, crops or other vegetation (continually or seasonal), movable objects or weather (fog, snow, etc.). Where lesser sight distances exist, the motorist should reduce speed and be prepared to stop not less than 4.5 m (15 ft) before the near rail unless and until they are able to determine, based upon the available sight distance, that there is no train approaching and it is safe to proceed. Wherever possible, sight line deficiencies should be improved by removing structures or vegetation within the affected area, regrading an embankment, or realigning the highway approach.

Many conditions however cannot be corrected because the obstruction is on private property, or it is economically infeasible to correct the sight line deficiency. If available corner sight distance is less than what is required for the legal speed limit on the highway approach, supplemental traffic control devices such as enhanced advance warning signs, STOP or YIELD signs, or reduced speed limits (advisory or regulatory) should be evaluated. If it is desirable from traffic mobility criteria to allow vehicles to travel at the legal speed limit on the highway approach, active control devices should be considered.

Clearing Sight Distance

At all crossings, except those with gates, a driver stopped 4.5 m (15 ft) short of the near rail must be able to see far enough down the track, in both directions, to determine if sufficient time exists for moving their vehicle safely across the tracks to a point 4.5 m (15 ft) past the far rail, prior to the arrival of a train. Required clearing sight distance along both directions of the track, from the stopped position of the vehicle, is dependent upon the maximum train speed and the acceleration characteristics of the "design " vehicle.

At multiple track highway-rail grade crossings of two or more in-service railroad tracks through the roadway, and where two or more trains can operate simultaneously over or in close proximity to the crossing, the presence of a train on one track can restrict or obscure a driver's view of a second train approaching on an adjacent track. Such crossings must be treated the same as any other crossing having insufficient clearing sight distance. Even where there is only one track through the crossing, but additional tracks (such as a siding) are located adjacent to, but terminate before reaching the crossing, the sight distance to the limit of where railroad cars or equipment could be stored should be evaluated. Figure 1 is a diagram designed to illustrate some unusual conditions that would merit special consideration at a single-track highway-rail grade crossing.

Figure 1

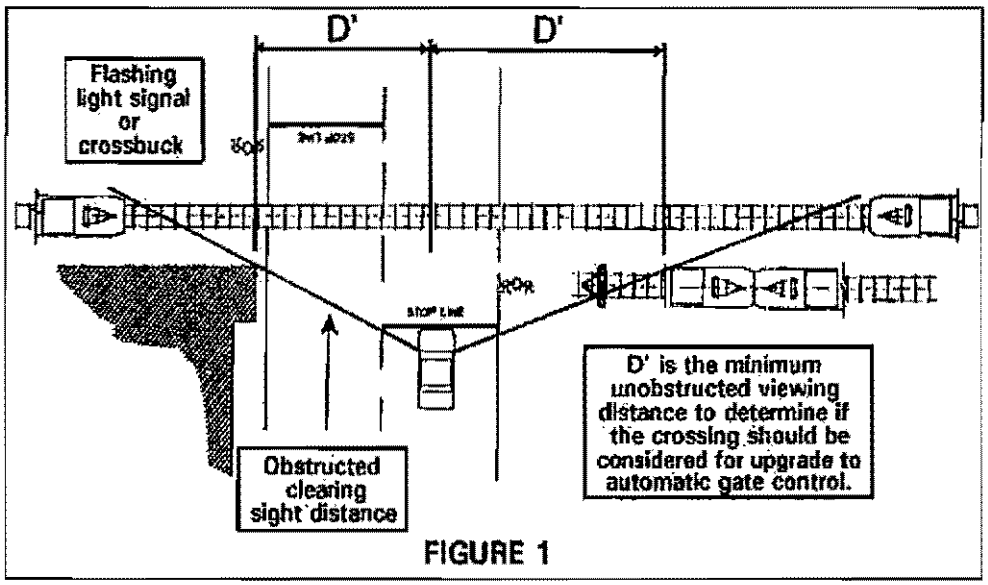


FIGURE 1

This figure shows an aerial view of a highway-rail grade crossing. A single-rail track stretches across the width of the figure. A locomotive is located on both the right and left-ends of the track. There is a second track on right side of the crossing with a locomotive on it. This track ends before the roadway. An automobile is stopped behind a "stop line" in the middle of the figure. On both sides of the intersection there is a symbol for a flashing light signal. In the lower left quadrant, a building is shown that restricts sight the sight of a locomotive approaching from the left. There is a 45-degree line between the automobile and the locomotive on the left end of the track that demonstrates the obstructed clearing sight distance caused by the building. Another 45-degree line stretches from the automobile to the locomotive on the right end of the track that demonstrates the obstructed clearing sight distance caused by the locomotive on the second track. There is a box between the automobile and locomotive that says, "D is the minimum unobstructed viewing distance to determine if the crossing should be considered for upgrade to automatic gate control."

Table 2, prepared by members of the TWG, relates the typical minimal clearing sight distances for various train speeds and vehicle types. (It should be noted the column for 65 foot double trucks generally corresponds to the distances listed in table 36 on page 133 of the *RHGCH*, under the column for vehicle speed of "0 MPH." Vehicle acceleration data has been interpreted from the *Traffic Engineering Handbook*.[6]) The person or agency evaluating the crossing should determine the specific design vehicle, pedestrian, bicyclist, or other non-motorized conveyance and compute clearing sight distance if it is not represented in the table. Also note the table values are for a level, 90-degree crossing of a single track. If other circumstances are encountered, the values **must** be **re-computed**.

TABLE 2
CLEARING SIGHT DISTANCE (in feet) *

Train Speed	Car	Single Unit-Truck	Bus	WB-50 Semi-Truck	65-ft Double Truck	Pedestrian **
10	105	185	200	225	240	180
20	205	365	400	450	485	355
25	255	455	500	560	605	440
30	310	550	600	675	725	530
40	410	730	795	895	965	705
50	515	910	995	1,120	1,205	880
60	615	1,095	1,195	1,345	1,445	1,060
70	715	1,275	1,395	1,570	1,680	1,235
80	820	1,460	1,590	1,790	1,925	1,410
90	920	1,640	1,790	2,015	2,165	1,585

* A single track, 90-degree, level crossing.
** walking 1.1 mps (3.5 fps) across 2 sets of tracks feet apart, with a two second reaction time to reach a decision point 3 m (10 ft) before the center of the first track, and clearing 3 m (10 ft) beyond the center line of the second track. Two tracks may be more common in commuter station areas where pedestrians are found. (See Figure 2).

Note: 1 meter = 0.3048 feet.

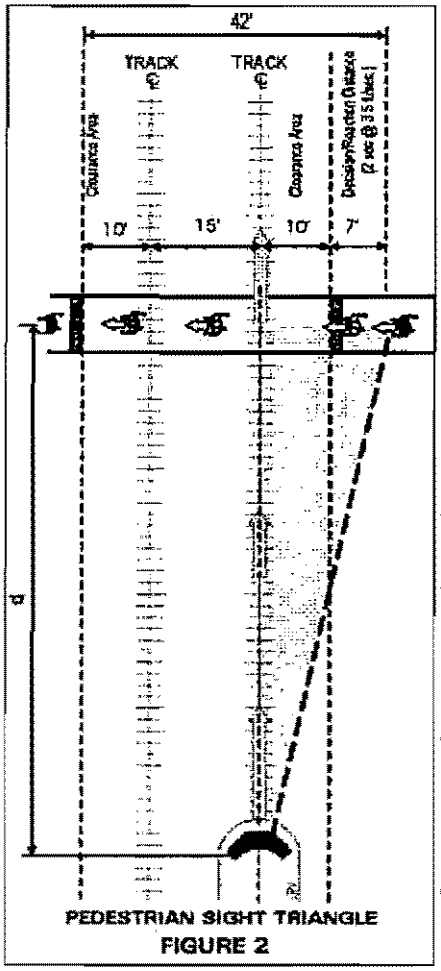


Figure 2: Pedestrian Sight Triangle

A highway-rail grade crossing is displayed depicting a pattern for the pedestrian sight triangle. The distance the pedestrian travels from one side of the crossing to the other is 42 feet. There are two tracks in the crossing. The distance is broken up into the following respective categories:

- 7 ft. Decision/Reaction Distance of 2 seconds @3.5 feet per second;

- 10 ft. Clearance Area just before a rail track;

- 15 ft. between two rail tracks;

- 10 ft. from last rail track to clearance area.

A locomotive is approaching from the south in the diagram. The pedestrian is on the immediate right of the crossing starting at the Decision/Reaction Distance category-space. The figure of the pedestrian is shown several times to represent the movement over the crossing. There is a "STOP HERE " label on both sides of the crossing immediately prior to the beginning of the clearance area. There is a dotted line reaching from the pedestrian's figure to the first track that demonstrates the sight distance to an approaching locomotive. The area inside the triangle is shaded. The sight triangle demonstrates that the pedestrian is 17 ft. from the center of the first track.

If there is insufficient clearing sight distance, and the driver is unable to make a safe determination to proceed, the clearing sight distance needs to be improved to safe conditions, or flashing light signals with gates, or closure, or grade separation should be considered. (See Recommendation, "3.F.3".)

SYSTEMS OPERATING REQUIREMENTS AND OBJECTIVES

The second step involves a traffic control device selection process considering respective highway and rail system operational requirements. From a highway perspective, concerns for roadway capacity and drivers' expectations may mandate the type of traffic control present. There are circumstances when train interference can be so disruptive to highway operations that a highway-rail grade crossing is incompatible with system objectives. From the rail perspective, there can also be circumstances when the potential for highway traffic interference can be sufficiently disruptive, or potentially so catastrophic, that closure, grade separation, or activated control would be considered. It is within these contexts where operation and safety variables should be considered, such as:

a. Highway - AADT (Annual Average Daily Traffic), legal and/or operating speed;
b. Railroad - train frequency, speed and type (passenger, freight, other);
c. Highway - Functional classification and/or design level of service;
d. Railroad - FRA Class of Track and/or High Speed Rail corridors;
e. Proximity to other intersections;
f. Proximity to schools, industrial plants and commercial areas;
g. Proximity to rail yards, terminals, passing tracks and switching operations;
h. Available clearing and corner sight distance;
i. Prior accident history and predicted accident frequency;
j. Proximity and availability of alternate routes and/or crossings; and

k. Other geometric conditions.

Special consideration should also be given to situations where highway-rail crossings are sufficiently close to other highway intersections that traffic waiting to clear the adjacent highway intersection can queue on or across the tracks. Additionally, special consideration is required when there are two or more sets of tracks sufficiently close to each other that traffic stopped on one set could result in a queue of traffic across the other.

HIGHWAY SYSTEM OBJECTIVES

Roads and streets which are planned, designed, constructed, maintained and operated by public agencies serve two important but conflicting functions: land access and mobility. Overriding these interests should be a concern for safety.

An example of a facility constructed primarily for mobility is the Interstate highway. Access is only by interchanges, with ramps and acceleration/deceleration lanes. These allow vehicles to enter and leave the highway with minimal effect on the through traffic stream. Interstate highways do not have direct driveway access to adjacent properties, grade level intersections, transit stops, pedestrian and bicycle facilities or highway-rail grade crossings, all of which interfere with the free flow of traffic.

A local street is at the other end of the spectrum. It provides direct access to adjacent land, with driveways to parking facilities and provision of services such as on-street deliveries and trash pickup. The

low-type design of local streets, including presence of parked vehicles, pedestrians and bicycles, makes travel at any significant speed undesirable.

Many roads and highways fall in the spectrum between Interstate highways and local roads, and fulfill their purpose with varying degrees of success. Mobility is affected by providing adequate access to adjacent development in an environment complicated by driveways and street intersections, and other modes of transportation such as transit, bicycles, pedestrians and railroads. The concept is illustrated in Figure 3.[7]

Figure 3:

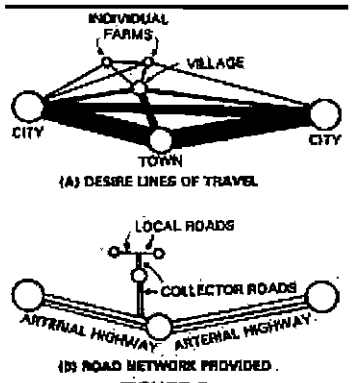


FIGURE 3

A. Desired Lines of Travel

The figure depicts the desired lines of travel between several points and is depicted in the form of an irregular pentagon. A circle, representing "City ", "Town ", and "City ", respectively is shown on each of the three southern points of the figure. On the left and right points of the irregular pentagon, there is a label that reads "City. " The far-south point of the pentagon reads "Town. " In the center of the pentagon there is a circle with an arrow pointing to it labeled "Village. " Above "Village " are two smaller circles that are labeled "Individual Farms ". Twelve lines connect the various circles of the pentagon indicating the desired lines of travel between the various points. There are thick black lines leading from each "City " to the "Town ".

B. Road Network Provided

The figure shows the same pattern of circles as Figure A that are labeled the same as in A). There are five lines connecting the points indicating the roadway network. "Arterial Highway " is written for the segments connecting both "City " circles to the "Town ". To the left of the "Town " is a vertical line labeled "Collector Roads " which runs to the "Village " circle and extends slightly beyond the village. Horizontally placed atop the "Collector Roads " is a small "local roads " line with the two "Individual Farms " circles on each endpoint. Each line represents travel between the various points.

A highway-rail grade crossing can impede highway traffic flow based on several factors. The most obvious is, of course, blockages by trains. The geometry of the crossing and approaches, and the condition of the surface can present additional impediments.

LEVELS OF SERVICE

The performance of a road or street is normally described in terms of "Level of Service.[8] " The Level of Service is a concept that describes the operational characteristics of the traffic stream and how they are perceived by drivers and passengers. Speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience are factors that characterize levels of service. Traffic flow characteristics are described by letter designations; "A " the best, corresponding to a free flow condition, and "F " the worst, corresponding to a breakdown of flow or "stop and go " condition. Table 3 provides guidance for selecting Level of Service for particular locations.

TABLE 3
GUIDE FOR SELECTION OF DESIGN LEVELS OF SERVICE

	Type of Area and Appropriate Level of Service			
Highway Type	**Rural Level**	**Rural Rolling**	**Rural Mountainous**	**Urban and Suburban**
Freeway	B	B	C	C
Arterial	B	B	C	C
Collector	C	C	D	D
Local	D	D	D	D

Note: General operating conditions for levels of service:

A - free flow, with low volumes and high speeds.
B - reasonably free flow, but speeds beginning to be restricted by traffic conditions.
C - in a stable flow zone, but most drivers restricted in freedom to select their own speed.
D - approaching unstable flow, drivers have little freedom to maneuver.
E - unstable flow, may be short stoppages.
F - forced flow, congested stop-and-go operation.
(Source: A Policy on Geometric Design of Highways and Streets. AASHTO. 2001. Page 90)

The nominal level of service normally considered acceptable during the planning and design of a new or reconstructed roadway is "C " which is within the range of stable flow. The presence of a highway-rail grade crossing can drop the level of service below "C ".

SAFE APPROACH SPEED

Passive crossings with a restricted sight distance require an engineering study to determine the safe approach speed based upon available stopping and/or corner sight distance. As a minimum, an advisory speed posting may be appropriate, or a reduced regulatory speed limit might be warranted (if it can be effectively enforced). (See Guidance Section of this Report, "3.F.2c. ") Active devices improve highway capacity and level of service in the vicinity of a crossing, particularly where corner sight distances are restricted. When flashing lights are active however, a driver is required to stop and look for a train.

The effects of such delay increases as volume increase. Queues become longer and vehicle delay increases proportionally. These delays are observed by the driver as a reduction in the facility's level of service. The type of control installed at highway-rail crossings needs to be evaluated in the context of the highway system classification and level of service.

RAILROAD SYSTEMS - FUNCTIONAL CLASSIFICATION

A commonly used means of classifying freight and "heavy rail " passenger rail routes is by their respective FRA designations for class of track. This Federal designation establishes the maximum authorized speed for freight and passenger trains, and places requirements on the track maintenance criteria, vehicle standards, and train control signal systems. In some respects, the FRA Class of Track may be viewed as a surrogate for rail traffic volume. In general, railroads are not likely to make the additional investment required to maintain tracks to a higher standard absent sufficient traffic volume to justify the added expense. Table 4 indicates maximum permissible train speeds for various classes of track.

TABLE 4
MAXIMUM TRAIN SPEEDS BY CLASS OF TRACK*

Class of Track	Freight	Passenger
Class 1	10 MPH	15 MPH
Class 2	25 MPH	30 MPH
Class 3	40 MPH	60 MPH
Class 4	60 MPH	80 MPH
Class 5	80 MPH	90 MPH
Class 6	110 MPH	110 MPH
Class 7	125 MPH	125 MPH
Class 8	160 MPH	160 MPH
Class 9	200 MPH	200 MPH

* If train operations exceed 177 km/h (110 mph) for a track segment that will include highway-rail grade crossings, FRA's approval of a complete description of the proposed warning/barrier system to address the protection of highway traffic and high speed trains must be obtained in advance. All elements of the warning/barrier system must be functioning.

Source: 49 CFR 213
Note: 1 mph = 1.61 km/h

Not unlike the system specification that all highway-rail crossings on full control access highways be grade separated, it is only logical that certain rail systems should have similar status. In 1994, the FRA defined a core railroad system of approximately 128,800 km (80,000 mi) known as the Principal Railroad Lines (PRLs). These lines have one or more of the following attributes: Amtrak service; defense essential; or, annual freight volume exceeding 20 million gross tons. This core network was described in the Department of Transportation's 1994 Action Plan to improve highway-rail grade crossing safety. The Action Plan set forth a long-term goal of eliminating (grade separating or realigning) intersections of PRLs and highway routes on the National Highway System (NHS - defined as "an interconnected system of principal arterial routes to serve major population centers, intermodal transportation facilities and other major travel destinations; meet national defense requirements; and serve interstate and interregional travel ").

FUNCTION, GEOMETRIC DESIGN AND TRAFFIC CONTROL

Functional classification is important to both the highway agency and railroad operator. Even though geometric criteria can be determined without reference to the functional classification, the designer should consider the function that the highway is expected to serve. The functional classification of the highway defines the geometric criteria to be used in its planning, design and construction. Where the highway intersects a railroad, the crossing, whether grade

separated or at-grade, should be designed consistently with the functional classification of the highway or street. These design considerations can also extend to traffic control.

Drivers form expectancies based on their training and experience; that is, situations which occur in similar environments and in similar ways are incorporated into the driver's knowledge base, along with successful responses to the situations. Drivers on a US or state-numbered route, or on a facility having a higher functional classification, have higher expectancies for operating characteristics, level of service and traffic control than do those same drivers on local roads and streets. These higher classed roads and streets also tend to serve a more diverse cross-section of vehicles and lading, including transit buses, intercity buses and haz-mat carriers. For these reasons, functional classification of the road or street should be considered in the decision-making process concerning geometric design and traffic control devices.

TRAFFIC CONTROL DEVICES

GENERAL DISCUSSION

The purpose of traffic control at highway-rail grade crossings is to permit safe and efficient operation of rail and highway traffic over such crossings. Highway vehicles approaching a highway-rail grade crossing should be *prepared to yield and stop if necessary* if a train is at or approaching the crossing.

PASSIVE DEVICES

A passive highway-rail grade crossing is described as follows:

All highway-rail grade crossings having signs and pavement markings (if appropriate to the roadway surface) as traffic control devices that are not activated by trains.

The following tables describe a variety of devices that can be used at a passive controlled highway-rail grade crossing, or supplement active devices. Table 5A are devices currently referenced in the 2000 MUTCD edition. Table 5B lists devices that are not currently proposed in the MUTCD, and any jurisdiction wishing to use these devices to experiment must request permission from the FHWA.

TABLE 5A - CURRENT MUTCD DEVICES

MUTCD No.	Traffic Control Device	Application or Indication of Need
R15-1	CROSSBUCK sign	Required device
R15-2	"Multiple Tracks " sign	Standard device, with 2 or more tracks; optional with gate.
W10-1	Advance warning sign	Required device, with MUTCD exceptions
	RR Pavement Markings	All paved roads, with MUTCD exceptions
R1-1	STOP sign	As indicated in MUTCD reference 1993 memorandum.
W3-1, 1a	STOP AHEAD sign	Where STOP sign is present at crossing.
R1-2	YIELD sign	As indicated in MUTCD reference 1993 memorandum.
W3-2, 2a	YIELD AHEAD sign	Where YIELD sign is present at crossing.
R3-1, -2	Turn Restriction sign * (An "active " sign)	Use with interconnected, preempted traffic signals. Install on the nearby parallel highway to control turns toward the tracks.
R3-4	U-Turn Prohibition sign	Use in median of divided highways at highway-rail grade crossings to inhibit turning vehicles from using the track zone for illegal movement as necessary.
R4-1,	DO NOT PASS sign	Where passing near the tracks is observed.

W14-3		
R8-8	DO NOT STOP ON TRACKS sign	Where queuing occurs, or where storage space is limited between a nearby highway intersection and the tracks. May be supplemented with a flashing light activated by queuing traffic in the exit lane(s) from the crossing. (See discussion on Queue Cutters Signals.)
R8-9	TRACKS OUT OF SERVICE sign	Applicable when there is some physical disconnection along the railroad tracks to prevent train using those tracks.
R10-5	STOP HERE ON RED sign	Use with pre-signal and/or Stop Line pavement markings to discourage vehicle queues onto the track.
R10-11	NO TURN ON RED sign	Use with pre-signal and/or where storage space is limited between a nearby-interconnected traffic signal controlled intersection.
R15-3, W10-1	EXEMPT sign	School buses and those commercial vehicles that are usually required to stop at crossings are not required to do so where authorized by ordinance.
R15-4	Light Rail Transit Only Lane sign series	For multilane operations where roadway users might need additional guidance on lane use and/or restrictions.
R15-5, 5a	DO NOT PASS Light Rail Transit signs	Where vehicles are not allowed to pass LRT vehicles loading or unloading passengers where no raised platform physically separates the lanes.
R15-6, 6a	No Vehicles on Tracks signs	Used where there are adjacent vehicle lanes separated from the LRT lane by a curb or pavement markings.
R15 -7, 7a	DIVIDED HIGHWAY sign	Use with appropriate geometric conditions.
R15-8	LOOK, Supplementary sign	• Multiple tracks • Collision experience • Pedestrian presence
W10-2, 3, 4	Advance Warning Signs Series	Based upon specific situations with a nearby parallel highway.
W10-5	LOW GROUND CLEARANCE CROSSING sign	As indicated by MUTCD guidelines, incident history or local knowledge.
W10-8, 8a	TRAINS MAY EXCEED 80 MPH (130 KM/H) sign	Where train speed is 80 mph (130 km/h) or faster
W10-9	NO TRAIN HORN sign	Shall be used only for crossings in FRA-authorized quiet zones.
W10-10	NO SIGNAL sign	May be used at passive controlled crossings.
W10-11, 11a	Storage Space signs	Where the parallel highway is close to crossing, particularly with limited storage space between the highway intersection and tracks.
W13-1	"Advisory Speed " plate	• May be used with any advance warning sign where appropriate, e.g. advance warning, humped crossing, rough crossing, super-elevated track or other condition where a speed lower than the posted speed limit is advised.
I-12	Light Rail Station sign	Used to direct road users to a light rail station or boarding location.
I-13, 13a	Emergency Notification sign	Post at all crossings to provide for emergency notification.
	Dynamic Envelope Delineation, pavement markings	Where there is queuing or limited storage space for highway vehicles at a nearby highway intersection.
	Signs on both sides of	• For extra emphasis

	highway	• Multi lane • One-way roads • Curved approaches
	Increased retroreflectivity on highway signs	• Nighttime train operations.
	Roadway delineators, post-mounted on shoulders	• Frequent inclement weather • Crossing narrower than approach pavement • Isolated crossings • May be used as an alternative to illumination
	Flashing lights on signs and lighted signs	• Presence of competing stimuli, "visual clutter " • Restricted sight distance to the crossing • High speed highway traffic approach • Isolated crossing • Heavy volume or queued traffic in advance of the crossing
	Overhead signs	• Multi-lane approach • High speed highway approach • If a sign cannot be placed on the roadside • May be used as an alternative to the double signs
	Crossing illumination:	• Nighttime train operations • Crossings are blocked for long periods • Train speeds are low • Nighttime collision experience • Curved approach (vertical and horizontal curves) • Frequent occurrence of fog or smoke.
	Stop and flag	• Railroad option, but may be considered by traffic engineer. • Combination of low train frequency, short trains, high-volume highway traffic, multilane highway

TABLE 5B - NOT CURRENTLY PROPOSED IN THE MUTCD - *EXPERIMENTAL DEVICES*

	SECOND TRAIN and other supplemental signs	• Multiple tracks • Collision experience • Pedestrian presence
	Buckeye CROSSBUCK sign	Among a number of special signs under current research.

HIGHWAY-RAIL GRADE CROSSING (CROSSBUCK) SIGNS

The MUTCD states, "The Highway-Rail Grade Crossing (R15-1) sign, commonly identified as the Crossbuck Sign, shall be retroreflectorized white with the words RAILROAD CROSSING in black lettering. As a minimum, one Crossbuck sign shall be used on each highway approach to every highway-rail grade crossing, alone or in combination with other traffic control devices. If automatic gates are not present and if there are two or more tracks at the highway-rail grade crossing, the number of tracks shall be indicated on a supplemental Number of Tracks (R15-2) sign of inverted T shape mounted below the Crossbuck sign in the manner and at the height indicated in the MUTCD. "

STOP and YIELD SIGNS

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) (Public Law 102-240; 105 Stat 1914; December 18, 1991) required that the FHWA revise the MUTCD to enable State or local governments to install STOP or YIELD signs at any passive highway-rail grade crossing where two or more trains operated daily. In response, the FHWA published a final rule in the Federal Register (57 FR 53029), which incorporated the new standards into the

MUTCD. This final rule, published in March 1992, was effective immediately.

The FHWA and the FRA published a memorandum containing guidelines for when the use of STOP or YIELD signs is appropriate. According to the jointly-developed document, "it is recommended that the following considerations be met in every case where a STOP sign is installed: [9]"

1. Local and/or State police and judicial officials commit to a program of enforcement no less vigorous than would apply at a highway intersection equipped with STOP signs.
2. Installation of a STOP sign would not occasion a more dangerous situation (taking into consideration both the likelihood and severity of highway-rail collisions and other highway traffic risks) than would exist with a YIELD sign.

According to this memorandum, any of the following conditions indicate that the use of a STOP sign might reduce risk at a crossing:

1. Maximum train speeds equal, or exceed, 48 km/h (30 mph).
2. Highway traffic mix includes buses, hazardous materials carriers and/or large (trash or earth moving) equipment.
3. Train movements are 10 or more per day, five or more days per week.
4. The rail line is used by passenger trains.
5. The rail line is regularly used to transport a significant quantity of hazardous materials.
6. The highway crosses two or more tracks, particularly where both tracks are main tracks or one track is a passing siding that is frequently used.
7. The angle of approach to the crossing is skewed.
8. The line of sight from an approaching highway vehicle to an approaching train is restricted such that approaching traffic is required to substantially reduce speed.

The memorandum also states, however, that the above conditions should be weighed against the possible existence of the following factors:

1. The highway is other than secondary in character. Recommended maximum of 400 ADT in rural areas, and 1,500 ADT in urban areas.
2. The roadway is a steep ascending grade to or through the crossing, sight distance in both directions is unrestricted in relation to maximum closing speed, and heavy vehicles use the crossing.

A footnote in this joint document also states that "a crossing where there is insufficient time for any vehicle, proceeding from a complete stop, to safely traverse the crossing within the time allowed by maximum train speed, is an inherently unsafe crossing that should be closed. "

ACTIVE DEVICES

An active highway-rail grade crossing is described as follows:

All highway-rail grade crossings equipped with warning and/or traffic control devices that gives warning of the approach or presence of a train.

Due to the variables which should be considered, an engineering and traffic investigation is required to determine the specific application of active devices at any given highway-rail grade crossing. Guidance is provided in the following sections for the application of the many active traffic control system devices available for grade crossing design, in addition to various median treatments that can supplement these devices. The following is a list of active devices that can be considered for use at a highway-rail grade crossing. The first four commonly found at many grade crossings are designated as "standard devices."

STANDARD ACTIVE DEVICES

Flashing-Light Signal

A standard flashing-light signal consists of two red lights in a horizontal line flashing alternately at approaching

highway traffic. At a crossing with highway traffic approaching in both directions, flashing-lights are installed facing oncoming traffic in a back-to-back configuration in accordance with the MUTCD. The support used for the lights should also include a standard crossbuck sign and, where there is more that one track, an auxiliary "multiple tracks" R15-2 sign. Back lights may be eliminated with one-way highway traffic, based on engineering judgment. An audible control device may be included.

Cantilever Flashing-Light Signal

This device supplements the standard flashing-light signal. Cantilever flashing-lights consist of an additional one or two sets of lights mounted over the roadway on a cantilever arm and directed at approaching highway traffic. Cantilevered lights provide better visibility to approaching highway traffic, particularly on multi-lane approaches. This device is also useful on high-speed two-lane highways, where there is a high percentage of trucks, or where obstacles by the side of the highway could obstruct visibility of standard mast mounted flashing-lights. An example is where the terrain or topography of the approaching highway is such that the sight of a roadside mounted signal light could not be readily seen by an approaching driver due to vertical or horizontal curves.

Cantilever flashing-light signals may be mounted back-to-back and should also have an additional crossbuck added to the overhead structure, based on site conditions and engineering judgment.

Automatic Gate

The automatic gate provides supplemental visual display when used with both road side mounted flashing-lights and cantilever flashing-light signals. The device consists of a drive unit and a gate arm. The drive mechanism can be mounted on flashing-light posts or cantilever pole supports, or on a stand-alone support. The gate arm is fully reflectorized on both sides with 45 degree diagonal red and white stripes and has at least three lights; the tip light is continuously lit and the others alternately flash when the gate is activated and lowered. When lowered, the gate should extend across approaching highway traffic lanes. Special consideration should be given to clearances for movement of the counter weight arm portion of the gate drive unit in a median and adjacent to sidewalk locations with pedestrians, particularly with the requirements of the Americans with Disabilities Act (ADA) of 1990.

Additional Flashing-Light Signals

Additional approaches to active highway-rail grade crossings require additional flashing-light signals be directed at the approaching traffic. These lights can be mounted on existing flashing-light masts, extension arms, additional traffic signal masts, cantilever supports, in medians or other locations on the left side of the roadway.

SUPPLEMENTAL ACTIVE DEVICES

Active Advance Warning Signs with Flashers

A train activated advance warning sign (utilizing the W-10 sign) should be considered at locations where sight distance is restricted on the approach to a crossing, and the flashing-light signals cannot be seen until an approaching driver has passed the decision point (the distance to the track from which a safe stop can be made)[10]. Two yellow lights can be placed on the sign to warn drivers in advance of a crossing where the control devices are activated. The continuously flashing yellow "caution " lights can influence driver speed and/or provide warning for stopped vehicles ahead. An Advisory Speed Plate sign indicating the safe approach speed also should be posted with the sign.

If the advance flashers are connected to the railroad control circuitry, and only flash upon the approach of a train, they should be activated prior to the control devices at the crossing so that a driver would not pass a dark flasher and then encounter an activated flashing-light at the crossing. (Track circuits may need to be revised to handle this.) A few States use a supplementary message such as TRAIN WHEN FLASHING. In order to allow the traffic queue at the crossing time to dissipate safely, the advance flashers should continue to operate for a period of time after the active control devices at the crossing deactivate, as determined by an engineering study.

If such an advance device fails, the driver would not be alerted to the activated crossing controls. If there is concern for such failure, some agencies use a passive, RAILROAD SIGNAL AHEAD sign to provide a full time warning message. The location of this supplemental advance warning sign is dependant on vehicle speed and geometric

conditions of the roadway.

Active Turn Restriction Signs

An active turn restriction sign (blank-out sign with internal illumination) displaying "No Right Turn " or "No Left Turn " (or appropriate international symbol) should be used in the following instances; on a parallel street within 15 m (50 ft) of the tracks where a turning vehicle from that parallel street could proceed around lowered gates; at a signalized highway intersection, where traffic signals at a nearby highway intersection are interconnected and preempted by the approach of the train, and all existing turn movements toward the grade crossing should be prohibited. These signs shall be visible only when the restriction is in effect.

MEDIAN SEPARATION

Despite the dangers of crossing in front of oncoming trains, drivers continue to risk lives and property by driving around crossing gates. At many crossings a driver is able to cross the center line pavement marking and drive around a gate with little difficulty. The numbers of crossing gate violations can be reduced by restricting driver access to the opposing lanes. Highway authorities have implemented various median separation devices, which have shown a significant reduction in the number of vehicle violations at crossing gates.

There are limitations common to the use of any form of traffic separation at highway-rail grade crossings. These include restricting access to intersecting streets, alleys and driveways within the limits of the median and possible adverse safety effects. The median should be designed to allow vehicles to make left turns or U-turns through the median where appropriate, based on engineering judgment and evaluation.

BARRIER WALLS SYSTEMS

Concrete barrier walls and guardrails generally prevent drivers from crossing into opposing lanes throughout the length of the installation. In this sense they are the most effective deterrent to crossing gate violations. But, the road must be wide enough to accept the width of the barrier and the appropriate end treatment.[11]. Sight restrictions for vehicles with low driver eye heights and any special need for emergency vehicles to make a U-turn maneuver should be considered (but not for the purpose of circumventing the traffic control devices at the crossing). Installation lengths can be more effective if they extend beyond a minimum length of 46 m (150 ft).

WIDE RAISED MEDIANS

Curbed medians generally range in width from 1.2 to more than 30 m (4 - 100 ft). While not presenting a true barrier, wide medians can be nearly as effective since a driver would have significant difficulty attempting to drive across to the opposing lanes. The impediment becomes more formidable as the width of the median increases. A wide median, if attractively landscaped, is often the most aesthetically pleasing separation method.

Drawbacks to implementing wide raised medians include availability of sufficient right-of-way, and maintenance of surface and/or landscape. Additions such as trees, flowers and other vegetation higher than .9 m (3 ft) above the roadway can restrict the drivers' view of approaching trains. Maintenance can be expensive depending on the treatment of the median. Limitation of access can cause property owner complaints, particularly for businesses. Non-mountable curbs can increase total crash rate and severity of accidents when struck by higher speed vehicles (>64 km/h [40 mph]).[12]

NON-MOUNTABLE CURB ISLANDS

Non-mountable curb islands are typically six to nine inches in height and at least .6m (2 ft) wide, and may have reboundable, reflectorized vertical markers. Drivers have significant difficulty attempting to violate these types of islands because the six to nine inch heights cannot be easily mounted and crossed.

There are some disadvantages to be considered. The road must be wide enough to accommodate a two foot median. The increased crash potential should be evaluated. AASHTO recommends special attention be given to high visibility if such a narrow device is used in higher speed (>64 km/h [40 mph]) environments.[13].Care should be taken to assure that an errant vehicle cannot bottom-out and protrude into the oncoming traffic lane. Sight restrictions for low driver eye heights should be considered if vertical markers are installed. Access requirements should be fully

evaluated, particularly allowing emergency vehicles to cross opposing lanes (but not for the purpose of circumventing the traffic control devices at the crossing). Paint and reflective beads should be applied to the curb for night visibility.

MOUNTABLE RAISED CURB SYSTEMS

Mountable raised curb systems with reboundable vertical markers present drivers with a visual impediment to crossing to the opposing traffic lane. The curbs are no more than six inches in height, less than twelve inches in width, and built with a rounded design to create minimal deflection upon impact. When used together, the mountable raised median and vertical delineators discourage passage. These systems are designed to allow emergency vehicles to cross-opposing lanes (but not for the purpose of circumventing the traffic control devices at the crossing). Usually such a system can be placed on existing roads without the need to widen them.

Because mountable curbs are made to allow emergency vehicles to cross, and are designed to deflect errant vehicles, they also are the easiest of all the barriers and separators to violate. Large, formidable vertical markers will inhibit most drivers. Care should be taken to assure that the system maintains its stability on the roadway with design traffic conditions, and that retro-reflective devices or glass beads on the top and sides of the curb are maintained for night visibility. Curb colors should be consistent with location and direction of traffic adjacent to the device.

OTHER BARRIER DEVICES

FOUR-QUADRANT TRAFFIC GATE SYSTEMS

Four-quadrant gate systems consist of a series of automatic flashing-light signals and gates where the gates extend across both the approach and departure side of roadway lanes. Unlike two-quadrant gate systems, four-quadrant gates provide additional visual constraint and inhibit nearly all traffic movements over the crossing after the gates have been lowered. At this time, only a small number of four-quadrant gate systems have been installed in the U.S., and incorporate different types of designs to prevent vehicles from being trapped between the gates.

VEHICLE ARRESTING BARRIER SYSTEM - BARRIER GATE

A moveable barrier system is designed to prevent the intrusion of vehicles onto the railroad tracks at highway-rail grade crossings. The barrier devices should at least meet the evaluation criteria for a NCHRP Report 350 (Test Level 2) attenuator,[14] stopping an empty: 4500-pound pickup truck traveling at 70 km/h (43 mph). However, it could injure occupants of small vehicles during higher speed impacts, and may not be effective for heavy vehicles at lower speeds.

Two types of barrier devices have been tested and used in the U.S.; vehicle arresting barriers and safety barrier gates.

The vehicle arresting barrier (VAB) is raised and lowered by a tower lifting mechanism. The VAB in the down position consists of a flexible netting across the highway approaches that is attached to an energy absorption system. When the netting is struck, the energy absorption system dissipates the vehicle's kinetic energy and allows it to come to a gradual stop. This device was tested at three locations in the high-speed rail corridor between Chicago, IL and St. Louis, MO.

The safety barrier gate is a movable gate designed to close a roadway temporarily at a highway-rail crossing. A housing contains electro-mechanical components that lower and raise the gate arm. The gate arm consists of three steel cables, the top and bottom of which are enclosed aluminum tubes. When the gate is in the down position the end of the gate fits into a locking assembly that is bolted to a concrete foundation. This device has been tested to safely stop a pickup truck traveling at 72 km/h (45 mph) and has been installed in Madison, WI and Santa Clara County, CA.

A barrier gate could also be applied in those situations requiring a positive barrier e.g., in a down position, closing off road traffic and opening only on demand.

TRAIN DETECTION SYSTEMS

WARNING TIME AND SYSTEM CREDIBILITY

Reasonable and consistent warning times re-enforce system credibility. Unreasonable or inconsistent warning times may encourage undesirable driver behavior. Research has shown when warning times exceed 40-50 seconds, drivers will accept shorter clearance times at flashing lights, and a significant number will attempt to drive around gates.[15] Although mandated maximum warning times do not yet exist, efforts should be made to ensure traffic interruptions are reasonable and consistent without compromising the intended safety function of an active control device system's design. Excessive warning times are generally associated with a permanent reduction in the class of track and/or train speeds without a concomitant change in the track circuitry and without constant warning time equipment. When not using constant warning train detection systems, track approach circuits should be adjusted accordingly when train speeds are permanently reduced. Another frequent cause of excessive warning times at crossings without constant warning time equipment is variable speed trains, e.g., inter-city passenger trains or fast commuter trains interspersed with slower freight trains.

A major factor affecting system credibility is an unusual number of false activations at active crossings. Every effort should be made to minimize false activations through improvements in track circuitry, train detection equipment, and maintenance practices. A timely response to a system malfunction coupled with repairs made without undue delay can reduce credibility issues. Remote monitoring devices are an important tool.

Joint study and evaluation is needed between the highway agency and railroad to make a proper selection of the appropriate train detection system.

Train detection systems are designed to provide the minimum warning time for a crossing. In general, the MUTCD states that the system should provide for a minimum of 20 seconds warning time. When determining if the minimum 20 seconds warning time should be increased, the following factors should be considered:

- track clearance distances due to multiple tracks and/or angled crossings; (add one second for each 3 m [10 ft] of added crossing length in excess of 10.7 m [35 ft]);
- the crossing is located within close proximity of a highway intersection controlled by STOP signs where vehicles have a tendency of stopping on the crossing;
- the crossing is regularly used by long tractor-trailer vehicles;
- the crossing is regularly used by vehicles required to make mandatory stops before proceeding over the crossing (e.g. school buses and hazardous materials vehicles);
- the crossing's active traffic control devices are interconnected with other highway traffic signal systems;
- provide at least 5 seconds between the time the approach lane gates to the crossing are fully lowered and when the train reaches the crossing, per 49 CFR Part 234;
- the crossing is regularly used by pedestrians and non-motorized components;
- where the crossing and approaches are not level and ;
- where additional warning time is needed to accommodate a four-quadrant gate system.

INTERFERENCE / INTEGRITY OF ACTIVE TRAFFIC CONTROL DEVICE SYSTEMS

Interference with normal functioning of an active control device system diminishes the driver's perception of the integrity of the system. Interference can result from, but is not limited to, trains, locomotives or other railroad equipment standing within the system's approach circuit, and testing or performing work on the control device systems or on track and other railroad systems or structures. The integrity of the control device system may be adversely affected if proper measures are not taken to provide for safety of highway traffic when such work is underway. It is important that Railroad employees are familiar with Federal regulations and railroad procedures which detail measures to be taken prior to commencing activities, which might interfere with track circuitry.

TYPE OF DETECTION SYSTEM

DC, AC-DC or AFO Grade Crossing Island and Approach Circuits:

These basic train detection circuits use a battery or transmitter at one end of a section of track and a relay, receiver or diode at the other end. A train on the section of the affected track will shunt the circuit and de-energize the relay. This type of system will continue to operate until the train leaves the circuit.

Motion Sensitive Devices (MS)

A type of train detection (control) system for automatic traffic control devices that has the capability of detecting the presence and movement of a train within the approach circuit of a crossing. MS devices will activate the traffic control devices at the crossing for all trains located within the approach circuit that are moving toward the crossing, regardless of train speed. If a train stops within the approach circuit before reaching the crossing, the traffic control devices will deactivate until the train resumes motion toward the crossing, but will remain deactivated if the train retreats beyond the detection circuit.

Constant Warning Time (CWT) Systems

A constant warning time system has the capability of sensing a train as it approaches a crossing, measuring its speed and distance from the crossing, and activating the traffic control devices to provide the desired warning time. Traffic control systems equipped with CWT provide relatively uniform warning times where train speeds vary and trains do not accelerate or decelerate within the approach circuits once the devices have activated. Trains may perform low speed switching operations beyond 213 m (700 ft) from a crossing without causing the crossing devices to unnecessarily activate. This reduces or eliminates excess gate operation that in turn, causes unnecessary delays to highway traffic. Like motion sensitive systems, if a train stops within the approach circuit before reaching the crossing the traffic control devices will deactivate.

RAILROAD TRAIN DETECTION TIME AND APPROACH LENGTH CALCULATIONS

It should be noted that even when "constant warning devices " are used, the calculated arrival time of the train at the crossing is based on the instantaneous speed of the train as it enters the crossing circuit. Once the calculation is made, changes in train speed will change train arrival time at the crossing and correspondingly reduce (or increase) the elapsed warning time at the crossing. This factor must be considered at a crossing interconnected to a nearby highway traffic signal utilizing either a simultaneous or advance preemption sequence.

Design information about railroad interconnection circuits and approach length calculations can be found in the American Railway Engineering and Maintenance-of-Way Association (AREMA) Signal Manual[16] Manual Part 3.1.10, *Recommended Functional/Operating Guidelines for Interconnection Between Highway Traffic Signals and Highway - Rail Grade Crossing Warning Systems*; and Manual Part 3.3.10, *Recommended Instructions for Determining Warning Time and Calculating Minimum Approach Distance for Highway-Rail Grade Crossing Warning Systems.*

PREEMPTION/INTERCONNECTION:

WHEN TO INTERCONNECT

The guidance in the MUTCD states: "When a highway-rail grade is equipped with a flashing-light signal system and is located within 60 m (200 ft) of an intersection or mid-block location controlled by a traffic control signal, the traffic control signal should be provided with preemption in accordance with Section 4D.13. "Recent studies indicate that when designing for the installation of a new traffic control signal substantially beyond 60 m (200 ft) (possibly 152-305m [500-1000 ft]) of a highway-rail grade crossing, an estimate of the expected queue length should be performed. For estimation purposes, a 95% probability level should be used. If the resulting expected queue length is equal to or greater than the available storage distance, consideration should be given to interconnecting the traffic control signal with the active control system of the railroad crossing and providing a preemption sequence. Guidance on estimating queue length is available in the article, "Design Guidelines for Railroad Preemption at Signalized Intersections," *ITE Journal*, February 1997. Guidance on the design of preemption operation is available in *Preemption of Traffic Signals At or Near Railroad Grade Crossings with Active Warning Devices*, #RP-025A, Institute of Transportation Engineers, 1997 www.ite.org or 202-289-0222; and the *Implementation Report of the USDOT Grade Crossing Safety Task Force, June 1, 1997, U.S. Department of Transportation*, www.fhwa.dot.gov. The *Implementation Report* is an excellent source of definitions.

FACTORS TO CONSIDER

Joint Agency Coordination

Close coordination between the highway agency and the railroad company is required when interconnecting a traffic signal with active railroad traffic control devices. In order to properly design the highway-rail preemption system, both the railroad company and the highway agency should understand how each system operates. An engineering study should be conducted at each interconnected location to

determine the minimum preemption warning time necessary to adequately clear traffic from the crossing in the event of an approaching train. Factors that need to be considered when calculating this time are equipment response and programmed delay times, minimum traffic signal green times, traffic signal vehicular and pedestrian clearances, queue clearance times and train/vehicle separation time.

Extended Advance Warning Times

Whenever it becomes necessary at gated crossings to provide design advance warning times in excess of 45 seconds, whether for traffic signal preemption or other purposes, consideration should be given to including supplemental median treatments to discourage drivers from attempting to circumvent the gates.

Second Train Circuitry at Multiple Track Crossings

At multiple track crossings, "second train " circuitry can be considered as part of the control network. This circuitry is intended to detect a second train approaching the crossing, but outside the normal warning time approach circuit. For instance, the normal approach circuit may provide 25 seconds warning but the second-train circuit may look an additional 10 seconds. If a train activates a train activates the traffic control devices AND a second train is detected within the 35-second circuit, the gates will be held down for the second train and the traffic signals remain preempted. (Also see Traffic Signal Controller Re-Service Considerations in the Preemption/Interconnection Appendix.)

Diagonal Railroad Crossing Both Highway Approaches to the Intersection

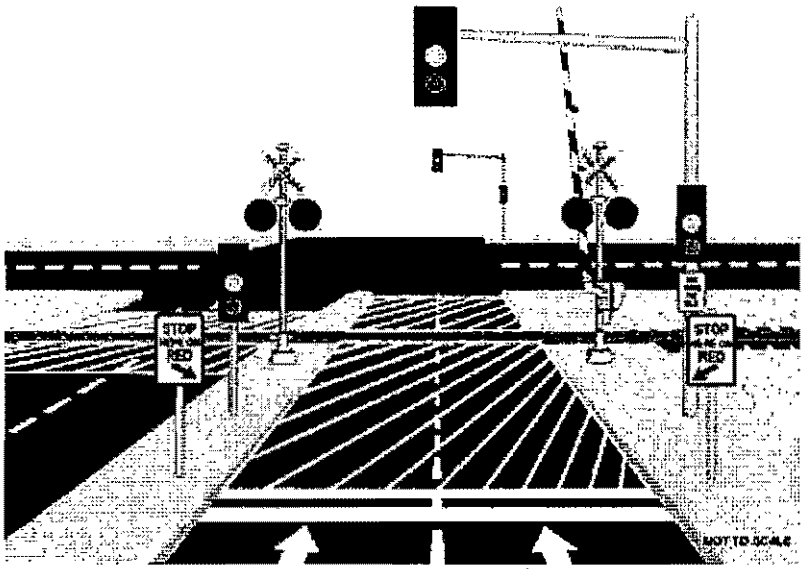
Where the railroads run diagonally to the direction of the highway, it is probable that the railroad may cross two highway approaches to an interconnected intersection. When this situation occurs, it is normally necessary to clear out traffic on both roadways prior to the arrival of the train, requiring approximately twice the preemption time computed for one approach. It is also normally required to have both railroad active traffic control device systems designed to operate concurrently. This is needed to prevent the interconnected traffic signals and railroad active control devices from falling out of coordination with each other which otherwise can occur under certain types of train movements or when one of the two crossings experiences a false signal activation prior to an actual train movement. When the railroad control devices activate, traffic leaving the intersection and approaching either crossing may queue back into the intersection and block traffic if there is not adequate storage for those vehicles between the crossing and the intersection. Traffic turning at the intersection toward the other crossing may also be unable to proceed due to stopped traffic.

When this occurs, utilization of advance preemption together with a hybrid design may help alleviate this problem. The hybrid design could consist of delaying the activation of the railroad devices facing vehicles leaving the intersection and approaching both crossings to help vehicles clear out of the intersection during the preemption sequence.

Pre-Signals

Pre-signals control traffic approaching the highway-rail grade crossing toward the nearby highway intersection, and are operated as part of the highway intersection traffic signal system. Their displays are integrated into the railroad preemption program. A diagram of a pre-signal is shown as Figure 4.

Figure 4



PRE-SIGNAL LOCATION AT AUTOMATIC GATE CROSSING
FIGURE 4

This figure depicts the location of a pre-signal at an automatic gate crossing. In the foreground of the figure is the away-going side of a divided highway. The road crosses a railroad track and a little further, intersects another road. At the intersection of the two roads, there is a traffic-control signal. The crossing is equipped with lights and an automated crossarm. Prior to the railroad crossing is another traffic-control signal and a double white line where vehicles are to stop. The signal and lines are designed to prevent a line of vehicles forming at the highway-highway intersection that would back up onto the railroad tracks. Between the double white line of the forward traffic-control signal and the white line of the intersection signal, diagonal white stripes are painted along the road to indicate the danger zone around the crossing. On either side of the road at the double white line is a sign that reads "STOP HERE ON RED, " with and arrow pointing to the double white line.

An engineering study should be made to evaluate the various elements involved in a pre-signal. These are summarized as follows.

Where the highway intersection is less than 15m (50 ft) from the highway-rail crossing (23m [75 ft] for a roadway regularly used by multi-unit vehicles), pre-signals should be considered. Where the clear storage distance is greater than 23 m (75 ft), pre-signals could be used, subject to an engineering study determining that the queue extends into the track area.

Without pre-signals at highway-rail grade crossings, drivers may focus on the downstream highway traffic signal indications rather than the flashing-light signals located at the grade crossing. This type of driver behavior is especially undesirable during the beginning of the preemption sequence when the downstream traffic signals are typically green (in order to clear queued vehicles off the tracks) and the flashing-light signals are activated.

Driver behavior at crossings equipped with pre-signals is modified because the driver stops at the railroad stop line even when a train is not approaching. By providing a consistent stopping location, with or without the presence of a train, the driver will not become confused as to a safe location to stop when a train is approaching.

Where geometric considerations in advance of the crossing complicate the installation of a pre-signal on a separate support in front of the railroad signal, the placement of railroad flashing-light signals and traffic signals on the same support should be considered to reduce visual clutter and to increase driver visibility of the pre-signals. A written agreement between the highway agency and railroad may be required.

The pre-signal phase sequencing should be progressively timed with an offset adequate to clear vehicles from the track area and downstream intersection. Vehicles that are required to make a mandatory stop (e.g., school buses, vehicles hauling hazardous materials, etc.) should be considered when determining the amount of time for the offset to ensure that they will not be forced to stop in the clear storage area.

For highway-rail grade crossings equipped with a pre-signal and clear storage distance less than 15 m (50 ft), (23 m [75 ft] for a roadway regularly used by multi-unit vehicles), a clear zone between the crossing and the downstream intersection may be diagonally striped to delineate the clear storage area.

The downstream traffic signal at the highway intersection controlling the same approach as the pre-signal should be equipped with programmable visibility indications or louvers. The downstream heads should only be visible from within the down stream intersection to the driver eye location of the first vehicle behind the pre-signal stop bar. Design of the visibility limited indications is quite complex and should consider a range of driver eye heights for the various vehicles expected on the roadway.

Long Distance between the Highway-Rail Crossing and the Highway Intersection

In cases where the crossing is located far from the highway intersection -- up to 305 m (1000 ft), the necessary minimum preemption warning time may be very high and in turn may require very long approach circuits along the tracks in order to provide such a time. Long track circuits can become extremely complex and expensive to implement, especially if located in an area where there are several adjacent crossings with overlapping track circuits, switching spurs, railroad junctions or commuter rail stations which could affect train operating speeds within the detection circuit. In addition, excessive preemption times may have detrimental effects on traffic flows within the vicinity of the crossing and may cause other problems such as traffic backing up along a route parallel to the crossing and backing up through another adjacent interconnected intersection. These are just a few factors to consider with a long distance interconnection.

Queue Cutter Flashing-light Beacon

An alternative to interconnecting the two traffic control devices may be the use of an automated Queue Cutter Flashing-light Beacon upstream of the highway-rail grade crossing. They may be utilized in conjunction with DO NOT STOP ON TRACKS (R8-8) as stated in the MUTCD signs. Such beacons can be activated by an induction loop on the departure side of the highway-rail grade crossing that detects a growing queue between the crossing and the distant highway intersection. If the beacons are activated only when the traffic signals on that approach are not green, they can be more effective as opposed to flashing all the time.

These are some of the many factors that should be considered when interconnecting an active traffic control device at a highway-rail grade crossing to a nearby highway traffic signal. A separate Preemption/Interconnection appendix is included with this report to provide further explanation of this very complex subject. However, it is not the intent of this document to serve as a primer for this very complicated topic. It cannot be emphasized enough that design, construction, operation and maintenance of this type of system requires expert knowledge and full cooperation between highway and railroad authorities. Other special conditions are discussed in the following section.

Also See Appendix for additional information

OTHER SPECIAL CONDITIONS

POTENTIAL QUEUING ACROSS TRACKS

Where queuing across a highway-rail grade crossing is occasioned by a nearby highway intersection that is not equipped with a traffic signal, the traffic engineer has a number of options including:

1. Install a DO NOT STOP ON TRACKS sign;
2. Install an automated Queue Cutter Flashing-light Beacon (see prior discussion in "Factors to Consider "); and/or;
3. Install a traffic signal with railroad preemption at the highway/highway intersection.

Queues extending over the highway-rail grade crossing could be considered a possible need for the installation of a traffic signal at the nearby highway intersection. However, the third option needs to be considered very carefully considering the harmful effects of an otherwise unwarranted traffic signal.

TRAIN AND LIGHT RAIL TRANSIT (LRT) ACTIVATED HIGHWAY TRAFFIC SIGNALS

Urban city streets often pose a special case for the application of active grade crossing traffic control devices. Slow speed switching moves and mixed-use light rail transit (LRT) operations are often controlled by traffic signals. In such cases, traffic signal heads must be clearly visible to the train operator. Trains must stop short before entering these intersections. Train detection can be accomplished by the use of island track circuits, key selector switches, inductive loops, train to way-side communications and other technologies.

Where LRT vehicles move within the street median or through the intersection of two or more city streets, and where train operating speeds and sight distances are consistent with safe stopping distances, the train may operate through these intersections controlled by traffic signal indications without stopping. In such cases, special transit signal aspects, which clearly indicate traffic signal controlled right-of-way, must govern train moves. Special transit indications may also provide information concerning track alignment to the transit operator. Automatic train stops and other train control devices may be used to enforce a train's compliance with the signal indication. Where special train aspects are present and safe stopping distance is assured, transit vehicles may utilize train to way-side communications, inductive loops, cantenary detector switches or other forms of detection to activate the traffic signals. Great care should be exercised in the location of special train indicators to avoid confusion to drivers approaching the intersection. Programmed heads and special aspects are helpful in this regard.

(SECOND) TRAIN COMING ACTIVE WARNING SIGN

Train detection systems can also be used to activate a "2nd Train Coming" supplemental warning sign. This sign is used on a limited basis, normally near commuter stations where multiple tracks and high volumes of pedestrian traffic are present. The sign will activate when a train is located within the crossing's approach circuits and a 2nd train approaches the crossing. It is also being evaluated at multiple track highway-rail grade crossings as a supplement to automatic gates. (Since this sign is not currently in the MUTCD, any jurisdictions wishing to use symbols to convey any part of this message, must request permission to experiment from the FHWA.)

PEDESTRIAN AND BICYCLIST CONSIDERATIONS

Non-motorist-crossing safety should be considered at all highway-rail grade crossings, particularly at or near commuter stations and at non-motorist facilities, such as bicycle/walking trails, pedestrian only facilities, and pedestrian malls.[17]

Passive and active devices may be used to supplement highway related active control devices to improve non-motorist safety at highway-rail crossings. Passive devices include fencing, swing gates, pedestrian barriers, pavement markings and texturing, refuge areas and fixed message signs. Active devices include flashers, audible active control devices, automated pedestrian gates, pedestrian signals, variable message signs and blank out signs.

These devices should be considered at crossings with high pedestrian traffic volumes, high train speeds or frequency, extremely wide crossings, complex highway-rail grade crossing geometry with complex right-of-way assignment, school zones, inadequate sight distance, and/or multiple tracks. All pedestrian facilities should be designed to minimize pedestrian crossing time and devices should be designed to avoid trapping pedestrians between sets of tracks.

Guidelines for the use of active and passive devices for **Non-motorist Signals and Crossings** are found in section 10D of Part 10 of the MUTCD.

ALTERNATIVES TO MAINTAINING THE CROSSING

CROSSING CLOSURE

Eliminating redundant and unneeded crossings should be a high priority. Barring highway or railroad system requirements that require crossing elimination, the decision to close or consolidate crossings requires balancing public necessity, convenience and safety. The crossing closure decision should be based on economics; comparing the cost of retaining the crossing (maintenance, accidents, and cost to improve the crossing to an acceptable level if it would remain, etc.) against the cost (if any) of providing alternate access and any adverse travel costs incurred by users having to cross at some other location. Because this can be a local political and emotional issue, the economics of the situation cannot be ignored. This subject is addressed in a 1994 joint FRA/FHWA publication entitled *Highway-Railroad Grade Crossings: A Guide To Crossing Consolidation and Closure*, and a March 1995

AASHTO publication, *Highway-Rail Crossing Elimination and Consolidation.*[18]

Whenever a crossing is closed, it is important to consider whether the diversion of highway traffic may be sufficient to change the type or level of traffic control needed at other crossings. The surrounding street system should be examined to assess the effects of diverted traffic. Often, coupling a closure with the installation of improved or upgraded traffic control devices at one or more adjacent crossings can be an effective means of mitigating local political resistance to the closure.

GRADE SEPARATION

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

- eliminating train/vehicle collisions (including the resultant property damage and medical costs, and liability);
- savings in highway-rail grade crossing surface and crossing signal installation and maintenance costs;
- driver delay cost savings;
- costs associated with providing increased highway storage capacity (to accommodate traffic backed up by a train);
- fuel and pollution mitigation cost savings (from idling queued vehicles);
- effects of any "spillover " congestion on the rest of the roadway system;
- the benefits of improved emergency access;
- the potential for closing one or more additional adjacent crossings; and
- possible train derailment costs.

A recently released report, entitled "Grade Separations-When Do We Separate,[19]" provides a stepwise procedure for evaluating the grade separation decision. The report also contains a rough screening method based on train and roadway vehicular volumes. However, as pointed out in the report, the screening method should be used with caution and should be calibrated for values appropriate for the particular jurisdiction.

TRAFFIC SEPARATION STUDY APPROACH TO CROSSING CONSOLIDATION

Both the FRA [20] and the AASHTO [21] have provided guidelines for crossing consolidation. State DOTs, road authorities and local governments may choose to develop their own criteria for closures based on local conditions. Whatever the case, a specific criteria or approach should be used, so as to avoid arbitrarily selecting crossings for closure. An example is provided by the North Carolina DOT.[22]

To improve crossing safety and provide a comprehensive approach to crossing consolidation, the traffic separation study approach is a worthwhile option. As part of a comprehensive evaluation of traffic patterns and road usage for an entire municipality or region, traffic separation studies determine the need for improvements and/or elimination of public highway-rail grade crossings based on specific criteria. Traffic separation studies progress in three phases: preliminary planning, study and implementation.

Crossing information is collected at all public crossings in the municipality. Evaluation criteria include: collision history, current and projected vehicular and train traffic, crossing condition, school bus and emergency routes, types of traffic control devices, feasibility for improvements and economic impact of crossing closures. After discussions with the local road authority, railroad, State DOT, municipal staff and local officials these recommendations may be modified. Reaching a "consensus" is essential prior to scheduling presentations to governing bodies and citizens.

Recommendations may include: installation of flashing-lights and gates, enhanced devices such as four-quadrant gates and longer gate arms, installation of concrete or rubber crossings, median barrier installation, pavement markings, roadway approach modifications, crossing or roadway realignments, crossing closures and/or relocation of existing crossings to safer locations, connector roads, and feasibility studies to evaluate potential grade separation locations.

The most dynamic aspect of the public involvement process occurs at crossing safety workshops and public hearings. A goal of these forums is to exchange information and convey the community benefits of enhanced crossing safety, including the potential consequences to neighborhoods of train derailments containing hazardous materials resulting from crossing accidents. Equating rail crossings to highway interchanges, something the average citizen can relate to, greatly assist in reinforcing the need for eliminating low-volume and/or redundant crossings.

NEW CROSSINGS

Similar to crossing closure/consolidation, consideration of opening a new public highway-rail crossing should likewise consider public necessity, convenience, safety and economics. Generally, new grade crossings, particularly on main-line tracks, should not be permitted unless no other viable alternatives exist and, even in those instances, consideration should be given to closing one or more existing crossings. If a new grade crossing is to provide access to any land development, the selection of traffic control devices to be installed at the proposed crossing should be based on the projected needs of the fully completed development.

Communities, developers and highway transportation planners need to be mindful that once a highway-rail grade crossing is established, drivers can develop a low tolerance for the crossing being blocked by a train for an extended period of time. If a new access is proposed to cross a railroad where railroad operation requires temporarily holding trains, only grade separation should be considered.

GUIDANCE

These treatments are provided for consideration at every public highway-rail grade crossing. Specific MUTCD Signs and treatments are included for easy reference.

1. ***MINIMUM DEVICES*** - all highway-rail grade crossings of railroads and public streets or highways should be equipped with approved passive devices. For street running railroads/transit systems, refer to MUTCD Parts 8 and 10.

2. ***MINIMUM WIDTHS*** - All highway-rail grade crossing surfaces should be a minimum of one foot beyond the edge of the roadway shoulder measured perpendicular to the roadway center line, and should provide for any existing pedestrian facilities.

3. ***PASSIVE*** - Minimum Traffic Control Applications:

    A. A circular Railroad Advance Warning (W10-1) sign shall be used on each roadway in advance of every highway-rail grade crossing except as described in the MUTCD;

    B. An emergency phone number should be posted at the crossing. This posting should include the USDOT highway-rail grade crossing identification number, highway or street name or number, railroad milepost and other pertinent information;

    C. Where the roadway approaches to the crossing are paved, pavement markings are to be installed as described in the MUTCD, subject to engineering evaluation;

    D. Where applicable, the TRACKS OUT OF SERVICE sign should be placed to notify drivers that track use has been discontinued;

    E. One reflectorized crossbuck sign shall be used on each roadway approach to a highway-rail grade crossing;

        1. If there are two or more tracks, the number of tracks shall be indicated on a supplemental sign (R15-2) of inverted T shape mounted below the crossbuck.

        2. Strips of retroreflective white material not less than two inches in width shall be used on the back of each blade of each crossbuck sign for the length of each blade, unless the crossbucks are mounted back-to-back.

        3. A strip of retroreflective white material, not less than two inches in width, shall be used on the full length of the front and back of each support from the crossbuck sign to near ground level or just

above the top breakaway hole on the post.

F. Supplemental Passive Traffic Control Applications (subject to engineering evaluation);

1. Inadequate Stopping Sight Distance:
   a. Improve the roadway geometry;
   b. Install appropriate warning signs (including consideration of active types);
   c. Reduce the posted roadway speed in advance of the crossing:
      i. Advisory signing as a minimum;
      ii. Regulatory posted limit if it can be effectively enforced;
   d. Close the crossing;
   e. Reconfigure/relocate the crossing;
   f. Grade separate the crossing.

2. Inadequate Approach (Corner) Sight Distance (Assuming Adequate Clearing Sight Distance):
   a. Remove the sight distance obstruction;
   b. Install appropriate warning signs;
   c. Reduce the posted roadway speed in advance of the crossing:
      i. Advisory signing as a minimum;
      ii. Regulatory posted limit if it can be effectively enforced;
   d. Install a YIELD (R1-2) sign, with advance warning sign (W3-2a) where warranted by the MUTCD (restricted visibility reduces safe approach speed to 16- 24 km/h [10-15 mph]);
   e. Install a STOP (R1-1) sign, with advance warning sign (W3-1a) where warranted by the MUTCD (restricted visibility requires drivers to stop at the crossing);
   f. Install active devices;
   g. Close the crossing;
   h. Reconfigure/relocate the crossing;
   i. Grade separate the crossing.

3. Deficient Clearing Sight Distances (For One or More Classes of Vehicles):
   a. Remove the sight distance obstruction;
   b. Permanently restrict use of the roadway by the class of vehicle not having sufficient clearing sight distance;
   c. Install active devices with gates;
   d. Close the crossing;
   e. Reconfigure/relocate the crossing;
   f. Grade separate the crossing; and
   g. Multiple railroad tracks and/or two or more highway approach lanes in the same direction should be evaluated with regard to possible sight obstruction from other trains (moving or standing on another track or siding) or highway vehicles.

4. **Stopping** and **corner** sight distance deficiencies may be treated immediately with warning or regulatory traffic control signs, such as a STOP sign, with appropriate advance warning signs. However, until such time as permanent corrective measures are implemented to correct deficient **clearing** sight distance, interim measures should be taken which may include:
   a. Temporarily close the crossing; and
   b. Temporarily restrict use of the roadway by the classes of vehicles.

4. ***ACTIVE*** - If active devices are selected, the following devices should be considered:

TABLE 6
GUIDELINES FOR ACTIVE DEVICES

Class of Track	Maximum Allowable Operating Speed For *Freight* Trains - Minimum Active Devices		Maximum Allowable Operating Speed For *Passenger* Trains - Minimum Active Devices	
Excepted track	10 mph	Flashers	N/A	N/A
Class 1 track	10 mph	Flashers	15 mph	Gates *
Class 2 track	25 mph	Flashers	30 mph	Gates *
Class 3 track	40 mph	Gates	60 mph **	Gates **

Class 4 track	60 mph	Gates	80 mph	Gates
Class 5 track	80 mph	Gates plus Supplemental Safety Devices	90 mph	Gates plus Supplemental Safety Devices
Class 6 track	110 mph with conditions	Gates plus Supplemental Safety Devices	110 mph	Gates plus Supplemental Safety Devices
Class 7 track	125 mph with conditions	Full Barrier Protection	125 mph	Full Barrier Protection
Class 8 track	160 mph with conditions	Grade Separation	160 mph	Grade Separation
Class 9 track	200 mph with conditions	Grade Separation	200 mph	Grade Separation

* Refer to MUTCD 2000 Edition, Part 10, transit and LRT in medians of city streets.
** Except 35 mph (56 km/h) for transit and LRT. Note: 1 mph = 1.61 km/h

A. Active devices ***with automatic gates*** should be considered at highway-rail grade crossings whenever an engineering study by a diagnostic team determines one or more of the following conditions exist:

1. All crossings on the National Highway System, "U.S. " marked routes or principal arterials not otherwise grade separated;
2. If inadequate clearing sight distance exists in one or more approach quadrants, AND it is determined ALL of the following apply:

    a. It is not physically or economically feasible to correct the sight distance deficiency;
    b. An acceptable alternate access does not exist; and
    c. On a life cycle cost basis, the cost of providing acceptable alternate access or grade separation would exceed the cost of installing active devices with gates;

3. Regularly scheduled passenger trains operate in close proximity to industrial facilities, eg. stone quarries, log mills, cement plants, steel mills, oil refineries, chemical plants and land fills;
4. In close proximity to schools, industrial plants or commercial areas where there is substantially higher than normal usage by school buses, heavy trucks or trucks carrying dangerous or hazardous materials;
5. Based upon the number of passenger trains and/or the number and type of trucks, a diagnostic team determines a significantly higher then normal risk exists that a train-vehicle collision could result in death of or serious injury to rail passengers;
6. Multiple main or running tracks through the crossing;
7. The expected accident frequency (EAF) for active devices without gates, as calculated by the USDOT Accident Prediction Formula including 5-year accident history, exceeds 0.1;
8. In close proximity to a highway intersection or other highway-rail crossings and the traffic control devices at the nearby intersection cause traffic to queue on or across the tracks. (In such instances, if a nearby intersection has traffic signal control, it should be interconnected to provide preempted operation, and consider traffic signal control, if none); or
9. As otherwise recommended by an engineering study or diagnostic team.

B. Active devices, with automatic gates should be considered ***as an option*** at public highway-rail grade crossings whenever they can be economically justified based on fully allocated life cycle costs ***and*** one or more of the following conditions exist:

1. Multiple tracks exist at or in the immediate crossing vicinity where the presence of a moving or standing train on one track effectively reduces the clearing sight distance below the minimum relative to a train approaching the crossing on an adjacent track (absent some other acceptable

means of warning drivers to be alert for the possibility of a 2nd train); [See Figure 1.]
2. An average of 20 or more trains per day;
3. Posted highway speed exceeds 64 km/h (40mph) in urban areas, or exceeds 88 km/h (55 mph) in rural areas;
4. Annual Average Daily Traffic (AADT) exceeds 2000 in urban areas, or 500 in rural areas;
5. Multiple lanes of traffic in the same direction of travel (usually this will include cantilevered signals);
6. The crossing exposure (the product of the number of trains per day and AADT) exceeds 5,000 in urban areas, or 4,000 in rural areas;
7. The expected accident frequency (EAF) as calculated by the USDOT Accident Prediction formula, including 5-year accident history, exceeds 0.075;
8. An engineering study indicates that the absence of active devices would result in the highway facility performing at a level of service below Level C;
9. Any new project or installation of active devices to significantly replace or upgrade existing non-gated active devices. For purposes of this item, replacements or upgrades should be considered "significant " whenever the cost of the otherwise intended improvement (without gates) equals or exceeds one-half the cost of a comparable new installation, and should exclude maintenance replacement of individual system components and/or emergency replacement of damaged units; or
10. As otherwise recommended by an engineering study or diagnostic team.

C. Warning/Barrier Gate Systems should be considered as supplemental safety devices at:

1. Crossings with passenger trains;
2. Crossings with high-speed trains;
3. Crossings in quiet zones; or
4. As otherwise recommended by an engineering study or diagnostic team.

D. Enhancements for Pedestrian Treatments

1. Design to avoid stranding pedestrians between sets of tracks;
2. Add audible devices, based on an engineering study;
3. Consider swing gates carefully; the operation of the swing gate should be consistent with the requirements of Americans with Disability Act. The gate should be checked for pedestrian safety within the limits of its operation;
4. Provide for crossing control at pedestrian crossings where a station is located within the proximity of a crossing or within crossing approach track circuit for the highway-rail crossing;
5. Utilize a Train to Wayside Controller to reduce traffic delays in areas of stations; and
6. Delay the activation of the gates, flashers and bells for a period of time at the highway-rail grade crossing in station areas, based on an engineering study.

5. ***CLOSURE*** - Highway-rail grade crossings should be considered for closure and vacated across the railroad right-of-way whenever one or more of the following apply:

A. An engineering study determines a nearby crossing otherwise required to be improved or grade separated already has acceptable alternate vehicular access, and pedestrian access can continue at the subject crossing, if existing;

B. On a life cycle cost basis, the cost of implementing the recommended improvement would exceed the cost of providing an acceptable alternate access;

C. If an engineering study determines any of the following apply:

1. FRA Class 1,2 or 3 track with daily train movements:

a. AADT less than 500 in urban areas, acceptable alternate access across the rail line exists within .4 km (1/4 mi) and the median trip length normally made over the subject crossing would not increase by more than .8 km (1/2 mi);
b. AADT less than 50 in rural areas, acceptable alternate access across the rail line exists within .8 km (1/2 mi) and the median trip length normally made over the subject crossing would not increase by more than 2.4 km (1-1/2 mi).

2. FRA Class 4 or 5 track with active rail traffic:

a. AADT less than 1000 in urban areas, acceptable alternate access across the rail line exists within .4 km (1/4 mi) and the median trip length normally made over the subject crossing would not increase by more than 1.2 km (3/4 mi);
b. AADT less than 100 in rural areas, acceptable alternate access across the rail line exists within 1.61 km (1 mi) and the median trip length normally made over the subject crossing would not increase by more than 4.8 km (3 mi).

3. FRA Class 6 or higher track with active rail traffic, AADT less than 250 in rural areas, an acceptable alternate access across the rail line exists within 2.4 km (1-1/2 mi) and the median trip length normally made over the subject crossing would not increase by more than 6.4 km (4 mi); and

D. An engineering study determines the crossing should be closed to vehicular and pedestrian traffic when railroad operations will occupy or block the crossing for extended periods of time on a routine basis and it is determined that it is not physically or economically feasible to either construct a grade separation or shift the train operation to another location. Such locations would typically include:

1. Rail yards;
2. Passing tracks primarily used for holding trains while waiting to meet or be passed by other trains;
3. Locations where train crews are routinely required to stop their trains because of cross-traffic on intersecting rail lines or to pick up or set out blocks of cars or switch local industries en route;
4. Switching leads at the ends of classification yards;
5. Where trains are required to "double " in or out of yards and terminals;
6. In the proximity of stations where long distance passenger trains are required to make extended stops to transfer baggage, pick up or set out equipment or be serviced en route; and
7. Locations where trains must stop or wait for crew changes.

6. ***GRADE SEPARATION***

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

1. The highway is a part of the designated Interstate Highway System;
2. The highway is otherwise designed to have full controlled access;
3. The posted highway speed equals or exceeds 113 km/h (70 mph);
4. AADT exceeds 100,000 in urban areas or 50,000 in rural areas;
5. Maximum authorized train speed exceeds177 km/h (110 mph);
6. An average of 150 or more trains per day or 300 Million Gross Tons (MGT) per year;
7. An average of 75 or more passenger trains per day in urban areas or 30 or more passenger trains per day in rural areas;
8. Crossing exposure (the product of the number of trains per day and AADT) exceeds 1,000,000 in urban areas or 250,000 in rural areas; or
9. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 800,000 in urban areas or 200,000 in rural areas.
10. The expected accident frequency (EAF) for active devices with gates, as calculated by the USDOT Accident Prediction Formula including 5-year accident history, exceeds 0.5;
11. Vehicle delay exceeds 40 vehicle hours per day.[23]

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

1. The highway is a part of the designated National Highway System;
2. The highway is otherwise designed to have partial controlled access;
3. The posted highway speed exceeds 88 km/h (55 mph);
4. AADT exceeds 50,000 in urban areas or 25,000 in rural areas;
5. Maximum authorized train speed exceeds 161 km/h (100 mph);
6. An average of 75 or more trains per day or 150 MGT per year;
7. An average of 50 or more passenger trains per day in urban areas or 12 or more passenger trains per day in rural areas;

8. Crossing exposure (the product of the number of trains per day and AADT) exceeds 500,000 in urban areas or 125,000 in rural areas; or
9. Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 400,000 in urban areas or 100,000 in rural areas;
10. The expected accident frequency (EAF) for active devices with gates, as calculated by the USDOT Accident Prediction Formula including 5-year accident history, exceeds 0.2;
11. Vehicle delay exceeding 30 vehicle hours per day;[24]
12. An engineering study indicates that the absence of a grade separation structure would result in the highway facility performing at a level of service below its intended minimum design level 10% or more of the time.

C. Whenever a new grade separation is constructed, whether replacing an existing highway-rail grade crossing or otherwise, consideration should be given to the possibility of closing one or more adjacent grade crossings.

D. Utilize Table 7 for LRT grade separation:

TABLE 7

Trains Per Hour	Peak Hour Volume (vehicles per lane)
40	900
30	1000
20	1100
10	1180
5	1200

Source:

Light Rail Transit Grade Separation Guidelines. An Informational Report. Institute of Transportation Engineers. Technical Committee 6A-42. March 1992

7. ***NEW CROSSINGS***

A. Should only be permitted to cross existing railroad tracks at-grade when it can be demonstrated:

1. For new public highways or streets where there is a clear and compelling public need (other than enhancing the value or development potential of the adjoining property);
2. Grade separation cannot be economically justified, i.e. benefit to cost ratio on a *fully allocated* cost basis is less than 1.0 (generally, when the crossing exposure exceeds 50,000 in urban areas or exceeds 25,000 in rural areas); and
3. There are no other viable alternatives.

B. If a crossing is permitted, the following conditions should apply:

1. If it is a main track, the crossing will be equipped with active devices with gates;
2. The plans and specifications should be subject to the approval of the highway agency having jurisdiction over the roadway (if other than a State agency), the State DOT or other State agency vested with the authority to approve new crossings, and the operating railroad;
3. All costs associated with the construction of the new crossing should be borne by the party or parties requesting the new crossing, including providing financially for the ongoing maintenance of the crossing surface and traffic control devices where no crossing closures are included in the project;
4. Whenever new public highway-rail crossings are permitted, they should fully comply with all applicable provisions of this proposed recommended practice; and
5. Whenever a new highway-rail crossing is constructed, consideration should be given to closing one or more adjacent crossings.

TRAFFIC CONTROL DEVICE SELECTION PROCEDURE

Step 1 - **Minimum Highway-Rail Grade Crossing Criteria:** (see report for full description)

A. Gather preliminary crossing data:

1. Highway:
    a. Geometric (number of approach lanes, alignment, median);
    b. AADT;
    c. Speed (posted limit or operating);
    d. Functional classification;
    e. Desired level of service;
    f. Proximity of other intersections (note active device interconnection); and
    g. Availability and proximity of alternate routes and/or crossings.
2. Railroad:
    a. Number of tracks (type: FRA classification, mainline, siding, spur);
    b. Number of trains (passenger, freight, other);
    c. Maximum train speed and variability;
    d. Proximity of rail yards, stations and terminals; and
    e. Crossing signal control circuitry.
3. Traffic Control Device:
    a. Passive or active;
    b. Advance;
    c. At crossing; or
    d. Supplemental.
4. Prior collision history

B. Based on one or more of the above, determine whether any of the recommended thresholds for closure, installing active devices (if passive), or separation have been met based on highway or rail system operational requirements;

C. Consider crossing closure or consolidation:
    1. If acceptable alternate route(s) is/are available; or
    2. If an adjacent crossing is improved, can this crossing be closed? or
    3. If this crossing is improved, can an adjacent crossing be closed?

D. For all crossings, evaluate stopping and clearing sight distances. If the conditions are inadequate for the existing control device, correct or compensate for the condition (see Step 3 below).

E. If a passive crossing, evaluate corner sight distance. If less than the required for the posted or legal approach speed, correct or compensate for the condition (see Step 3 below).

Step 2 - **Evaluate Highway Traffic Flow Characteristics:**

A. Consider the required motorist response to the existing (or proposed) type of traffic control device. At passive crossings, determine the degree to which traffic may need to slow or stop based on evaluation of available corner sight distances.

B. Determine whether the existing (or proposed) type of traffic control device and railroad operations will allow highway traffic to perform at an acceptable level of service for the functional classification of the highway.

Step 3 - **Possible Revision to the Highway-Rail Grade Crossing:**

A. If there is inadequate sight distance related to the type of control device, consider measures such as:
    1. Try to correct the sight distance limitation;
    2. If stopping sight distance is less than "ideal " for the posted or operating vehicle approach speed and cannot be corrected, determine the safe approach speed and consider either posting an advisory speed plate at the advance warning sign or reduce the regulatory speed limit on the approach;
    3. If corner sight distance is inadequate and cannot be corrected, determine the safe approach speed and consider posting an advisory speed plate at the advance warning sign, or reduce the regulatory speed limit on the approach, or install STOP or YIELD signs at the crossing;
    4. If clearing sight distance is inadequate, upgrade a passive or flashing-light only traffic control device to active with gates, or close (consolidate) the crossing, or grade separate;

B. If highway and/or train volumes and/or speeds will not allow the highway to perform at an acceptable level of

service, consider traffic control device upgrade to active (possibly with additional devices such as gates and medians), or closure (consolidation) or separation;

C. If crossing closure or consolidation is being considered, determine the feasibility and cost of providing of an acceptable alternate route and compare this to the feasibility and cost of improving the existing crossing;

D. If grade separation is being considered:
   1. Economic analysis should consider fully allocated life-cycle costs;
   2. Consider highway classification and level of service;
   3. Consider the possibility of closing one or more adjacent grade crossings.

Step 4 - **Interim Measures And/or Documentation:**

A. If the above analysis indicates a change or improvement in the crossing or type of traffic control devices is indicated, determine what if any interim measures can or should be taken until such time as recommended improvement can be implemented;

B. If the above analysis indicates a change or improvement in the crossing or type of traffic control devices is indicated, but there are other compelling reasons or circumstances for not implementing them, document the reasons and circumstances for your decision;

C. If the above analysis indicates no change or improvement in the crossing or type of traffic control devices is indicated, document the fact that the crossing was evaluated and determined to be adequate.

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GLOSSARY

Acceptable Alternate Access - For purposes of this guidance document, a roadway of at least comparable design, construction and utility as the roadway being closed, giving appropriate consideration to the additional traffic that would be diverted over it.

Active Crossing - All highway-rail grade crossings equipped with warning and/or traffic control devices that are activated by train detection.

CFR - Code of Federal Regulations

Clearance Time - The difference between vehicle crossing time and train arrival time.

Diagnostic Team - A group of knowledgeable representatives of the parties of interest in a highway-rail grade crossing or group of crossings.

Doubling Trains - When individual tracks in rail-yards are insufficient to hold an entire inbound or outbound train, it is necessary to "double " a train. For **outbound trains**, where the CFR requires an initial terminal brake test of the entire train, this requires assembling the entire train on one outbound track, usually the mainline, from several yard tracks. For **inbound trains**, when yarding the entire train on more than one yard track, this means leaving part of the

train on the main line by either pulling through, then breaking the train, or initially pushing part of the train into a yard track, while holding the excess rail cars on a main track or lead, which are subsequently "yarded " on another track or tracks.

Passive Crossing - All highway-rail grade crossings having signs and pavement markings as traffic control devices that are not activated by trains, that identify and direct attention toward the location of a highway-rail grade crossing, and advise motorists, bicyclists, and pedestrians to take appropriate action.

Separation Time - The component of maximum preemption time during which the minimum track clearance distance is clear of vehicular traffic prior to the arrival of the train.

Train to Wayside Controller - Equipment sometimes employed by light rail transit systems to verify the identity of a light rail vehicle and perform numerous communication and signal functions. This is particularly effective on railroads with both heavy (freight) and LRT operation. As related to a passenger station near a highway-rail grade crossing, if the light rail vehicle is approaching the station to stop, such equipment reduces gate downtime by delaying activation of the gates at the crossing until the light rail vehicle is to depart the station rather than activating the gates as the light rail vehicle first approaches the station. (A through train would cause the gates to activate at the normal time).

Urban and Rural - "Urban and rural areas have fundamentally different characteristics with regard to density and types of land-use, density of street highway networks, nature of travel patterns, and the way in which these elements are related. Consequently, urban and rural functional systems are classified separately. Urban areas are considered those places within boundaries set by the responsible State and local officials having a population of 5,000 or more. Rural areas are those areas outside the boundaries of urban areas. " (Source AASHTO Green Book) In addition, urban areas are generally characterized by having higher density of access to adjacent land use, lower vehicle operating speeds and lower levels of service of traffic flow.

Warning Time - The amount of time provided between activation of a active traffic control device by a train and passage of the train to the crossing.

APPENDIX

PREEMPTION / INTERCONNECTION

The topic of highway traffic signal preemption and interconnection to active highway-rail grade crossings is very complex. It requires special traffic engineering evaluation, and close coordination between highway and railroad design and operation personnel. This appendix has been included to provide some guidance information on the subject, and provides detailed discussion on several elements. (Please refer to the main document for discussion on when to interconnect, agency coordination, accommodation of second train situations and references.)

PEDESTRIAN CLEARANCE PHASE

The MUTCD provides that the pedestrian clearance phase may be "abbreviated " during the railroad preemption of the traffic signals. Some agencies have elected to utilize the abbreviated interval, some eliminate entirely the pedestrian clearance phase during the preemption sequencing, while others provide full clearance intervals. Abbreviating the pedestrian "don't walk " phase may expedite the intended vehicular cycle, however, it may not expedite pedestrian or driver behavior. Drivers may yield to pedestrians and thereby prevent vehicles behind them from clearing off the tracks. To minimize this potential, full pedestrian clearance may be provided, but consequently, additional minimum preemption warning time will be required. The preemption interconnect may consist of simultaneous preemption (traffic signals are preempted simultaneously with the activation of the railroad control devices), or advance preemption (traffic signals are preempted prior to the activation of the railroad control devices), or possibly a special design which could consist of two separate closed loop normally energized circuits. The first, pedestrian clearance call should occur a predetermined length of time to be defined by a traffic engineering study and continue until the train has departed the crossing. The purpose of the first call is to safely clear the pedestrian. The second, vehicle clearance call, programmed with a higher priority in the traffic signal controller than the first call, should occur a predetermined length of time to be determined in a traffic engineering study, but not less than 20 seconds prior to the arrival of a train, and continue until the train departs the crossing. The purpose of the second call is to clear motor vehicle queues, which may extend into the limits of the crossing. While one preemption interconnect

circuit can be used to initially clear-out the pedestrian traffic and then a time delay used for the second vehicular clearance, a system with two separate circuits provides a more uniform timing if the train speed varies once preemption occurred. This is especially important if the train accelerates after the pedestrian clearance is initiated. A timing circuit may not provide adequate warning time.

If the pedestrian clearance phase is abbreviated (or eliminated), additional signing alerting pedestrians of a shortened pedestrian cycle should be considered.

TRAFFIC SIGNAL CONTROLLER RE-SERVICE CONSIDERATIONS

Traffic signal controller re-service is the ability of the traffic signal controller to be able to accept and respond to a second demand for preemption immediately after a first demand for preemption has been released, even if the programmed preemption routine/sequence is not complete. In other words, if a traffic signal controller receives an initial preempt activation and shortly thereafter it is deactivated, most traffic signal controllers will continue to time out the preemption sequence; if a second demand for preemption is placed during this period, the traffic signal controller must return to the track clearance green. At any point in the preemption sequence, even during the track clear green interval, the controller must return to the start of a **full** track clearance green interval with a second preemption demand. Until recently, most traffic signal controllers were unable to recognize a second preempt until the entire preemption sequence of the first activation timed out. If the second demand occurred during the initial preemption sequence, the traffic signal controllers continued the same sequence as if that was still the initial demand for preemption. The traffic signal controller re-service capability must be able to accept and respond to any number of demands for preemption.

The point in which preemption is released from the railroad active control devices to the traffic signals is critical to the proper operation of re-service. In order for the traffic signal controller to recognize a second demand, the first demand must be released, therefore the railroad active control devices must release the preempt activation just as the crossing gates begin to rise, not when they reach a fully vertical position. Otherwise, especially at locations with short storage areas between the crossing and the highway intersection, traffic may creep under the rising gates and with a second train, a second track clear green interval will not be provided if the gates never reach a fully vertical position.

PROGRAMMING SECURITY

Security of programmed parameters is critical to the proper operation of the highway-rail preemption system. As an absolute minimum, control equipment cabinets should be locked and secure to prevent tampering and controllers should be password protected. In addition to preventing malicious tampering of control devices, security should be considered to prevent accidental changes in timing parameters, especially in the traffic signal controller where a programming mistake can easily be made due to the large quantity of parameters even when just viewing the data. Some traffic signal controller manufacturers have designed systems where the critical railroad preemption parameters can not be changed without both proper software and physically making a hardwire change the traffic signal cabinet. Without proper data changes, the traffic signals will remain in a flashing red operation until the data is corrected. In addition, these systems prevent a different type of controller or even controller software from operating the traffic signals. It is important to preserve the integrity of the system once it is tested and proven to operate properly. Another method of preserving the proper timing parameters is remote monitoring of the traffic signal controller. Routine uploads of traffic signal timings can be compared to a database to check for unapproved changes in any timing parameters.

SUPERVISED INTERCONNECT CIRCUITRY

The interconnection circuit between the highway traffic signal control cabinet and the railroad signal cabinet should be designed as a system. Frequently, the interconnect cable circuit is designed so that the preemption relay can be falsely de-energized, thereby causing a preempt call, without the railroad signals being activated. The traffic signals will then cycle through their clearance phase and remain at "stop" until the false preempt call is terminated. If a train approaches the crossing during the false preemption, the railroad signals will activate, but the traffic signals will not provide track clearance phases because they are still receiving the first false call. Even worse, a short between the wires in this type of circuit will virtually disable preemption and will only be recognizable once the railroad active control devices are activated with an approaching train. To address this potential problem supervised preemption circuits may be used. In its simplest form, the supervised circuit is formed by having two control relays in the traffic control cabinet each of which is energized by the railroad crossing relay. One relay, the Preemption Relay, is energized only when the railroad active control devices are off. The second relay, the Supervision Relay, is energized only when the railroad active control devices are operating. When circuited in this manner, only one control relay is

energized at a time. If both relays are simultaneously energized or de-energized, the supervision logic determines that there is a problem and can implement action. This action may include initiating a clearance cycle and upon completion of the clearout, the traffic signals can go into an all-way flashing red instead of stop. The all-way flashing red will allow traffic to advance off the tracks instead of being held by the red signal. An engineering study may determine that the all-way flashing red is undesirable due to high highway traffic volumes compared to rail traffic. In all cases remote-monitoring devices that send alarm messages to the railroad and highway authority should be installed. Law enforcement traffic control should be used until repairs can be performed. More information on supervised circuits can be found in an article, *Supervised Interconnection Circuits at Highway-Rail Grade Crossings,* by Mansel, Waight, and Sharkey, ITE Journal, March 1999, Institute of Transportation Engineers available at www.ite.org

ADVANCE PREEMPTION AND USE OF TIMERS

When advance preemption is used the traffic signal preemption occurs prior to the active control devices being activated. This allows preemption to begin behind the scene and the active control time of the railroad signals is not necessarily increased. Railroads frequently use two detection times in their system. The first detection time is designed to initiate traffic signal preemption. The second detection time is used to activate the active control devices. If the train is decelerating as it approaches the crossing, the time difference between initiation of preemption and activation of the active control devices will increase. It is imperative that the time difference does not increase to the point where the traffic signal clear out cycle ends (i.e. traffic signal turns red) before the active control devices turn on. To prevent re-queuing traffic on the tracks, a "not-to-exceed " timer should be installed to force the activation of the active control devices prior to the appropriate time in the clear out cycle. If the train accelerates toward the crossing the second detection time will activate the active control devices prior to expiration of the timing cycle. Another issue when designing advance preemption circuitry is multiple consecutive train movements can cause the traffic signals to remain in preemption due to a second approaching train, but the railroad active control devices deactivate after the first train just clears the crossing. In this case, the traffic signals will not provide a second track clearance indication since the first call is still present, therefore the railroad circuitry should be designed to prevent this from occurring. Also, when the traffic signals experience a loss of power or a malfunction which causes an all way red flash, the advance preemption time becomes ineffective in helping clear vehicles from the crossing and effectively, vehicles will have less time to clear the crossing. An additional interconnection circuit should be utilized between the railroad and the traffic signal controls, so that the railroad active control devices would activate at the same time as the advance preempt circuit would normally activate the traffic signals in the event of all-way-red flash or loss of power to the traffic signals.

If railroad gates are used, another method of minimizing the potential of the clearout cycle from ending while traffic is on the tracks is to continue the clearout cycle until the gates are in the lowered position. This requires an additional circuit between the railroad cabinet and the highway traffic control cabinet and special logic in the traffic signal control cabinet. The above mentioned techniques for the supervised circuit may be employed.

STANDBY POWER SOURCES

Railroad active control devices are normally off when no train is approaching; therefore, railroads install backup power systems to provide power to the signals during commercial power failures. This is different from traffic signals that generally are dark if the commercial power is off. When traffic signals are dark, motorists in most jurisdictions are expected to know that traffic signals are ahead, stop their vehicle at the stop bar, and proceed through the intersection as if the dark signal was a stop sign. Since dark traffic signals cannot display a clear out aspect to a motorist, backup power systems should be considered at interconnected locations. When considering power back up systems for traffic signals, it should be considered on a system wide basis rather than just at individual interconnected locations since other adjacent signalized intersections may just as well also stall traffic. The fail-safe mode of operation in the event of a traffic signal malfunction is an all way red flash, in which case power back up systems will have no effect. The use of remote monitoring and law enforcement traffic control can be used to minimize the requirements and cost of the backup power system.

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[3] A Policy on Geometric Design of Highways and Streets is available at the following URL: http://www.ite.org/bookstore/lp323b.html

[4] *A Policy on Geometric Design of Highways and Streets*. American Association of State Transportation Officials (AASHTO). 2001 Edition. P. 449, available at www.ite.org, or 202-289-0222 and http://www.aashto.org

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[6] *Traffic Engineering Handbook - Fourth Edition*. Institute of Transportation Engineers. Washington D.C.: 1990. available at www.ite.org, or 202-289-0222

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[22] *Consolidating Railroad Crossings: on Track for Safety in North Carolina.* Rail Division, Engineering & Safety Branch. North Carolina Department Of Transportation. 2000, North Carolina DOT, available at: http://www.dot.state.nc.us/.

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United States Department of Transportation - **Federal Highway Administration**

From: Jerry Holder [JHolder@HNTB.com]
Sent: Tuesday, October 16, 2001 12:03 PM
To: Steve Z. Chutchian (E-mail); Jim Pierce (E-mail); Mike E. Murphy (E-mail)
Subject: ITE - Quiet Zones at Railroad Crossings

FYI...I thought you might be interested in the ITE meeting being held in Ft.
Worth this Thursday. I know that the Town of Addison is wanting to put some
of these in on future projects and I thought you might like to know about
this meeting. I am going to attend for two reasons. First, to hear the presentation, and second, Joe T. Garcia's is my favorite restaurant. Hope
to see you there.

Ordinance needed to prevent sounding whistle and creates a penalty.

Jerry Holder

>>
>

Ft Worth Main #
1-817-871-8900

We would like to remind you of this upcoming event.

Monthly Meeting

Date: Thursday, October 18, 2001
Time: 12:00PM - 1:00PM CDT (GMT-05:00)

(Resolution/ Agreement & Ordinance
Got a lot of info from Walter Ragsdale

Place:
Joe T. Garcia's Mexican Restaurant, 817-626-4356
2201 N. Commerce St.
Ft. Worth
[$10 Cash/Check to TexITE]

Please RSVP:
to E. Pilgrim by NOON Wednesday before the meeting:
PHONE: 817-277-5503
E-MAIL: e-pilgrim@ttimail.tamu.edu
FAX: 817-461-1239

Program:
Russ Wiles, City of Fort Worth ← 1-817-871-7978
"Quiet Zones at Railroad Crossings"

Will be glad to share documents they have prepared also.

"A presentation on techniques known as Quiet Zones used to supplement train
horns at railroad grade crossings. Includes what Quiet Zone devices are, federal guideline status, and local experience."

Who will construct & maintain

May want to use loop or other detectors in the "no mans zone" between gates.

Dave Visney FRA

RR X City Agreement
Cost + Maint.
Resolution & Ordinance
Prevents Boundary
Penalty

Use detectors in
no man's zone

8-16-01

Fed. R.R. Admin

Dave Visney

Hwy Grade Crossing

Regional Manager

Phone - 817-284-8142

Ft Worth (Hurst)

Can Assist with Quiet Zones

$30 million Irving plan seeks quieter, safer rail line crossings

Gates, medians, elevated tracks among project's proposed changes

By Lee Powell
Irving Bureau

IRVING — The bone-rattling train whistles heard in Irving soon may fall silent.

A $30 million plan is in the works to modify 18 rail crossings with additional gates and safety enhancements or to eliminate them by elevating stretches of track or tunneling beneath them. With the changes, trains would no longer need to sound their horns when approaching a crossing.

Although so-called quiet zones have been created at a few crossings in other area cities such as Richardson, nothing has been attempted on the scale of what is being proposed in Irving.

"In terms of a significant stretch of railroad, this is the biggest project I'm aware of in the area," said Lonnie Blaylock, Dallas Area Rapid Transit commuter rail vice president. "Irving's very interested in it, we're very interested in it, and it has lots of trains going through it."

The line most affected stretches less than 10 miles through Irving and is part of a 34-mile line between Dallas and Fort Worth that carries everything from Trinity Railway Express commuter trains to coal trains.

The plan is being designed to reduce traffic backups caused by the frequently passing trains.

Work also would be done on a rail line that begins near the South Irving station of the Trinity

Please see IRVING, 28A.

DMN 6-20-01

Irving to spend $30 million on project to ensure quieter, safer rail crossings

Continued from Page 25A

Railway Express" and passes through north Irving and Las Colinas. This north-south line is used only for freight traffic but may carry commuter trains someday.

The east-west line was purchased in the early 1980s by the cities of Dallas and Fort Worth from the remnants of the bankrupt Chicago, Rock Island & Pacific. Ownership was transferred last year to DART and the Fort Worth Transit Authority, known as the T.

Commuter rail service on the line began in 1996.

The most ambitious portion of the project involves elevating the east-west rail line for almost two miles, taking it over the major arteries of Story and Belt Line roads. That part of the project would cost about $25 million.

Smaller projects to shift the line over or under the road are planned for three other crossings.

Remaining crossings would receive so-called quad gates that stretch across all lanes of traffic, preventing motorists from weaving around the gates when they are down.

Others would undergo a less costly modification that involves building several hundred feet of median on either side of the rail line to discourage motorists from inching around lowered crossing gates.

When the work will be done depends on financing and the timeline for building the elevated portion of the line, Mr. Blaydes said.

A mix of city, DART, state and federal dollars probably will be funneled toward the project.

Officials are also waiting for new rules governing quiet zone crossings being developed by the Federal Railroad Administration.

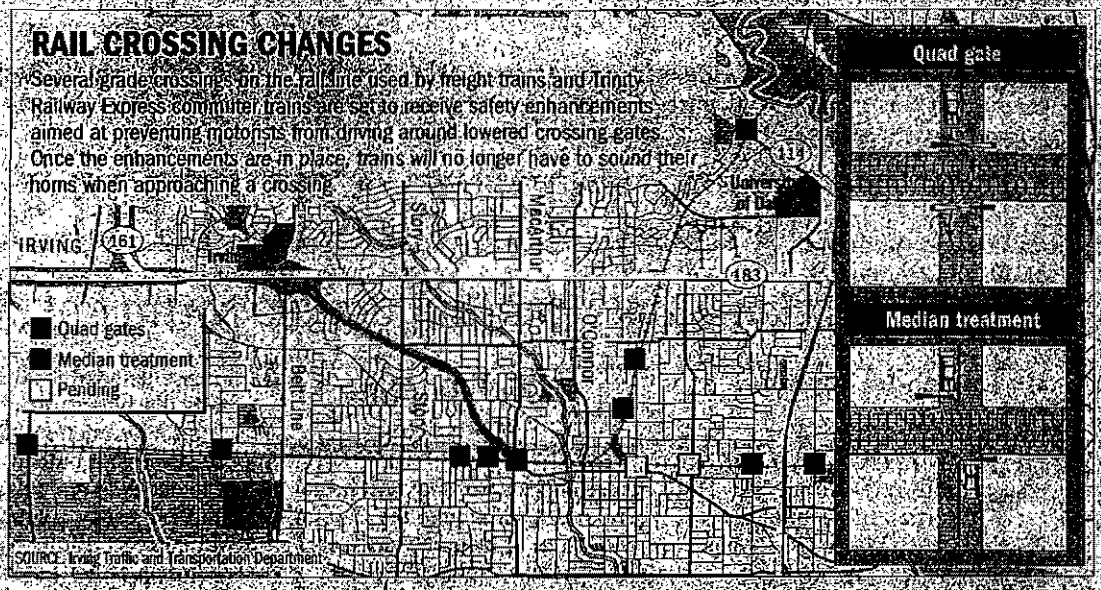
The rules are expected to come out this summer.

Some of the work, particularly elevating a section of the line, will probably be done in conjunction with a project already under way to add a second track so more trains can be run.

Elected officials say they hope the project will reduce the complaints they field from constituents about train whistles.

"When you're discussing quality of life and the trains that run through our city, this is the most important opportunity we have to improve," said Irving City Council member Linda Harper-Brown, who chairs the council's planning and development committee.

This story also appears in the Irving Morning News.



Staff Graphic

May 14, 2001

MEMORANDUM

To: Ron Whitehead, City Manager

From: Jim Pierce, P.E., Assistant Public Works Director

Subject: Railroad Noise Issues

As a result of our investigations, we have found two ways that can be used to eliminate or lessen the noise problem that results from trains blowing their horn at the railroad crossings as they pass through Addison.

One way is to establish quiet zones at each crossing. A quiet zone is established by using a combination of crossing gates, and, medians or barriers that prevent a vehicle from crossing the tracks when the gates come down. With this type of system the train engineer drives the train through the crossing without blowing his horn. This concept has been proposed in Federal Regulations but has not yet been approved.

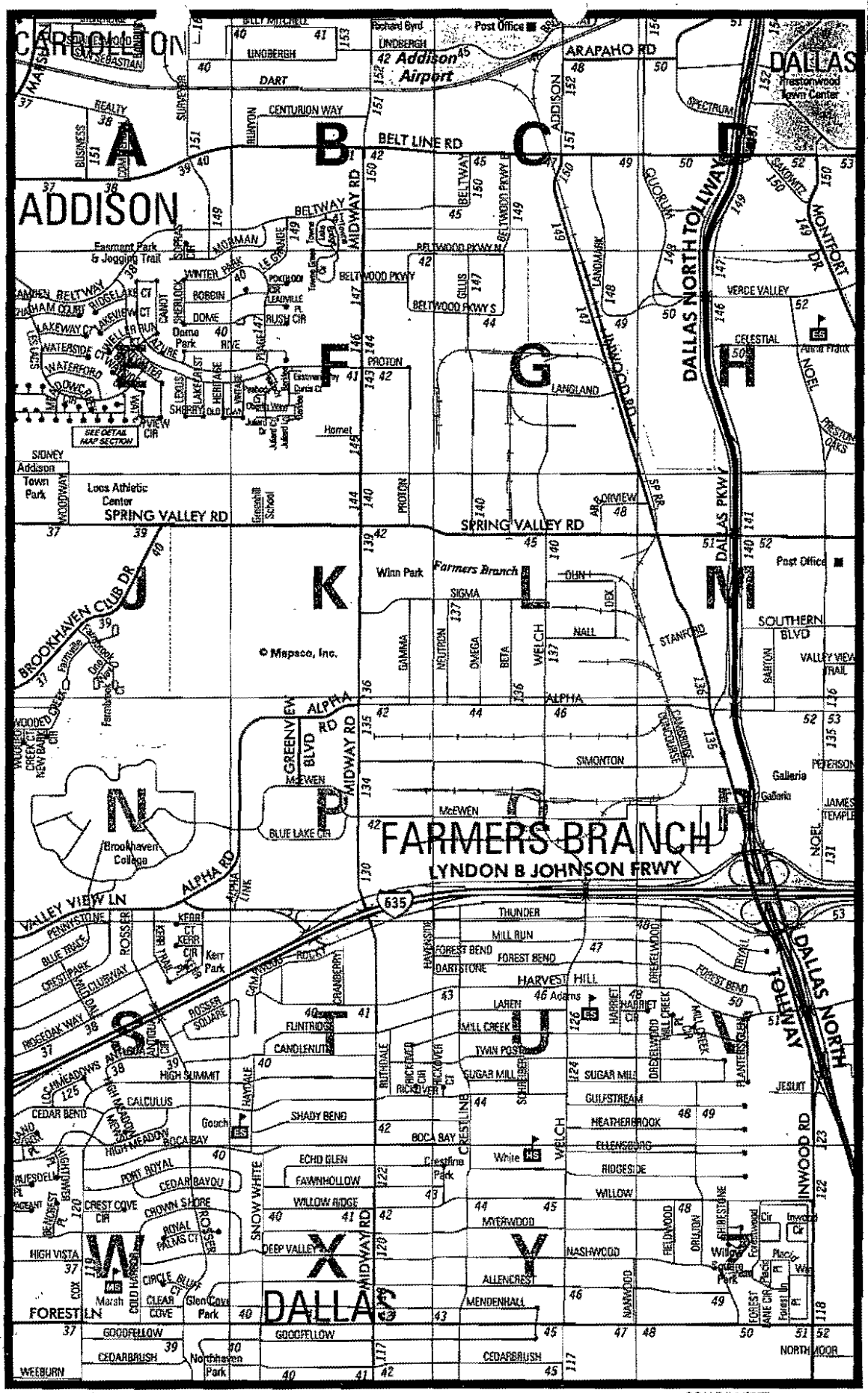
The other way is to use the "Wayside Horn" system. In this system, horns are placed at the railroad crossings that direct sound blasts directly at the oncoming street traffic at the same time the warning lights are flashing, and the crossing gates are coming down. The wayside horn sounds like a train horn so the motorist identifies the sound with an oncoming train. When the train engineer approaches a wayside horn crossing, he receives a signal that the system is working and does not have to sound his horn. If he does not receive a "working" signal, he blows his horn as he passes through the crossing. The wayside horn system reduces the area affected by an 80dba sound level by 97%.

Railroad Controls Limited (RCL), Fort Worth, is a company that constructs railroad crossing warning signals and gates and has also developed the wayside horn system. RCL has looked at all of the railroad crossings in Town to determine which type of equipment would be required to create a quiet zone at the crossings. Their findings follow:

Crossing	4 Quadrant Gates	Wayside Horns	Estimated Cost
Tollway (SB)	Qualifies	Recommended Supplement	$35,000 (Horns)
Tollway (NB)	Qualifies	Recommended Supplement	$35,000 (Horns)
Quorum Drive	Qualifies	Recommended Supplement	$35,000 (Horns)
Addison Road	Gates + Detection		$380,000
Addison Road		Horns + Circuitry	$95,000

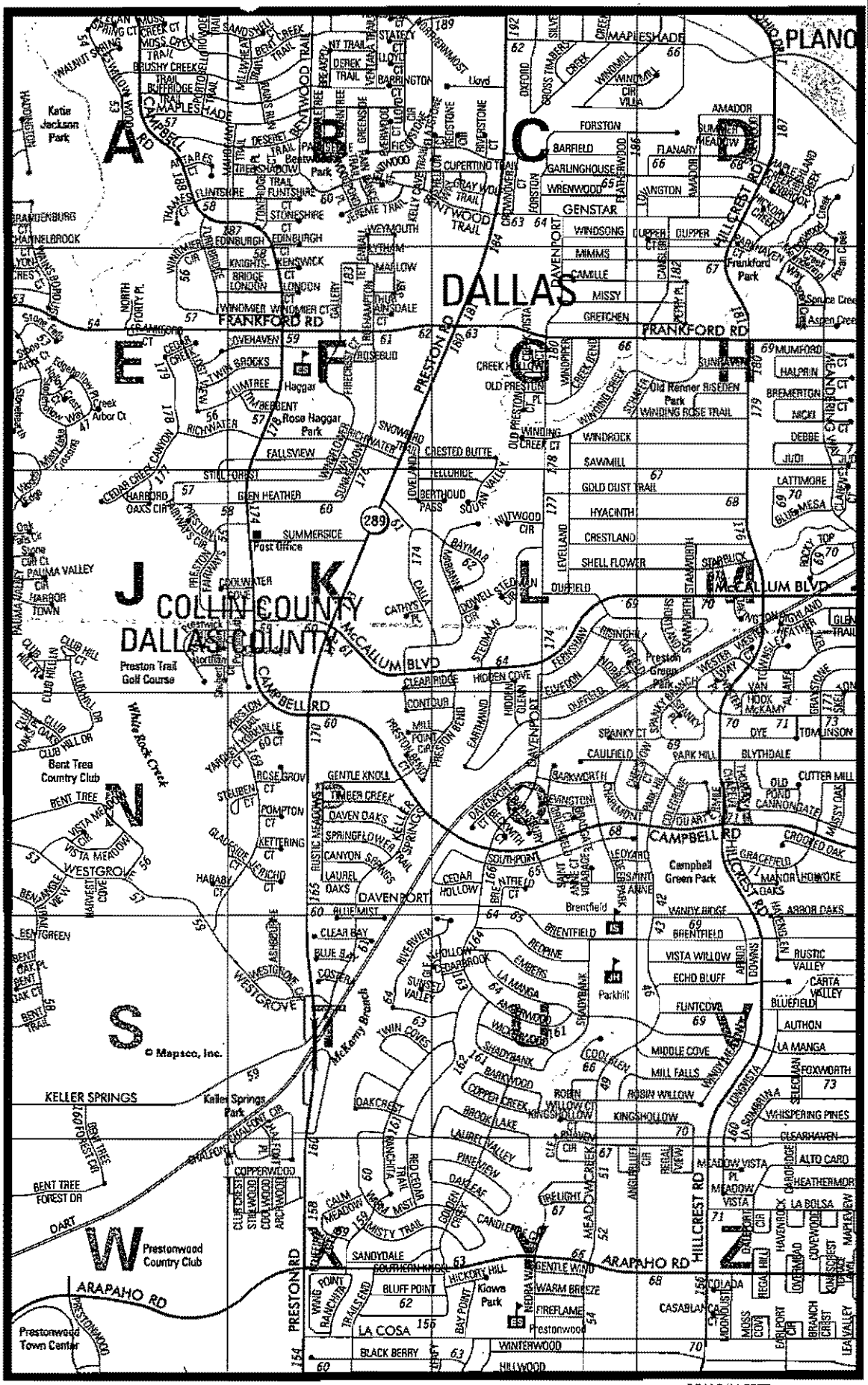
Midway Road	Qualifies	Recommended Supplement	$55,000 (Horns)
Surveyor Blvd.	Gates		$280,000
Surveyor Blvd.		Horns + Circuitry	$55,000
Marsh Lane	Qualifies	Recommended Supplement	$35,000 (Horns)
Spectrum(Proposed)	Gates		$280,000
Spectrum(Proposed)		Horns + Circuitry	$185,000

To summarize, all crossings except Addison Road, Surveyor, and future Spectrum Road would qualify as a quiet zone in their present state. To construct Addison, Surveyor and Spectrum as quiet zones would cost approximately $940,000. As an alternative, to install the wayside horn system at all the crossings, including future Spectrum, would cost approximately $530,000. The wayside horn option while being less expensive, would also provide a present a uniform system of signals to the train engineer as he passes through Addison.



DETAIL MAP SECTION STARTS ON INDEX PAGE 170

CONTINUED ON MAP 656



CONTINUED ON MAP 4

CONTINUED ON MAP 6

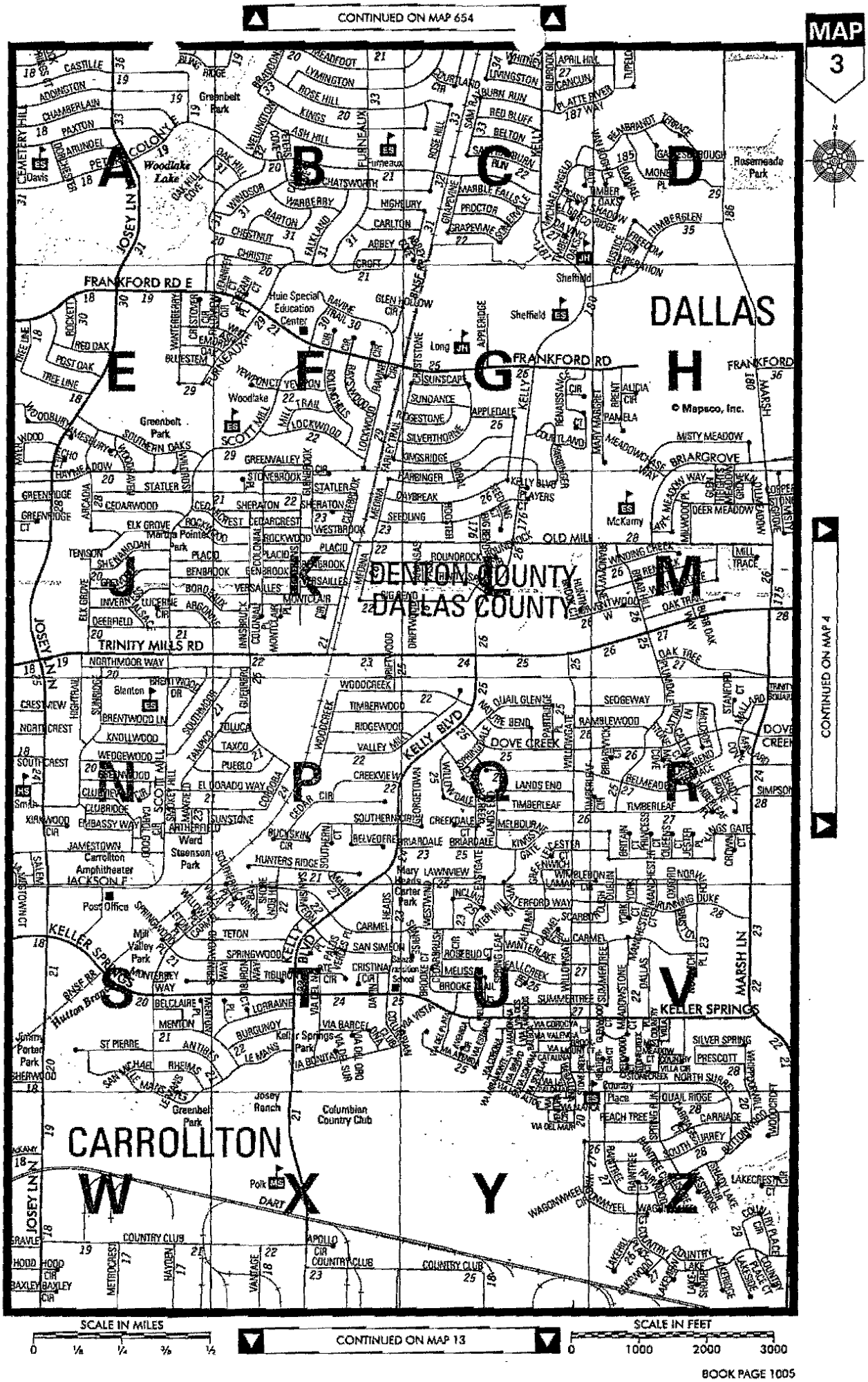
CONTINUED ON MAP 15

SCALE IN MILES
0 ⅛ ¼ ⅜ ½

SCALE IN FEET
0 1000 2000 3000

BOOK PAGE 1007

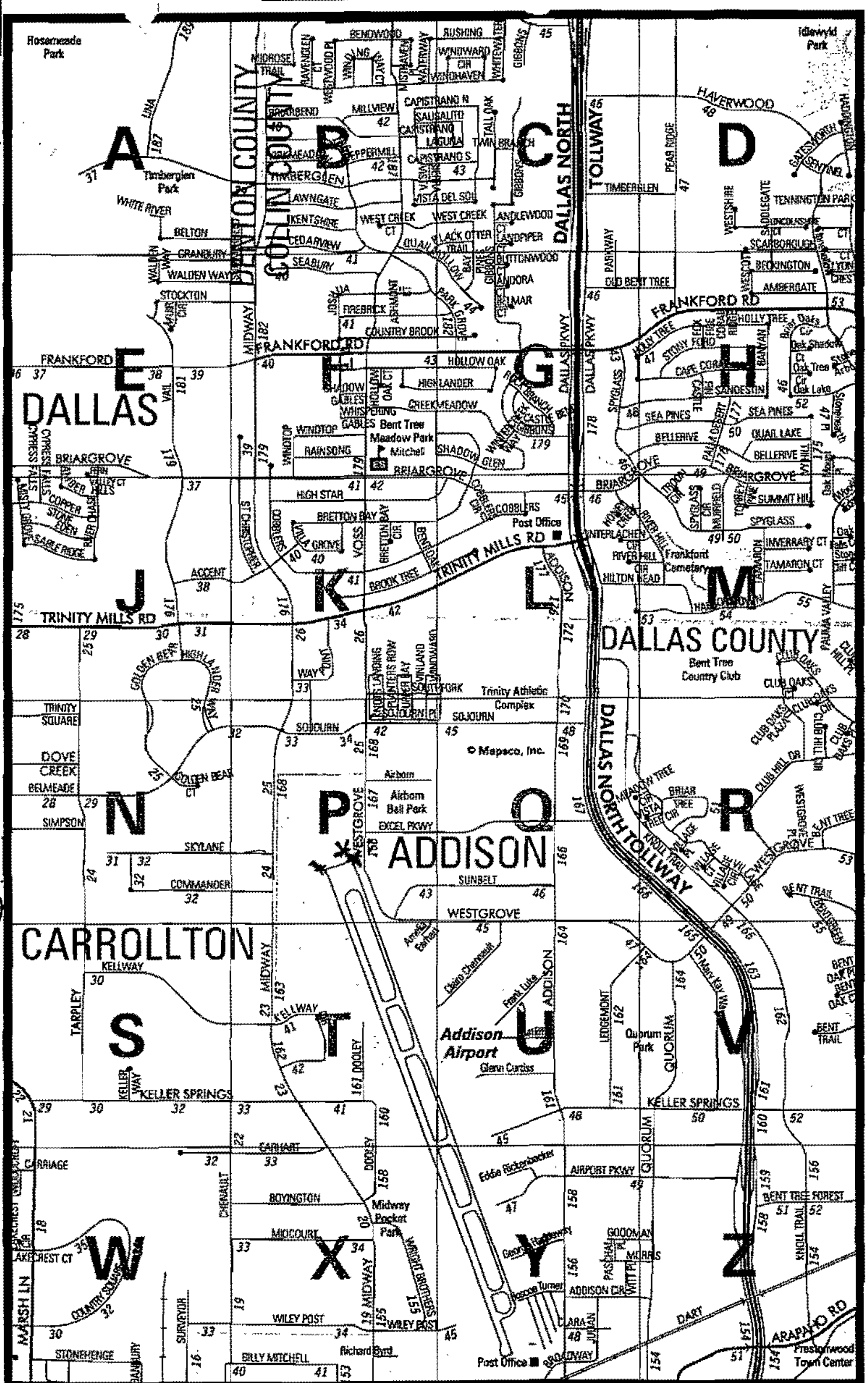
DETAIL MAP SECTION STARTS ON INDEX PAGE 170



BOOK PAGE 1005

DETAIL MAP SECTION STARTS ON INDEX PAGE 170

CONTINUED ON MAP 655



CONTINUED ON MAP 3

CONTINUED ON MAP 5

SCALE IN MILES
0 ⅛ ¼ ⅜ ½

CONTINUED ON MAP 14

SCALE IN FEET
0 1000 2000 3000

DETAIL MAP SECTION STARTS ON INDEX PAGE 170

CONTINUED ON MAP 656

CONTINUED ON MAP 657

CONTINUED ON MAP 4

CONTINUED ON MAP 7

CONTINUED ON MAP 15

CONTINUED ON MAP 16

SCALE IN MILES

SCALE IN FEET

SCALE IN MILES

SCALE IN FEET

THIS PAGE ALSO APPEARS IN THE MAPSCO COLLIN-GRAYSON STREET GUIDE AS PAGE COLLIN 127.

PAGE ALSO APPEARS IN THE MAPSCO COLLIN-YSON STREET GUIDE AS PAGE COLLIN 128.

◆ EDITORIAL: Public-private effort still makes a difference/14A ◆

WEATHER

Today: Partly cloudy. Scattered showers. High: 90s. Low: 70s.

Weather update, page 2A

THE BEAUMONT ENTERPRISE

A HEARST NEWSPAPER

THURSDAY

AUGUST 3, 2000

VOL. CXIX, NO. 272

http://www.SoutheastTexasLive.com ◆ THE ADVOCATE FOR SOUTHEAST TEXAS SINCE 1880 ◆ 50 Cents

City wants quieter trains

'50s ordinance banning train whistles at night will be enforced starting Monday

By JEORGE ZARAZUA
THE ENTERPRISE

BEAUMONT – City officials, responding to resident complaints, will begin to penalize trains for blowing their whistles at night under a little-used ordinance that has been on the books since 1958.

City Manager Stephen Bonczek has notified the three railroad companies operating in the city that, beginning on Monday, police officers will begin ticketing trains that sound their horns between 9 p.m. and 6 a.m.

The three train companies affected are Burlington Northern & Santa Fe Railway, Kansas City Southern Railway and Union Pacific Railroad Company.

At least one railroad company is concerned that the crackdown could increase the number of accidents at railroad crossings.

Bonczek said trains would only be allowed to use their horns during the restricted time period if there is imminent danger of an accident.

"If there is an intersection where there are no vehicles, then you let the gates do their job," he said.

The city manager also said trains blocking an intersection for more than 30 minutes will be ticketed under another 1958 ordinance.

Violators of either of the two ordinances can be charged with a Class C misdemeanor, punishable by up to a $500 fine, said City Attorney Lane Nichols.

The new enforcement effort was prompted by numerous complaints about the excessive noise that train horns make, Bonczek told the trainmasters in a letter dated July 28.

TRAINS, page 8A

FROM PAGE ONE

TRAINS: Ban is from 9 p.m. to 6 a.m.

Continued from page 1A

"While the city recognizes the importance of adequate warning systems to alert drivers of an impending train arrival, there needs to be sensitivity to the negative consequences of noise particularly in the late evening hours," Bonczek says in his letter.

Pat Hyatt, a spokesman for Burlington Northern & Santa Fe Railway, said his company regretted the city's decision and was unsure if the railway would change its operations in Beaumont.

"We are generally opposed to so-called whistle bans for safety reasons," Hyatt said.

He cited studies by the U.S. Department of Transportation's Federal Railroad Administration showing a 62 percent increase in accidents at intersections where whistle bans were in place.

Officials at the other two railroad companies couldn't be reached for comment.

But Bonczek said the enforcement of the ordinance isn't intended to lower safety standards for railroad crossings.

"The engineers know where the risk is," he said. "We're asking them to use their judgement, not to compromise safety standards."

The Federal Railroad Administration has been studying safety at railroad crossings in an effort to create universal guidelines regulating train horn noise.

Texas does require trains to sound their horns while approaching railroad crossings, but state law allows cities with populations of more than 5,000 to establish their own regulations regarding train horn noise.

Once the Federal Railroad Administration finalizes the universal rules, they will supercede any state or local ordinances, according to attorneys for the federal agency.

Officials have been working on those rules since 1994; public hearings on the proposed rules were concluded earlier this year. No release date for the final rules has been scheduled.

Since 1938, train engineers have adopted a standard of sounding their horns two long blasts, then one short and one long as they approach railroad crossings.

S89°40'09"E
44.33'

FIP

FIP

WILLIAM LOMAX SURVEY
ABST. NO. 792

PARCEL 1
GROSS 16.7752 AC
LESS 0.0312 AC
NET 16.7440 AC

PARCEL 2

40 0 40
Scale 1" = 40 ft

40'

PERPETUAL EASEMENT OF INGRESS/ EGRESS
VOL. 5340, PG. 571
D.R.D.C.T.

UNITED FIDELITY OFFICE PARK
VOL. 80140, PG. 1720
M.R.D.C.T.

RICHMONT PROPERTIES, LTD.
VOL. 94155, PG. 3422
D.R.D.C.T.
0.820 AC.

S0°10'44"E ~ 233.24'

LINE DATA

LINE NO.	BEARING	DIST.
L1	N0°29'14"W	12.35'
L2	S0°10'44"E	12.35'
L3	N0°10'44"W	12.35'

PARCEL 1
2,512 S.F. (0.0577 AC)

PARCEL 2
1,358 S.F. (0.0312 AC)

S89°31'52"E ~ 203.44'

L2

N89°31'52"W ~ 203.38'

SIR

FIR

SIR

L3

SIR

S88°05'50"E ~ 220.53'

N89°18'26"W ~ 220.00'

POB
PARCEL 2

SIR

322.77'
N89°18'26"W ~ 582.77'

FND "X" CUT
IN CONC.

POC
PARCEL 2

30'

30'

KELLER SPRINGS ROAD

LEGEND

- (IP) FIP FOUND IRON PIPE
- (IR) FIR FOUND IRON ROD
- (⊙) SET 1/2 INCH IRON ROD WITH PLASTIC CAP STAMPED DTE

DAL TECH
ENGINEERING, INC.
17311 DALLAS PKWY., SUITE 200
DALLAS, TEXAS 75248
PHONE: (972)250-2727
FAX: (972) 250-4774

STATE OF TEXAS
REGISTERED
DONALD R. HOWARD
2812
PROFESSIONAL
LAND SURVEYOR

9/8/98

DATE: SEP. 7, 1998

JOB NO. 9822

EXHIBIT A
PARCEL 2 PLAT
KELLER SPRINGS AT
QUORUM DRIVE

C:\9822\9822PARC\PARCEL2.DWG SEP. 7, 1998

7-17-00

Quiet Zone Requirements @ Crossings

Four-Quadrant Gate System
Fully blocks road — No option to "go around" the gates

Medians may be used as "channelization" device. No opportunity to go around gate.

Need signs alerting motorists that no train horn will sound

Est Cost 150 K per intersection (Say 200K)
Possible Sites along Cotton Belt

Dallas Parkway (2 locations)
Knoll Trail (Dallas) (within ½ mile of residences)
Future Spectrum
Quorum Dr.
Addison Rd
Midway
Surveyor
Marsh

7 intersections
7 x 200 K = $ 1,400,000

Cesar 7-17-00 — Phone Call

Railroad Controls Ltd. Web Site — Costs

www.railroadcontrols.com

Scott Booker — Classmate of Cesar

Chris Poe — P.D. Ferridyne

Consultant for Richardson

CEO Bob Albritton

Pres Rick Campbell

1-817-820-6300

Doug Henry Dir. of Const.

2 options — • 4 Quad gates

• Way-Side Horns

(automated Horn System)

50K/crossing

4 Quad gates — up to 250K

Doug will pass info on to Rick Campbell who will call when he returns from vacation.

9/5/00 Kurt Anderson — Wayside Horns — Rick was called out of town & could not attend. Need to reschedule.

Jim Pierce

From: Chris Terry
Sent: Thursday, June 08, 2000 9:08 AM
To: Michael Murphy
Cc: Jim Pierce
Subject: FW: Call from Ron Whitehead

FYI -

Chris

-----Original Message-----
From: Lea Dunn
Sent: Thursday, June 08, 2000 8:09 AM
To: Chris Terry
Subject: FW: Call from Ron Whitehead

Chris,

FYI - I don't know if you were copied on this, but thought you should be kept in the loop.

Lea

-----Original Message-----
From: Don Franklin
Sent: Wednesday, June 07, 2000 9:16 AM
To: Ron Whitehead
Cc: Lea Dunn
Subject: FW: Call from Ron Whitehead

Ron:
In reference to your inquiry, we issued two (2) citations to DGN&O Railroad Company, both of which occurred on June 3rd.
1st: 0037 hours 15200 Surveyor, Obstructing RR Crossing; 13 minutes
2nd: 1625 hours 15200 Addison Road, Obstructing RR Crossing; 12 minutes
Texas law permits obstructing a crossing for up to 5 minutes. Also, the law recently changed requiring that we now cite the company not the Conductor. Both violations were observed by officers who were also timekeepers. The Conductor operating the train at the Surveyor site was very uncooperative and belligerent with officers almost to the point of being arrested.
We have had few problems with the RR since our earlier discussions with them.
Don

-----Original Message-----
From: Amy Ferguson
Sent: Tuesday, June 06, 2000 4:45 PM
To: Don Franklin
Subject: Call from Ron Whitehead

Ron called at 4:40 pm today. Said he had received a call from the railroad about some tickets being written for blocking the roadways. He wanted some background on this if it was happening in Addison.
Said you could get back to him tomorrow... not something you had to handle tonight.

Amy Ferguson
Addison Police Department
972/450-7117

Railroad Joint Issues
Meeting @ Carrollton

4-12-00

Gary W. Jackson City Mgr
Milburn R. Gravley, Mayor
Mark Guy Asst. City Mgr.

DGNO is willing to explore using quiet zones

Engineers must blow horns @ intersections
If FRA approves a quiet zone, the DGNO will issue a "general order" forbidding blowing the horn

Final Rule effective in 1yr after passage

Get letters from FRA so that we can go ahead before the 365 day period

David - 7" curb not enough. Would like to see a guard rail.

Dave Disney - local FRA person on crossing issues

Ron - Whistle blowing is creating opposition to "rail"
Can time of operation be adjusted?
David - have been operating (4 months
Lattimore (Plano) Mills - have increased shipments
Adjust time often leads to blocking traffic

Ron

DART has bought line for future commuter rail opps
Hopefully, freight will be compatible
We want a quiet zone all thru Addison

Alt route to go from Sherman to Greenville to Plano would eliminate some traffic thru Addison & Carrollton - May/may not ever happen
We are affected by Farmers Branch Customers and the rock ft train
The big picture, we may see more traffic in Addison

Possible to see Dars plan by fall

Lonnie is going before the Board to propose to purchase more ROW

Work with DGNO & DART on specs for quiet zone?

David Wants 1800 feet of storage
There are some possibilities:
(1) Expand the carrollton Yard
Drainage issues
(2) Provide storage along the S side of the main line
Jon will check with planners on this

Use of Locomotive Horn Meeting

April 12, 2000

	Name	Organization	Phone
1.	MILBURN GRAVLEY	CARROLLTON	972-242-531=
	Cesar Molina	CARROLLTON TRANS.	972.466.305C
	Tom Hammons	"	"
	Jim Pierce	Town of Addison	972-450-28[illegible]
	Mike Murphy	TOWN OF ADDISON	972-450-2E[illegible]
	NOMA BULOT	DART	214-749-29[illegible]
	DAVID EVERMANN	DGNO RAILROAD	972-487-818C
	JAN SEIDNER	DART	214-749-2917
	Ron Whitehead	Addison	972 450-70=[illegible]
	MARC GUY	CARROLLTON	972-466-30=

Use of Locomotive Horn Meeting
April 12, 2000

1. Discuss the proposed FRA rule on locomotive horn.

2. Discuss the concept of quiet zone

3. Discuss grade crossing at Marsh Lane about 350 feet north of Realty.

   What improvements can be made at this location to ensure motorists safety in the event of a whistle ban?
   Will DGNE RR be willing to assist City in establishing a quiet zone at this location?
   Will Addison be willing to pass any necessary ordinances to create a quiet zone?
   Will DART be willing to cooperate with City on this matter?

4 Other issues related to this crossing?

   Since rule has not been passed, need FRA approval.
   More than likely, will have to follow all of the notification requirements listed in the proposed rule.
   Will need to identify funding for proposed improvements.

CARROLLTON
MEMORANDUM

DATE: April 10, 2000

TO: Marc Guy, Assistant City Manager

FROM: Cesar J. Molina, Jr., Director of Transportation Cesar 972-466-3050

SUBJECT: **Proposed Rule on Locomotive Horn Use**

BACKGROUND:

On January 13, 2000, the U.S. Department of Transportation's Federal Railroad Administration (FRA) published proposed rules in the Federal Register on the use of locomotive horns at public highway-rail grade crossings. This action was prompted by the aftermath of the State of Florida's whistle ban. Effective July 1, 1984, the Florida legislature authorized local governments to ban the nighttime use of whistles by interstate trains approaching highway-rail grade crossings equipped with flashing lights, bells, crossing gates, and highway signs that warn motorists that train whistles would not be sounded at night.

In August 1990, the FRA initiated a study on the effect of the Florida whistle ban law. FRA's study concluded that there were 195 percent more collisions after the whistle ban went into effect. A study of the daytime collision rates found that they remained virtually unchanged. FRA then compared collision data from two railroads operating on the same rail line. The study determined that Florida East Coast Railway Company (FEC) which is considered an "interstate" carrier and subject to the whistle ban law, had a nighttime collision rate increase of 195 percent. In contrast, CSX Transportation Company, a local carrier and not subject to the whistle ban, had a nighttime collision rate increase of 67 percent. On July 26, 1991, FRA issued an emergency order ending the Florida whistle ban.

In the two years after the emergency order was issued, nighttime collision rates returned back to the pre-ban levels. In the two years prior to the end of the ban (1989 to 1991), there were 51 nighttime collisions. In the two years after the ban ended (1991 to 1993), there were only 16 nighttime collisions. As a result of the Florida study, Congress passed the Swift Rail Development Act on November 2, 1994. This Act requires the use of locomotive horns at grade crossings, but gives FRA the authority to make reasonable exceptions. Any regulations adopted as a result of this act are not effective until one year after the date of the publication of the final rule. This proposed rule is the FRA's first attempt to codify the requirements in the Swift Rail Development Act.

SECTION BY SECTION ANALYSIS

Section 229.129 Audible Warning Device

FRA currently has a rule that requires each lead locomotive to have an audible warning device. The warning device must produce a minimum sound level of 96 decibels, dB(A) at 100 feet forward of the locomotive in its direction of travel. However, the existing rule does not set a maximum limit on the sound produced by the locomotive horn. Some commuter carriers have set the maximum sound level of their horns to the minimum set by FRA. In contrasts, many freight locomotives have horns that deliver as much as 114 dB(A) at 100 feet in front of the locomotive. It is important to note that decibels are measured in a logarithmic scale. Therefore, 114 dB which is 18 dB higher than the FRA minimum is not 19 percent louder than the 96 dB level but actually 63 times louder or 6,209 percent louder.

The proposed rule describes three possible options for the sound level of locomotive horns. The first option is to set the maximum permissible train horn sound level at 104 dB(A). This is believed to be sufficient in most circumstances where a vehicle is at a crossing with automated warning devices. The second option is to set the maximum permissible train horn level at 111 dB(A). Based on the results from the Volpe National Transportation Systems Center, horns producing sounds at this level should be adequate for passive crossings (i.e., crossings with no automated warning devices). The third option is a variable sound level setting. Under this option, the locomotive engineers would set the horn at a low setting (maximum of 104 dB(A)) for crossing with active warning devices and at a high setting (maximum of 111 dB(A)) for crossing that have passive warning devices. However, the FRA is concerned that this option would put too much burden on the locomotive engineers.

An additional concern is the directionality of the train horn. Current practice is to place the horn near the center of the locomotive. This was to reduce the noise level for the train crews. However, the FRA does not believe that this is necessary for the protection of the train crews. Furthermore, placing the horn in the center of the train leads to higher sound levels at right angles from the locomotive. The FRA is requesting comments on both the proposed sound level and the directionality of the horns.

Section 222.3 Application

The proposed rule will apply 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 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.

Section 222.5 Preemptive Effect

All existing local ordinances and state statutes related to whistle bans at public crossings will be preempted by this regulation unless such ordinances or laws fall within the 49 United States

Codes (USC) Section 20106. Moreover, this rule does not confer authority on localities to establish quiet zones if state law does not otherwise permit such actions.

Section 222.21 When to Use Locomotive Horns

This section requires, except as provided elsewhere in this rule, that a locomotive must sound its horn when it approaches and passes a public highway-rail crossing. Additionally, if using whistle boards, the railroad must place them at a distance from the crossing equal to the distance traveled by the train in 20 seconds while operating at the maximum speed of the track. However, research suggested that the maximum distance from a crossing should be ¼ mile regardless of the track speed. Additionally, recent research indicates that 15 seconds of advanced warning may be sufficient. FRA is requesting comments on this section.

Section 222.23 Emergency and Other Uses of Locomotive Horns

The establishment of a quiet zone does not prevent an engineer from sounding the horn in such situations, nor does it impose a legal duty to do so. The regulations in this rule are not meant to restrict the use of the locomotive horn when active crossings warning devices have malfunctioned.

Section 222.31 Train Operations Which Do Not Require Sounding of Horns at Individual Crossings

Locomotive horns need not be sounded at individual highway-rail grade crossings at which the maximum authorized operating speed (as established be the railroad) for that segment of track is 15 miles per hour or less and properly equipped flaggers providing warning to motorists.

Section 222.33 Establishment of Quiet Zones

The concept of quiet zones was established to ensure that a whistle ban would have the greatest impact in terms of noise reduction; ease the added burden on locomotive crews of the necessity of determining on a crossing-by-crossing basis whether or not to sound the horns; and enable grade crossing safety initiatives to be focused on specific areas within the quiet zone. The FRA is proposing two different methods of establishing quiet zones, depending on local circumstances. In the first method, every public grade crossing within the proposed quiet zone would have a supplementary safety measure applied to the crossing. The supplementary safety measures are listed in Appendix A of this rule. On the second method, every public grade crossing within the proposed quiet zone would have either supplementary safety measures or alternative safety measures. The alternative safety measures are listed in Appendix B. The second method gives the local governmental entities considerably more flexibility than the first method.

Under this proposed rule, either the state or a local jurisdiction can establish a quiet zone. The FRA is considering three separate approaches. The first approach is for all designations and applications to come from the state agency. A second approach allows the political subdivision with direct responsibility over traffic safety at a crossing to establish quiet zones. The third

approach is for political subdivision in which the proposed quiet zone is located to be the applicant. To explain the difference between approaches two and three, consider the KCS grade crossing at Preston Road (SH 289) about 1000 feet south of Plano Parkway in Plano. Under approach two, TxDOT would be responsible for establishing a quiet zone but under approach three, Plano would have to request the quiet zone. FRA is requesting comments on this section with regards to the methods for establishing quiet zones and the political entity that can apply for a quiet zone.

The length of the quiet zone is set at a minimum of ½ mile or 2,640 feet. The community that establishes the quiet zone has the discretion to establish its length subject to the ½ mile minimum. The basis for establishing a minimum length is to not have zones so short that they put an undue burden on the locomotive engineers.

Each highway approaching a quiet zone grade crossing must have advanced warning signs. The signs are to be designed by each state but they must be in conformance with the Manual on Uniform Traffic Control Devices (MUTCD). Also, private crossings are not subject to this requirement but FRA is seeking comments on this issue as well.

Section 222.35 Notice and Information Requirements

This section requires the requesting agency to provide written notice of the quiet zone designation to all railroads operating over public highway-rail grade crossings within the quiet zone, the highway or traffic control authority and law enforcement authority having jurisdiction at the affected grade crossings, the state agency responsible for highway and road safety, and the FRA Associate Administrator for Safety. All of the notices must be sent by certified mail with return receipt requested. Additionally, the FRA is requesting certain minimum information as specified in this section.

Section 222.37 Quiet Zone Implementation

Before a quiet zone can be implemented, all of the notification requirements of Section 222.35 must be met and at least 14 days have elapsed since the other parties received the required notification.

Section 222.39 Quiet Zone Duration

A quiet zone may remain in effect indefinitely provided that it remains in compliance with all of the applicable rules. Furthermore, within 6 months of the five-year anniversary of the original application, the designated political entity sends a certified letter to all of the original parties stating that it is still in compliance with requirements of Section 222.35. This process is repeated every five years. If the zone that is established uses primarily alternative safety devices as described in Appendix B, the reaffirmation period is reduced to 3 years, everything else remains the same. Additionally, the FRA may at any time evaluate the safety record of any quiet zone. If the FRA determines that the safety devices implemented in the quiet zone are insufficient, they can request that the locally responsible agency take additional measures to improve the safety of

the zone. If necessary, the FRA can eliminate a quiet zone. The FRA is soliciting comments on this section.

Section 222.41 Supplementary and Alternative Safety Measures

Appendix A of the proposed regulation contains a list of approved supplementary safety measures. These are devices that the FRA has determined to be an effective substitute for the locomotive horns in the prevention of highway-rail crashes. Appendix B list additional alternative safety measures that may be included in a request for FRA acceptance of a quiet zone. Appendix C lists certain situations where the establishment of a quiet zone would not pose a significant risk.

Additionally, this section includes how new devices are added to Appendix A and B. Also, this section clearly states that the use of traditional highway-rail grade crossing measures do not constitute supplementary safety measures for the establishment of quiet zones.

Appendix A Supplementary Safety Measures

A quiet zone establish using devices from Appendix A do not require specific FRA approval. These devices fully compensate for the lack of a locomotive horn.

1. Temporary Closure of a Public Highway-Rail Grade Crossing
2. Four-Quadrant Gate System
3. Gates with Medians or Channelization Devices
4. One Way Streets with Gates
5. Photo Enforcement*

* Currently this option is not available in Texas.

Appendix B Alternative Safety Measures

Quiet zones may be established using alternative safety measures. Based on the requirements of Section 222.33(b), a local municipality or state can apply for a quiet zone to the FRA. This section lists all of the additional requirements and information that needs to be sent to the FRA before they make a determination on the request. Currently, two alternative safety measures are listed. They are

1. Programmed Enforcement
2. Public Education and Awareness

Additionally, the FRA has heard testimony on the use of Wayside Horns as an alternative safety measure. They are considering adding this device to the list of alternative safety measures in the final version of this rule.

Railway-crossing horns may be music to ears of golfers, others in Richardson

By Tony Hartzel
Transportation Writer of The Dallas Morning News

RICHARDSON — The par 3, 171-yard 14th hole at Canyon Creek Country Club has a tough hazard, courtesy of the Kansas City Southern Railway.

"It can be disturbing to some of our golfers when they're on their backswing and that train horn blows," said Canyon Creek office manager Ronnie Morris. "It would be nice if at some time in the future, we didn't have to hear it during our big tournament."

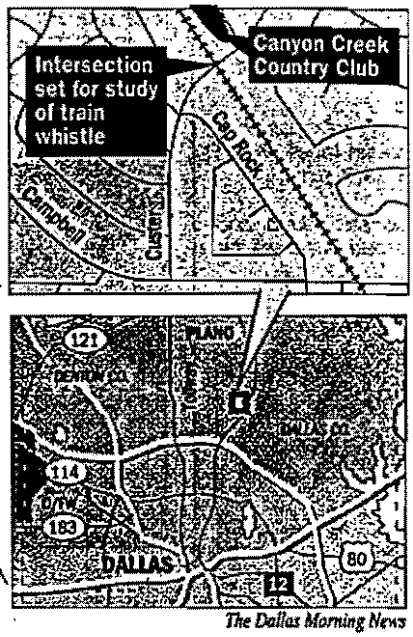
Duffers will soon have to blame their hooks and slices on something else, thanks to a pilot project by the city of Richardson and the railway, which has the shortest route between Kansas City and the Gulf of Mexico.

Sometime next month, the city will install what are called wayside horns at the Custer Parkway railroad crossing. The street-facing, car-level horns will sense when trains are coming, eliminating the need for engineers to sound their whistles adjacent to the No. 14 tee box.

"It's a quality-of-life issue," said Richardson traffic engineer Walter Ragsdale. "It could be an overall benefit. Instead of the train notifying motorists from a quarter-mile away, it's right there at them."

Richardson will pay $30,000 for installation and connection to the railroad's sys-

Please see RICHARDSON on Page 35A.



The Dallas Morning News

DMN 3-31-00

Continued from Page 27A.

tem. The horns will operate for a 90-day test period, Mr. Ragsdale said. The Custer Parkway crossing, in a heavily residential area, will continue to use flashing red lights and automatic gates.

Federal Railroad Administration officials have approved the test project, and they will review its effectiveness for potential future use.

Train whistles have become an increasing concern nationwide as residential areas sprout and take root around rail lines. Communities have passed whistle bans, but a lack of federal guidelines has prompted engineers to continue the audible alerts.

The Richardson project would eliminate the need for horns to be sounded near a hospital on Campbell Road, Mr. Ragsdale said.

"We're willing to explore options that would allow us to exist together," said Kathy Simpson of the railway. "Our primary concern is the safety of our employees and the public. At the same time, we understand concerns about the horns."

Engineers on the Richardson route will look for a white strobe light telling them the wayside horn is working, Ms. Simpson said. The engineer will sound the horn as a precaution if the light doesn't flash.

Nationwide, federal officials have distributed proposed rules that would eliminate the need for train horns if railroad crossings are made safer. In one example, recommendations would require a city to spend about $100,000 per crossing to install more gates and create impassable medians and shoulders.

"Wayside horns are not part of our proposed rules, but they could be included in the final recommendations if they are proven to be safe and effective," said Pamela Barry, director of the railroad administration's office of public affairs. "We feel this still needs some study."

Final federal rules could be passed by the end of the year and would take effect a year later.

Although Dallas Area Rapid Transit has a growing rail presence, each community will have to decide whether to pay for whatever crossing improvements the federal government eventually allows, said Lonnie Blaydes, vice president for commuter rail.

"This isn't a potential for DART, necessarily, but more for cities that want quiet zones," he said.

Canyon Creek will host its big Southwestern Bell Futures Golf Classic April 7-9, probably too soon for the wayside horns, Mr. Morris said.

"A lot of citizens and golfers would appreciate it if they would do this," Mr. Morris said.

Ron
Chris
Mike

I will follow up with Walter Ragsdale so we can see (hear) if this in operation

Jim

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By Tony Hartzel
Transportation Writer of The Dallas Morning News

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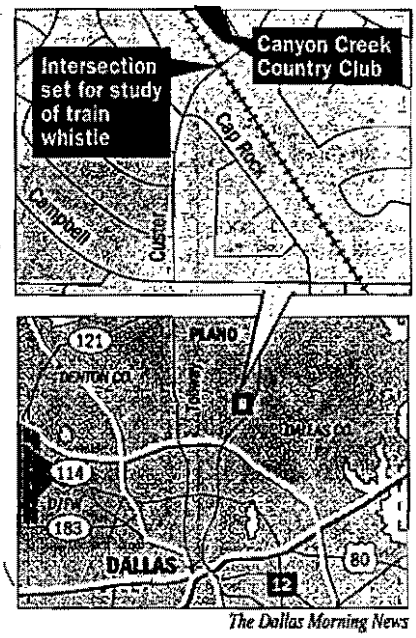

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Railroad Noise Issues

3-29-00

Walter Kazdal 972-238-4273
(Went to Florida to testify on new regs)
Where: Test Site w KC RR
N. of Campbell on Custer

FRA has guidelines —
Richardson Will comment on the Regs —

Directional Horns → "Alt. Safety improvements"
re-direct the horn

Now → Train → must blow horn ¼ mile @ advance of intersection

Directional horns Eliminates 95% of noise

Doing a "before" study now — on train horn noise.

Horns will be installed in a month or so —
will do a 90 day study

R has Agreement to do this city-wide with that RR

(Need a bore permit to install equipment)

May 26th Comments due — Noise Reduction
is a plus - please implement a
method to reduce noise & maintain
Safety —

Fla. had Quiet zones but had accidents.
FRA made them rescind them

Railroad lobby is heavy against it, so
we should comment on the regs.

Jim Pierce

From: Jim Pierce
Sent: Tuesday, March 28, 2000 11:27 AM
To: Cesar Molina (E-mail)
Cc: Ron Whitehead; Michael Murphy
Subject: Railroad Noise Issue

Ron Whitehead and Mike Murphy would like to be included in your meeting with DGNR to discuss noise issues. Thank you for thinking of us. Please advise when the meeting will be.

Jim Pierce, P.E.
Assistant City Engineer
PO Box 9010
Addison, TX 75001-9010
972-450-2879

Jim Pierce

From: Ron Whitehead
Sent: Monday, March 27, 2000 5:19 PM
To: Jim Pierce
Subject: RE: Railroad Noise Issues

-----Original Message-----
From: Jim Pierce
Sent: Monday, March 27, 2000 10:24 AM
To: Ron Whitehead
Cc: Michael Murphy
Subject: Railroad Noise Issues

Yes. I would like to be included if it is O.K. with Carrollton. Ron

On 3/23, Mike and I Met with Cesar Molina, Director of Transportation, Carrollton, and Cesar brought up the railroad noise issue. They are getting a lot of railroad horn blowing complaints. They (Cesar, the City Manager, and possibly the Mayor) are planning a meeting with David Eyermann of DGNR to discuss the problem. Cesar asked if we would like to join the meeting since we are also having complaints. What do you think? Please let me know so I can get back to Cesar.

Crossing directional horns are being looked at as a possible solution. Richardson has, or is about to have a crossing rigged up this way for a trial. I have a call working to Walter Ragsdale to learn more about this.

Cesar advised that the Federal Railroad Administration (FRA) has published proposed rules on use of locomotive horns at highway-rail grade crossings. The proposed rules, among other things, would allow "quiet zones" to be established where no horn blowing would be needed as long as a certain level of safety devices were installed to protect the public at the crossings. This could be a good answer. I have a copy of the proposed rules. The are open to comment until May 26, 2000.

Jim Pierce, P.E.
Assistant City Engineer
PO Box 9010
Addison, TX 75001-9010
972-450-2879

Jim Pierce

From: Cesar Molina [CMolina@ci.carrollton.tx.us]
Sent: Thursday, March 23, 2000 3:12 PM
To: 'jpierce@ci.addison.tx.us'
Subject: RR Noise issue

Jim,

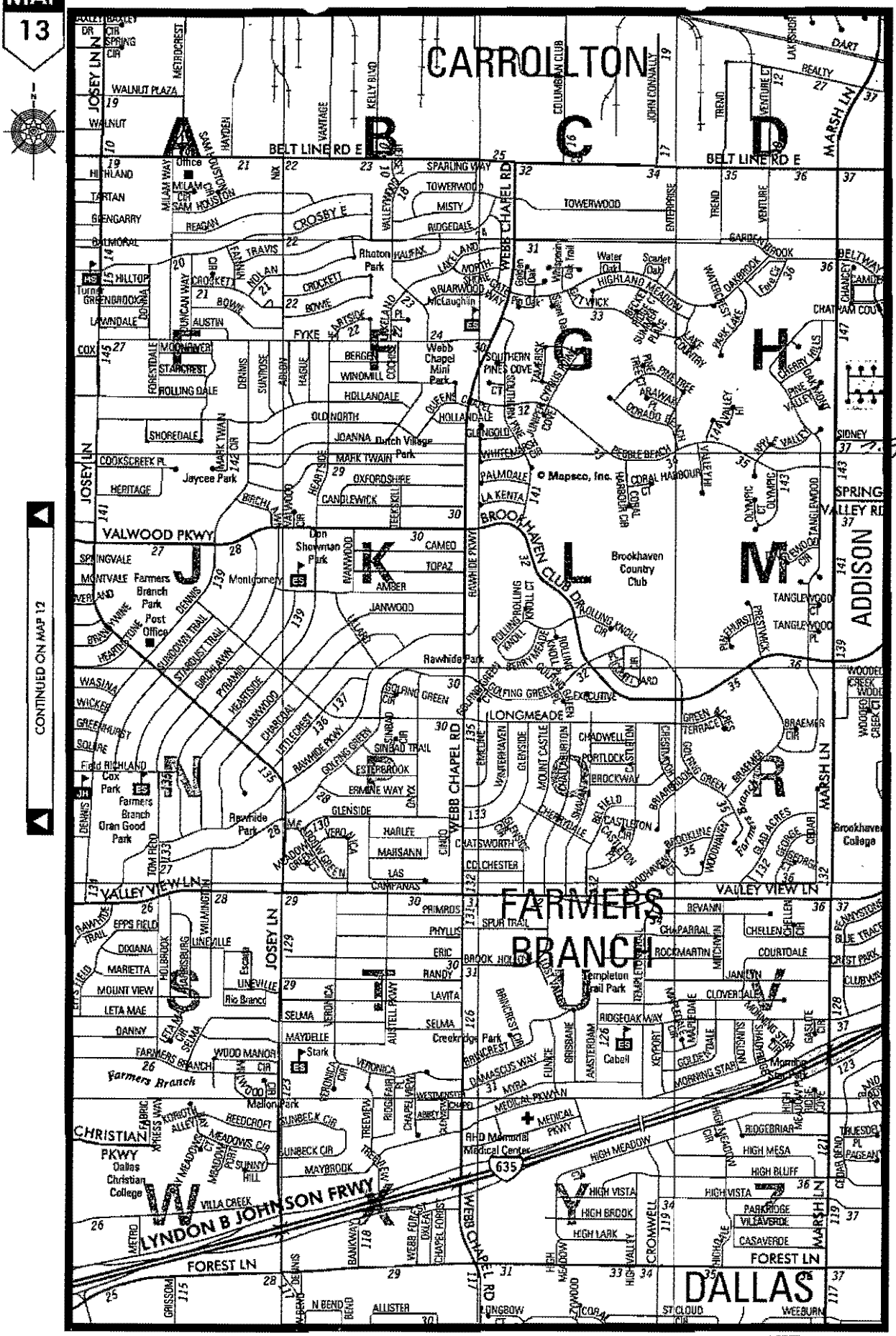
The FRA website where you can download the proposed FRA rule on the Use of
Locomotive Horns is http://www.fra.dot.gov/horns/ Once in the web site, click on "Notice of Proposed Rulemaking(NPRM)" Then click on the download
as a .pdf file. This will allow you to read it and print it from Adobe Acrobat.

Also, I spoke with my ACM. He said that it was fine if Mike Murphy and your
City Mgr want to attend our meeting. He will ask Gary, if the mayor should
be invited. I'll let you know what they tell me.

Cesar

Cesar

MAP 13



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DETAIL MAP SECTION STARTS ON INDEX PAGE 170

Federal Register

Thursday
January 13, 2000

Part II

Department of Transportation

Federal Railroad Administration

49 CFR Parts 222 and 229
Use of Locomotive Horns at Highway-Rail Grade Crossings; Proposed Rule

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Parts 222 and 229

[Docket No. FRA–1999–6439, Notice No. 1]

RIN 2130–AA71

Use of Locomotive Horns at Highway-Rail Grade Crossings

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking.

SUMMARY: FRA is proposing rules to require that a locomotive horn be sounded while a train is approaching and entering a public highway-rail crossing. The proposed rules also provide for an exception to the above requirement in circumstances in which there is not a significant risk of loss of life or serious personal injury, use of the locomotive horn is impractical, or supplementary safety measures fully compensate for the absence of the warning provided by the horn. This rule is required by law.

DATES: *Written Comments:* Comments must be received by May 26, 2000. Comments received after that date will be considered to the extent possible without incurring additional expense or delay.

Public Hearings: FRA will hold public hearings to receive oral comments from interested parties. The dates and specific location of hearings will be announced in a subsequent **Federal Register** document and on FRA's web site at *http://fra.dot.gov.* Cities in which hearings will be held are listed in **ADDRESSES** section below.

ADDRESSES: *Written Comments:* Anyone wishing to file a comment should identify the FRA docket and notice numbers (Docket No. FRA–1999–6439, Notice No.1). Comments should be sent to the Docket Management System, U.S. Department of Transportation, room PL–401, 400 Seventh Street, S.W., Washington, D.C. 20590–0001. Written comments will be available for public review during regular business hours at the above address and through the Internet at *http://dms.dot.gov.*

Public Hearings: Public hearings will be held in the following cities: Los Angeles, California; Washington, D.C.; Ft. Lauderdale, Florida; Chicago, Illinois; South Bend, Indiana; Berea, Ohio; Pendleton, Oregon; and Boston, Massachusetts. The specific location and date of each hearing will be announced in a subsequent **Federal Register** document and on FRA's web site at *http://fra.dot.gov.*

FOR FURTHER INFORMATION CONTACT: Ron Ries, Office of Safety, FRA, 1120 Vermont Avenue, N.W., Washington, D.C. 20590 (telephone: 202–493–6299); or Mark Tessler, Office of Chief Counsel, FRA, 1120 Vermont Avenue, N.W., Washington, D.C. 20590 (telephone: 202–493–6038).

SUPPLEMENTARY INFORMATION:

Background

Approximately 4,000 times per year, a train and highway vehicle collide at one of this country's 262,000 public and private highway-rail grade crossings. Of those crossings, more than 158,000 are public at-grade crossings—those crossings in which a public road crosses railroad tracks at grade. During the years 1994 through 1998, there were 21,242 grade crossing collisions in the United States. These collisions one of the greatest cause of death associated with railroading, resulting in more than 400 deaths each year. For example, in the 1994–1998 period, 2,574 people died in these collisions. Another 8,308 people were injured. Approximately 50 percent of collisions at highway-rail intersections occur at those intersections equipped with active warning devices such as bells, flashing lights, or gates (approximately 62,000 crossings).

Compared to a collision between two highway vehicles, a collision with a train is eleven times more likely to result in a fatality, and five and a half times more likely to result in a disabling injury. The average freight locomotive weighs between 140 and 200 tons, compared to the average car weight of one to two tons. Many freight trains weigh in excess of ten thousand tons. Any highway vehicle, even a large truck, would be crushed when struck by a moving train. The laws of physics compound the likelihood that a motor vehicle will be crushed in a collision with a moving train. The train's weight, when combined with the likelihood that the train will not be able to stop to avoid a collision, results in severe injury or death in virtually every collision (it takes a one-hundred car train traveling 30 miles per hour approximately half a mile to stop—at 50 miles an hour that train's stopping distance increases to one and a third miles).

FRA is responsible for ensuring that America's railroads are safe for both railroad employees and the public. FRA shares with the public the responsibility to confront the compelling facts surrounding grade crossing collisions.

In 1990, as part of FRA's crossing safety program, the agency studied the impact of train whistle bans (i.e., state or local laws prohibiting the use of train horns or whistles at crossings) on safety in Florida. (In this document the terms "whistle" and "horn" are used interchangeably to refer to the air powered locomotive audible warning device required to be installed on locomotives by 49 CFR 229.129, and to steam whistles required to be installed on steam locomotives by 49 CFR 230.121. These terms do not refer to a locomotive bell, which has value as a warning to pedestrians but which is not designed to provide a warning over long distances.) FRA had previously recognized the locomotive horn's contribution to rail safety by requiring that lead locomotives be equipped with an audible warning device, 49 CFR 229.129, and exempting the use of whistles from federal noise emission standards "when operated for the purpose of safety." 49 CFR 210.3(b)(3). The Florida study, which is discussed below (and which has been filed in the docket), documented how failing to use locomotive horns can significantly increase the number of collisions.

A. Who Is at Risk in a Grade Crossing Collision?

Many people have argued that highway drivers who disobey the law and try to beat a train through a crossing should not be protected at the expense of the peace and quiet of communities that parallel railroad tracks. FRA strongly agrees that drivers who unlawfully enter grade crossings should be fined by local police, but death or serious injury is simply not a just penalty.

Overlooked in this emotional debate are the many innocent victims of crossing collisions, including blameless automobile and railroad passengers and railroad crews who, despite performing their duties correctly, are usually unable to avoid the collisions. Nationally, from 1994 to 1998, eight railroad crewmembers died in collisions at highway-rail crossings, and 570 crewmembers were injured. Two hundred railroad passengers were also injured and two died. In Bourbonnais, Illinois, earlier this year, eleven innocent passengers died in their sleeper car following a collision with a truck at a highway-rail crossing. In addition, since approximately one-half of all collisions occur at grade crossings that are not fully equipped with warning devices, some of the drivers involved in these collisions may have been unaware of the approaching train.

Property owners living near railroad rights-of-way can also be at risk. For example, on December 1, 1992, in Hiebert, Alabama, a freight train collided with a lumber truck. Three

locomotives and nine rail cars were derailed, releasing 10,000 gallons of sulfuric acid into a nearby water supply. Residents living near the derailment site had to be evacuated because of the chemical spill. Even where the locomotive consist is not derailed in the initial collision with the highway vehicle, application of the train's emergency brake can result in derailment and harm to persons and property along the right-of-way.

Law-abiding motorists can also be endangered in crossing collisions. On March 17, 1993, an Amtrak train collided with a tanker truck in Fort Lauderdale, Florida. Five people died when 8,500 gallons of burning fuel from the tanker truck engulfed cars waiting behind the crossing gates.

Highway passengers can also he innocent victims. On December 14, 1995, in Ponchatoula, Louisiana, five people were killed when their truck was hit by an Amtrak train. Among the dead were three children who were passengers in the truck.

In making a decision on the use of locomotive horns, all of the competing interests must be reasonably considered. Those whose interests will he affected by this rule include those who may he disturbed by the sounding of locomotive horns and all of those who may suffer in the event of a collision; pedestrians using the crossing; the motor vehicle driver and passengers, those in adjacent vehicles, train crews, and those living or working nearby.

B. FRA's Study of the Florida Train Whistle Ban

Effective July 1, 1984, Florida authorized local governments to ban the nighttime use of whistles by intrastate trains approaching highway-rail grade crossings equipped with flashing lights, bells, crossing gates, and highway signs that warned motorists that train whistles would not be sounded at night. Fla. Stat. § 351.03(4)(a) (1984). After enactment of this Florida law, many local jurisdictions passed whistle ban ordinances.

In August 1990, FRA issued a study of the effect of the Florida train whistle ban up to the end of 1989. The study compared the number of collisions at crossings subject to bans with four control groups. FRA was trying to determine the impact of the whistle bans and to eliminate other possible causes for any increase or decrease in collisions.

Using the first control group, FRA compared collision records for time periods before and during the bans. FRA found there were almost three times more collisions after the whistle bans were established, a 195 percent increase. If collisions continued to occur at the same rate as before the bans began taking effect, it was estimated that 49 post-ban collisions would have been expected. However, 115 post-ban collisions occurred, leaving 66 crossing collisions statistically unexplained. Nineteen people died and 59 people were injured in the 115 crossing collisions. Proportionally, 11 of the fatalities and 34 of the injuries could be attributed to the 66 unexplained collisions.

In the second control group, FRA found that the daytime collision rates remained virtually unchanged for the same highway-rail crossings where the whistle bans were in effect during nighttime hours.

The third control group showed that nighttime collisions increased only 23 percent along the same rail line at crossings with no whistle ban.

Finally, FRA compared the 1984 through 1989 accident record of the Florida East Coast Railway Company (FEC), which, because it was considered an "intrastate" carrier under Florida law, was required to comply with local whistle bans, with that of the parallel rail line of interstate carrier, CSX Transportation Company (CSX), which was not subject to the whistle ban law. By December 31, 1989, 511 of the FEC's 600 gate-equipped crossings were affected by whistle bans. Collision data from the same period was available for 224 similarly equipped CSX crossings in the six counties in which both railroads operate. As noted above, FRA found that FEC's nighttime collision rate increased 195 percent after whistle bans were imposed. At similarly equipped CSX crossings, the number of collisions increased 67 percent.

On July 26, 1991, FRA issued an emergency order to end whistle bans in Florida. Notice of that emergency order (Emergency Order No. 15) was published in the **Federal Register** at 56 FR 36190. FRA is authorized to issue emergency orders where an unsafe condition or practice creates "an emergency situation involving a hazard of death or injury." 49 U.S.C. 20104. FRA acted after updating its study with 1990 and initial 1991 collision records and finding that another twelve people had died and thirteen were injured in nighttime collisions at whistle ban crossings. During this time, a smaller study, conducted by the Public Utility Commission of Oregon, corroborated FRA's findings and led to the cessation of state efforts to initiate a whistle ban in Oregon.

FRA's emergency order required that trains operated by the FEC sound their whistles when approaching public highway-rail grade crossings. This order preempted state and local laws that permitted the nighttime ban on the use of locomotive horns.

Twenty communities in Florida petitioned for a review of the emergency order. During this review, FRA studied other potential causes for the collision increase. FRA's closer look at the issue strengthened the conclusion that whistle bans were the likely cause of the increase.

For example, FRA subtracted collisions that whistles probably would not have prevented from the collision totals. Thirty-five collisions where the motor vehicle was stopped or stalled on the crossing were removed from the totals. Eighteen of these collisions occurred before and 17 were recorded during the bans. When these figures were excluded, the number of collisions in the pre-ban period changed from 39 to 21, and the number of collisions in the post-ban period decreased from 115 to 98. Collisions which whistles could have prevented, therefore, totaled 98 collisions as compared to 21 collisions in the pre-ban period; this represents a 367 percent increase, compared to the 195 percent increase initially calculated.

Similarly, if collisions where the motor vehicle hit the side of the train were also excluded (nine in the pre-ban period and 26 in the post-ban period) as being unlikely to have been prevented by train whistles, the pre-ban collision count became 12 versus 72 in the whistle ban period. The increase in collisions caused by the lack of whistles then became 500 percent.

FRA's data, however, showed that, before the ban, highway vehicles on average, struck the sides of trains at the 37th train car behind the locomotive. After the ban took effect, 26 vehicles struck trains, and on average, struck the twelfth train car behind the locomotive. This indicated that motor vehicles are more cautious at crossings if a locomotive horn is sounding nearby. Before the whistle bans, highway vehicles tended to hit the side of the train after the whistling locomotive had long passed through the crossing. After the ban took effect, highway traffic hit the train much closer to the now silent locomotive—at the 12th car. The number of motor vehicles hitting the sides of trains also increased nearly threefold after the ban was established.

FRA also considered collisions involving double tracked grade crossings where two trains might approach at the same time. Since a driver's view of the second train might be blocked, hearing the second train's whistle could be the only warning

available to an impatient driver. FRA's Florida study found the number of second train collisions for the pre-ban period was zero, while four were reported for the period the bans were in effect.

Several Florida communities asked whether train speed increased collisions. FRA research has well established, as discussed below, that train speed is not a factor in determining the likelihood of a traffic collision at highway-rail crossings equipped with active warning devices that include gates and flashing lights. Speed, however, is a factor in determining the severity of a collision.

FRA also considered population growth in Florida, but found it was not a factor. Day time collision rates were not increasing at the very same crossings that had whistle bans at night. If population was a factor, then the day time numbers should have increased dramatically as well. FRA also reviewed the number of fatal highway collisions, and registered drivers and motor vehicles and found no increases that either paralleled or explained the rise in night time crossing collisions.

In the first two years after July 1991, when FRA issued its emergency order prohibiting whistle bans in Florida, collision rates dropped dramatically to pre-ban levels. In the two years before the emergency order, there were 51 nighttime collisions. In the two years after, there were only 16. Daytime collisions dropped slightly from 34 collisions in the two years before the emergency order, to 31 in the following two years.

C. FRA's Nationwide Study of Train Whistle Bans

FRA's Florida study raised the concern that whistle bans could be increasing collisions in other locations. Given the wide difference between grade crossing conditions from one community to another, FRA did not assume that the Florida results would be true at every whistle ban crossing. FRA began a nationwide effort to locate grade crossings subject to whistle bans and study collision information for those crossings. The Association of American Railroads (AAR) joined the FRA in that effort.

The AAR surveyed the rail industry and found 2,122 public grade crossings subject to whistle bans for some period of time between January 1988 and June 30, 1994. This total did not include the 511 public crossings that were subject to whistle bans in Florida that FRA had already studied. The study also did not include crossings on small, short line railroads, which did not report to the AAR. The nationwide survey found whistle bans in 27 states that affected 17 railroads. FRA studied collisions occurring between January 1988, and June 30, 1994.

Two thousand and four of the crossings were subject to 24-hour whistle bans. Another 118 grade crossings were subject to nighttime-only bans. The states with the largest number of whistle ban crossings were Illinois, Wisconsin, Kentucky, New York, and Minnesota. More than half of the crossings were on three railroads: CSX, Consolidated Rail Corporation (Conrail), and Soo Line. A report covering the nationwide study was issued in April 1995. FRA found that whistle ban crossings averaged 84 percent more collisions than similar crossings with no bans. There were 948 collisions at whistle ban crossings during the period studied. Sixty-two people died in those collisions and 308 were injured. Collisions occurred on every railroad with crossings subject to whistle bans, and in 25 of the 27 states where bans were in effect.

Since the 1995 study, FRA has continued to analyze relevant data. Over the period of 1992–1996, there were 793 collisions at 2,366 crossings subject to whistle bans. These collisions resulted in the fatalities and injuries displayed in Table 1, as well as more than $2 million in motor vehicle damages.

TABLE 1.—COLLISION INJURIES AND FATALITIES BY TYPE OF PERSON INVOLVED

Type of person involved	Injuries	Fatalities
Motorist	258	56
Pedestrian	17	41
Railroad employee	56	0

The types of collisions which took place at whistle ban crossings are shown in Table 2. It is interesting to note that the mean train speed (train speed is positively correlated with fatalities) varies by type of collision. Please note that the number of fatalities shown for category "hit by second train" are included in the other categories (97 fatalities).

TABLE 2.—TYPE OF COLLISION

Type of collision	Injuries	Fatalities	Mean train speed
Motor vehicle struck train	51	8	15.5
Train struck motor vehicle	224	89	25.4
Hit by second train	11	5	28.5

The driver was killed in the collision in 42 instances (5.3% of collisions), the remaining 55 fatalities were either passengers or pedestrians. The driver passed standing vehicles to go over the crossing in 37 of the collisions (4.7%). The driver was more likely to be killed when moving over the crossing at the time of the collision (35 of the driver fatalities), rather than when the vehicle was stopped or stalled at the crossing, and in most of the collisions (69.9%) at whistle-ban crossings the driver was moving over the crossing. Additionally, in almost every collision (97%), a warning device (either active or passive) was located on the vehicle's side of the crossing. This supports the theory that the warning given by the train horn could deter the motorist from entering the crossing.

Collisions which took place when the motorist was moving over the crossing were more likely to be fatal (72% of the fatalities). This type of collision was also more likely to result in injury with 209 of the 258 motorist injuries occurring under these circumstances. These are the types of collisions the proposed rule is designed to prevent. Motorists that fail to notice or heed the warning devices in place at a crossing may he deterred by the sound of a train horn. The motorist is also given information by the horn about the proximity, speed, and direction of the train.

Collisions occurred on every railroad with crossings subject to whistle bans, and in 25 of the 27 states where bans were in effect.

FRA's study indicated that the installation of automatic traffic gates at crossings with whistle bans was more than twice the national average. Forty percent of the whistle ban crossings had gates compared to 17 percent nationally.

FRA found 831 crossings where whistle sounding had at one time been in effect, but where the practice had changed during the January 1988 through June 1994 study period. In 87 percent of the cases, bans were no longer in effect. A "before-and-after" analysis comparing collision rates showed an average of 38 percent fewer collisions when whistles were sounded indicating that whistles had a .38 effectiveness rate in reducing collisions. This finding paralleled the Florida experience.

FRA also rated whistle ban grade crossings according to an "Accident Prediction Formula." The formula predicts the statistical likelihood of having a collision at a given highway-rail grade crossing. The physical characteristics of each crossing were considered in the formula, including the number of tracks and highway lanes, types of warning devices, urban or rural location, and whether the roadway was paved. Also considered were operational aspects, such as, the number of highway vehicles, and the number, type, time of day, and maximum speed of trains using the crossing. The formula was developed using data from thousands of collisions spanning many years. FRA then ranked the 167,000 public crossings in the national inventory at that time in an identical manner. Both the whistle ban crossings and the national inventory crossings were then placed into one of ten groups ranging from low-risk to high-risk.

FRA compared the number of collisions occurring within each of the ten groups of crossings, over a five year period from 1989 through 1993, and found that for nine out of the ten risk groups, the whistle ban crossings had significantly higher collision rates than the crossings with no whistle bans. On average, the risk of a collision was found to be 84 percent greater at crossings where train horns were silenced. Another way to interpret this difference would be to say that locomotive horns had a .46 effectiveness rate in reducing the rate of collisions.

FRA was concerned about the higher risk disclosed by the nationwide study. From its vantage point, FRA was able to see the elevated risk associated with whistle bans, which might not be apparent to local communities. While crossing collisions are infrequent events at individual crossings, the nationwide study, and the experience in Florida, showed they were much less infrequent when train horns were not sounded.

FRA conducted an outreach program in order to promptly share this information with all communities where bans were in effect. In addition to issuing press releases and sending informational letters to various parties, FRA met with community officials and participated in town meetings. Along with the study's findings, information about the upcoming rule requiring the sounding of train horns was presented, including provisions for supplementary safety measures that could be implemented by communities to compensate for silenced train horns and allow bans to remain in effect.

From the outreach effort, FRA gained a clearer understanding of local concerns and issues. Many of those concerns were expressed in person and others were submitted in writing to FRA's whistle ban docket. Another result of the outreach effort was the identification of 664 additional crossings that were subject to whistle bans, but not included in the nationwide study. About 95 percent of these were located in the city and suburbs of Chicago, Illinois. Many carry a high volume of commuter rail traffic.

Recently, FRA updated its analysis of the safety at whistle ban crossings, expanding it to include data for all the Chicago area crossings as well as for a few other newly identified locations.

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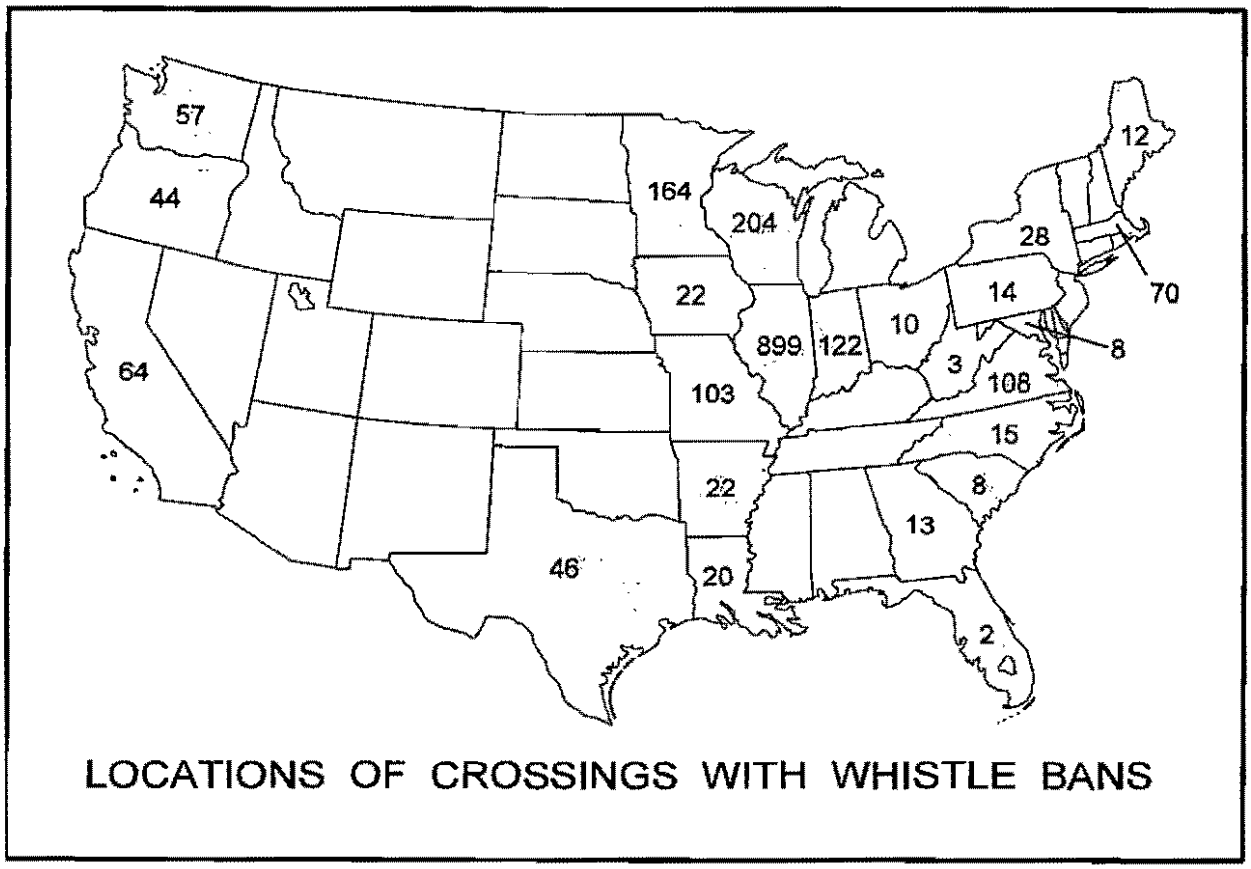

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FRA also refined its procedure by conducting separate analyses for three different categories of warning devices in place at the crossings (*e.g.*, automatic gates with flashing lights, flashing lights or other active devices without gates, and passive devices, such as "crossbucks" or other signs). In addition, FRA excluded from the analysis certain collisions where the sounding of the train horn would not have been a deterrent to the collisions. These included cases where there was no driver in the vehicle and collisions where the vehicle struck the side of the train beyond the fourth locomotive unit (or railcar). FRA also excluded events where pedestrians were struck. Pedestrians, compared to vehicle operators, have a greater opportunity to see and recognize an approaching train because they can look both ways from the edge of the crossing. They can also stop or reverse their direction more quickly than a motorist if they have second thoughts about crossing safely.

Data for the five-year time period from 1992 through 1996 was used for the updated analysis in place of the older data of the 1995 Nationwide Study. For the updated analysis, the collision rate for whistle ban crossings in each device category was compared to similar crossings in the national inventory using the ten range risk level method used in the original study.

The analysis showed that an average of 62 percent more collisions occurred at whistle ban crossings equipped with automatic gates and flashing lights than at similarly equipped crossings across the nation without bans. FRA will use this value as the increased risk associated with whistle bans instead of the 84 percent cited in the Nationwide Study of Train Whistle Bans released in April 1995. FRA believes that 62 percent is appropriate because it represents the elevated risk associated with crossings with automatic gates and flashing lights, which are the only category of crossings that will be eligible for "quiet zones" (except for certain crossings where train speeds do not exceed 15 miles per hour).

The updated analysis also indicated that whistle ban crossings without gates, but equipped with flashing light signals and/or other types of active warning devices, on average, experienced 119 percent more collisions than similarly equipped crossings without whistle bans. This finding made it clear that the train horn was highly effective in deterring collisions at non-gated crossings equipped only with flashing lights. The only exception to this finding was in the Chicago area where collisions were 16 percent less frequent. This is a puzzling anomaly. One possible explanation for this result is that more than 200 crossings (approximately one third of the crossings in Chicago) still included in the DOT/AAR National Inventory have in all likelihood been closed. They would continue to be included in the Inventory until reported closed by state or railroad officials. (At this time submission of grade crossing inventory data to FRA is voluntary on the part of states and railroads.) FRA believes this could contribute to the low collision count for Chicago area crossings without gates. Collisions cannot occur at crossings that have been closed. The retention of closed crossings in the inventory would, therefore, have the effect of incorrectly reducing the calculated collision rate for the Chicago area crossings.

In comparing the collision differences at crossings with gates and those without gates, FRA found that about 55 percent of the collisions at crossings with gates occurred when motorists deliberately drove around lowered gates. These collisions occurred 128 percent more often at crossings with

whistle bans than at other crossings. Another 18 percent of the collisions occurred while motorists were stopped on the crossings, probably waiting for vehicles ahead to move forward. There were smaller percentages of collisions involving stalled and abandoned vehicles. Suicides are not included in the collision counts. At crossings equipped with flashing signal lights and/or other active warning devices, but not gates, collisions occurred 119 percent more often at crossings subject to bans. A distinction should be made between the two circumstances. In the case of lowered gates, it is the motorist's decision to circumvent a physical barrier to take a clearly unsafe and unlawful action that can result in a collision. However, in the case of crossings with flashing light signals and/or other active devices, collisions may be more the result of a motorist's error in judgement rather than a deliberate violation of the state's motor vehicle laws. The ambiguity of flashing lights at crossings, which in other traffic control situations indicate that the motorist may proceed after stopping, when safe to do so, coupled with the difficulty of correctly judging the rate of approach of a large object such as a locomotive, may contribute to this phenomenon. FRA's collision data show that the added warning provided by the train horn is most critical at crossings without gates but which are equipped with other types of active warning devices.

By separating crossings according to the different categories of warning devices installed, FRA has been better able to identify the level at which locomotive horns increase safety at gated crossings and thus the level at which substitutes for the horn must be effective in order to fully compensate for the lack of a horn at those crossings.

For crossings with passive signs as the only type of warning device, the updated study indicated an average of 27 percent more collisions for crossings subject to whistle bans. This is the smallest difference identified between crossings with and without whistle bans. These crossings account for about one fourth of the crossings with whistle bans. Typically, they are the crossings with the lowest aggregate risk of collision because the installation of active warning devices usually follows a sequence where the highest risk crossings are equipped first. Two determinants of crossing risk are the amount of train traffic and highway traffic at a crossing. Often, crossings with only passive warning devices are located on seldom used sidings and industrial tracks and/or on highways with relatively low traffic levels. FRA believes this may be the reason that the difference in the numbers of collisions at whistle ban and non-ban crossings is so much less than for the other crossing categories. For crossings with passive warnings where trains do not exceed 15 miles per hour and where railroad personnel use flags to warn motorists of the approach of a train, whistle bans would entail a small risk of a collision resulting in an injury. However, at crossings with passive warnings and with higher train speeds, motorists would have no warning of the approach of a train if the train horn were banned. At such crossings, in order to ensure their safety, motorists must search for and recognize an approaching train, and then visually judge whether it is moving, and if so, estimate its arrival time at the crossing, all based only on visual information which may be impaired by hills, structures, vegetation, track curvature, road curvature as well as by sun angle, weather conditions, or darkness. The driver's decision to stop must be made at a point sufficiently in advance of reaching the crossing to accommodate the vehicle's stopping distance. If other vehicles are following, a sudden decision to stop could result in a rear-end collision with the vehicle being pushed into the path of the train. While FRA's data indicates that the smallest increase in collision frequency is associated with whistle bans at passive crossings, logic suggests that the banning of train horns at passive crossings could entail a much more significant safety risk per unit of exposure (vehicle crossings per train movement). Without the audible train horn warning, motorists would have no indication of the imminent arrival of a train beyond what they could determine visually. For motorists unfamiliar with whistle bans who encounter passive crossings where horns are not sounded, there would be an even greater risk.

The conclusions drawn from the 1995 Nationwide Study and its recent update have helped determine the requirements of this rule. FRA appreciates the assistance and cooperation of the many organizations and individuals who contributed to this effort by reporting whistle ban locations, compiling data, researching ordinances, and sharing their concerns, ideas, and opinions.

D. Congressional Action

After reviewing FRA's Florida study, Congress addressed the issue. On November 2, 1994, Congress passed the Swift Rail Development Act, Public Law 103–440 ("Act") which added section 20153 to title 49 of the United States Code. The Act requires the use of locomotive horns at grade crossings, but gives FRA the authority to make reasonable exceptions. Section 20153 of title 49 of the United States Code states as follows:

"§ 20153. Audible warning at highway-rail grade crossings.

"(a) DEFINITIONS.—As used in this section—

"(1) The term "highway-rail grade crossing" includes any street or highway crossing over a line of railroad at grade;

"(2) The term "locomotive horn" refers to a train-borne audible warning device meeting standards specified by the Secretary of Transportation; and

"(3) The term "supplementary safety measure" refers to a safety system or procedure, provided by the appropriate traffic control authority or law enforcement authority responsible for safety at the highway-rail grade crossing, that is determined by the Secretary to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties. A traffic control arrangement that prevents careless movement over the crossing (*e.g.*, as where adequate median barriers prevent movement around crossing gates extending over the full width of the lanes in the particular direction of travel), and that conforms to standards prescribed by the Secretary under this subsection, shall be deemed to constitute a supplementary safety measure. The following do not, individually or in combination, constitute supplementary safety measures within the meaning of this subsection: standard traffic control devices or arrangements such as reflectorized crossbucks, stop signs, flashing lights, flashing lights with gates that do not completely block travel over the line of railroad, or traffic signals.

"(b) REQUIREMENT.—The Secretary of Transportation shall prescribe regulations requiring that a locomotive horn shall be sounded while each train is approaching and entering upon each public highway-rail grade crossing.

"(c) EXCEPTION.—(1) In issuing such regulations, the Secretary may except from the requirement to sound the locomotive horn any categories of rail operations or categories of highway-rail grade crossings (by train speed or other factors specified by regulation)—

"(A) That the Secretary determines not to present a significant risk with respect to loss of life or serious personal injury;

"(B) For which use of the locomotive horn as a warning measure is impractical; or

"(C) For which, in the judgment of the Secretary, supplementary safety measures fully compensate for the

absence of the warning provided by the locomotive horn.

"(2) In order to provide for safety and the quiet of communities affected by train operations, the Secretary may specify in sucb regulations that any supplementary safety measures must be applied to all highway-rail grade crossings within a specified distance along the railroad in order to be excepted from the requirement of this section.

"(d) APPLICATION FOR WAIVER OR EXEMPTION.—Notwithstanding any other provision of this subchapter, the Secretary may not entertain an application for waiver or exemption of the regulations issued under this section unless such application shall have been submitted jointly by the railroad carrier owning, or controlling operations over, the crossing and by the appropriate traffic control authority or law enforcement authority. The Secretary shall not grant any such application unless, in the judgment of the Secretary, the application demonstrates that the safety of highway users will not be diminished.

"(e) DEVELOPMENT OF SUPPLEMENTARY SAFETY MEASURES.—(1) In order to promote the quiet of communities affected by rail operations and the development of innovative safety measures at highway-rail grade crossings, the Secretary may, in connection with demonstration of proposed new supplementary safety measures, order railroad carriers operating over one or more crossings to cease temporarily the sounding of locomotive borns at such crossings. Any such measures shall have been subject to testing and evaluation and deemed necessary by the Secretary prior to actual use in lieu of the locomotive horn.

"(2) The Secretary may include in regulations issued under this subsection special procedures for approval of new supplementary safety measures meeting the requirements of subsection (c)(1) of this section following successful demonstration of those measures.

"(f) SPECIFIC RULES.—The Secretary may, by regulation, provide that the following crossings over railroad lines shall be subject, in whole or in part, to the regulations required under this section:

"(1) Private highway-rail grade crossings.

"(2) Pedestrian crossings.

"(3) Crossings utilized primarily by nonmotorized vehicles and other special vehicles.

"(g) ISSUANCE.—The Secretary shall issue regulations required by this section pertaining to categories of highway-rail grade crossings that in the judgment of the Secretary pose the greatest safety hazard to rail and highway users not later than 24 months following the date of enactment of this section. The Secretary shall issue regulations pertaining to any other categories of crossings not later than 48 months following the date of enactment of this section.

"(h) IMPACT OF REGULATIONS.—The Secretary shall include in regulations prescribed under this section a concise statement of the impact of such regulations with respect to the operation of section 20106 of this title (national uniformity of regulation).

"(i) REGULATIONS.—In issuing regulations under this section, the Secretary—

"(1) Shall take into account the interest of communities that—

(A) Have in effect restrictions on the sounding of a locomotive horn at highway-rail grade crossings; or

(B) Have not been subject to the routine (as defined by the Secretary) sounding of a locomotive horn at highway-rail grade crossings;

"(2) Shall work in partnership with affected communities to provide technical assistance and shall provide a reasonable amount of time for local communities to install supplementary safety measures, taking into account local safety initiatives (such as public awareness initiatives and highway-rail grade crossing traffic law enforcement programs) subject to such terms and conditions as the Secretary deems necessary, to protect public safety; and

"(3) May waive (in whole or in part) any requirement of this section (other than a requirement of this subsection or subsection (j)) that the Secretary determines is not likely to contribute significantly to public safety.

"(j) EFFECTIVE DATE OF REGULATIONS.—Any regulations under this section shall not take effect before the 365th day following the date of publication of the final rule." The last two subsections of section 20153 were added on October 9, 1996 when section 20153 was amended by Public Law 104–264.

E. Rulemaking

When conducting a rulemaking, FRA must follow the Administrative Procedure Act (5 U.S.C. 553 *et seq.*) (APA). The APA generally requires that FRA allow all interested parties to review and comment on any proposed rule. Thus, by this notice, FRA is providing the public an opportunity to study the proposed rule and comment on it. Based on comments and testimony provided in response to this notice, FRA will, after the close of the comment period, determine what action to take.

There are two ways for you to share with FRA your opinions, experience or information about locomotive horns. First, the FRA can receive letters and other written remarks or reports. FRA places all of these comments in one place, the rulemaking docket. Please include the docket number on all comments submitted in response to this notice. The docket number for this rulemaking is "Docket Number FRA–1999–6439." All written comments are placed in the docket, including scientific and technical reports on which FRA substantially relied when preparing the proposed rule. For example, the docket for this rulemaking includes, among many documents, copies of FRA's Florida and nationwide whistle ban studies. The public is free to inspect the rulemaking docket during regular business hours at the address listed above. Additionally, all documents in the docket are now available online at http://dms.dot.gov.

The second way to make a comment on this rulemaking is to attend one of the scheduled public hearings. The hearings will provide interested parties an opportunity for an oral presentation. FRA will have a court reporter record each public hearing and will place a copy of the transcript of each hearing into the docket. FRA will review all written comments and testimony provided in the public hearings.

F. Comments Received by FRA

Because of the great interest in this subject throughout various areas of the country, FRA has been involved in an extensive outreach program to inform those communities which presently have whistle bans of one type or another in effect. FRA staff has attended a large number of meetings with local officials and citizens. FRA has also held a number of public meetings to discuss the issues and to receive information from the public. FRA broke from tradition and established a public docket before formal initiation of rulemaking proceedings in order to enable citizens and local officials to comment on how FRA might implement the Act and to provide insight to FRA. Establishment of the docket also enabled members of the public to learn what other interested parties thought about this subject. The vast majority of commenters were in favor of quiet zones in their communities. A number were in favor of the use of four-quadrant gates at affected crossings, while one person favored the less expensive articulated gates rather than four-quadrant gates. Some commenters indicated how they

think the Act should be amended. Of course, new legislative enactments are beyond the scope of this rulemaking, and FRA must implement the law as it now reads.

Some commenters expressed the belief that state and localities were best suited to make the decisions regarding exemptions from the requirement that trains sound horns at crossings. A representative of the City of Portland, Maine wants the Act amended to empower the appropriate transportation agency for each state to grant local municipalities exemptions, since these officials "are better able to properly assess the merits of any local community request for such a waiver." Examples of such exemptions that would be appropriate, according to this official, would be cases where the crossings are adequately protected, train speeds are no more than 30 miles per hour and vehicle speed is 35 miles per hour or less. This commenter also stated that all crossings which are flagged by the train crews or where the train crew activates the crossing signal should be exempt from locomotive horns. Similarly, the Maine Department of Transportation believes that "the State's regulatory process should be retained under any rules proposed * * *." The state requests that an exception under the Act be granted to those states which, either by an adjudicatory process or by rulemaking, permit train whistling to be discontinued.

The Chairman of the Board of Selectmen of the town of Acton, Massachusetts expressed strong opposition to the return of locomotive horns, and urged that FRA issue regulations "so that each state could make its own determination as to the appropriate level of safety devices needed at each grade crossing." Similarly, a Wisconsin state representative requests that FRA "empower states with the available expertise, such as Wisconsin's Office of the Commissioner of Railroads, to make their own rules. The states, better than the federal government, know the local conditions and have contact with the citizens who are represented directly in the State Legislature." This same legislator closed his comment by stating that "I hope this letter reaches a human being who will read it and I hope it will go to a deliberative body who truly cares about the true needs of our citizens." FRA wishes to assure the writer, and the public generally, that indeed we do care about the needs of our citizens. In addition to the citizens who may be disturbed by locomotive horns, we are concerned about the safety of the driver of a car at a grade crossing, the driver's innocent passengers, members of train crews, as well as nearby residents who may be injured by collisions at crossings. The intent of this rule is to help provide for safe grade crossings without unduly burdening nearby residents.

A number of commenters felt that costs associated with alternative safety measures should be borne by parties other than the local or state government. A Massachusetts state senator stated that FRA should require the railroad to assume the costs associated with two crossings in his town. An organization of bed and breakfast owners in Vicksburg, Mississippi objected to what they described as "intense noise" from local trains. The group urged that FRA "adopt a liberal policy permitting alternative grade crossing safety devices that would eliminate the need for the train horns." The group added, "Of course, a financial assistance program to accomplish these alternatives is also essential." The Town of Ashland, Massachusetts argues that the railroad's cost of doing business should not be transferred to the town and taxpayers. "Responsibility for this [measures to minimize disruption caused by these crossings] must be put squarely on the operators of the railroad. * * *"

Two commenters have raised the issue as to whether rural and urban areas should be treated in the same manner. One commenter stated that "the Act no doubt should apply in full force to rural sections of America, but such provisions are quite out of line with the logical treatment of those areas of the land where the population is far heavier." Another commenter urged FRA to establish maximum decibel levels for locomotive horns which "should be considerably lower in urban areas than in sparsely populated rural areas."

Various commenters have proposed that specific provisions be contained in FRA's regulations. One commenter proposes that the regulation be waived for any crossing within 300 yards of a residence.

Many commenters expressed the view that many communities with present whistle bans have excellent safety records and therefore sounding of locomotive horns will only disrupt residents' lives with no real impact on safety. The city attorney for Bellevue, Iowa indicated that the railroad tracks run down the center of a main street in the city. He points out that slow train speed, locomotives equipped with ditch lights, stop signs at crossings, and the sounding of the locomotive bell all have contributed to only 5 collisions, one injury, and no fatalities in almost 7 years of train traffic averaging 8 trains a day. He claims that locomotive horns along the 15 crossings in town will have a minimal affect on safety, but will have a maximum effect on the quality of life of most of Bellevue's residents. Similarly, the mayor of Batavia, Illinois indicated that because the city has a good rail safety record, the "whistle blowing standards that have been set forth in this Act are not necessitated and would cause unnecessary discomfort to our constituency." These commenters, along with others, recommend that a community's safety record be a factor in determining whether locomotive horns need to be sounded.

FRA has received many comments from Chicago area municipal groups representing suburban areas in which, for the most part, locomotive horns are not routinely sounded. The Chicago Area Transportation Study conducted by the Council of Mayors states that it represents over 200 cities and villages with over 4 million residents outside of Chicago. The study authors recommended that FRA's regulations include provisions for: (1) Accident reduction programs tailored to the magnitude and type of accident experience at individual crossings; (2) recognition of the effectiveness of enhanced enforcement of existing rail safety laws and public education programs; (3) use of less costly physical barriers such as flexible median delineator tubes and articulated railroad crossing gates; (4) use of strobe lights and more visible paint schemes on locomotives and cab car fronts and reflective delineators on the sides of railroad cars; and (5) exemptions from locomotive horns if a community or subregion's accident experience is under a specified threshold. These proposals were echoed by the West Central Municipal Conference and the West Suburban Mass Transit District, both of suburban Chicago.

Another association of suburban Chicago local governments, the DuPage [County] Mayors and Managers Conference, emphasized the large number of rail lines, large number of daily train movements and high volume of pedestrian and motor vehicle movements over area grade crossings. The Conference pointed out that the citizens have grown to rely on locomotive horns in cases of impending danger, not for warning of the routine approach of a train. The Conference indicates a downward trend in grade crossing collisions over the past ten years, and attributes a significant portion of that decline to stepped-up law enforcement efforts by municipalities and more focused public

awareness programs. Rather than providing for engineering improvements to decrease collisions at crossings, the Conference recommends that a community or subregion be exempt from both locomotive horn soundings and the requirement to install supplementary safety measures if the area's collision experience is under a specified threshold. The Conference states support for aggressive enforcement and education programs as well as less costly physical barriers such as flexible median delineator tube. The Conference is also in favor of a state-level oversight mechanism, rather than federal oversight, "given the already close working relationship that must exist between state highway and rail-related agencies."

FRA particularly appreciates the efforts of Members of Congress who have invited FRA to their districts and have provided citizens and local officials with the opportunity to express their views on this rulemaking process. These exchanges, and others conducted directly through FRA's regional crossing managers, have been very valuable in identifying the need for flexibility in preparing the proposed rule.

In the Chicago region, Rep. Henry Hyde of Illinois chaired a public meeting attended by the FRA Administrator, with participation by other Members of Congress and a number of public witnesses. Rep. William Lipinski also convened a district meeting with the Administrator in attendance that permitted a full airing of community concerns. These Chicago-area forums called attention to the large number of commuter and freight trains that would be required to sound horns along rail lines where many of the engineering concepts embodied in E.O. 15 would be difficult or impossible to implement, without substantial revision. Representatives from DuPage County proposed the concept of aggregating and abating risk by corridor rather than by crossing, a concept embodied in this proposal. Concerns were raised by an association of local governments regarding the identification of crossings currently impacted by informal bans on train horns, and those concerns led to an extensive data collection effort to complete the identification of impacted communities and re-analyze the accident data in light of this new information. Although most witnesses opposed any rulemaking in this area, a DuPage County citizen group formed to promote highway-rail crossing safety supported the use of train horns.

Senior FRA staff members also joined Rep. Tim Roemer and officials from the State Department of Transportation in meetings with city officials and citizens from South Bend and Mishawaka, Indiana, to consider the implications of the forthcoming rulemaking on those communities, where whistle bans are in place over most crossings. Concern was expressed that residents along the railroad would have to "pay the price" for violation of warning systems by individual motorists. Serious crashes had occurred along the Conrail line that bisects these cities, and options were reviewed for making improvements that might offset the train horn. Cost was identified as a critical issue for the local governments.

The office of Senator Edward Kennedy convened a meeting involving FRA senior staff early in the agency's outreach effort that was attended by several elected officials, who expressed concern over the prospective rulemaking. Senior FRA staff members attended separate district meetings in Massachusetts convened by Rep. Martin Meehan and Rep. John Tierney. These congressional districts are significantly impacted by scheduled commuter service. Residents and officials called attention to the generally good safety record at local crossings and the incompatibility of train horns with the quiet of their communities. Concern was also expressed regarding the public health effects of loud train horns and the cost of supplementary safety measures.

Citizens and officials involved in several of these contacts expressed concern that the proposed rule would impose "unfunded mandates" on local communities. Without exception, the offices of Members of Congress and Senators contacting FRA in this proceeding have expressed that FRA seek flexible solutions and allow ample time for communities with existing whistle bans to adjust to any new requirements.

Additional issues raised in the course of these contacts, briefings for congressional staff, and other communications are set forth elsewhere in this preamble, including the section-by-section analysis.

In-Vehicle Warning Systems

FRA periodically receives suggestions from the public that electronic devices should be installed on motor vehicles to warn of approaching trains, thereby eliminating the need for locomotive horns. Over the long term, systems may be deployed that permit broadcast notifications to motorists warning of the passage of trains over highway-rail crossings. If these systems are sufficiently reliable and use is widespread, sounding of the train horn may be discontinued. This type of warning may be achieved through integration of Intelligent Transportation Systems (ITS) deployed for highway use, together with elements of Positive Train Control (PTC) systems that will govern train movements and provide accurate data concerning location, direction of movement and velocity (or that may function on the train to notify information systems through location-specific interfaces). Such systems will not be widely deployed for some time, but a clearly delineated "user service" (Number 30) has been established within the architecture of the Intelligent Transportation Systems program as a venue for research and planning. FRA's PTC Working Group (a part of the Railroad Safety Advisory Committee) has also identified this as a possible auxiliary function for PTC.

In the interim, FRA expects progress toward in-vehicle warning for priority vehicles such as school buses, emergency vehicles and the like. Concepts for "proximity warning" have been evaluated with Department of Transportation funding at the Transportation Technology Center, and field operational tests were conducted in 1998. The State of Illinois is demonstrating a priority vehicle system in the Chicago metropolitan area. A commercial vendor is offering a radar system for private motor vehicles that is designed to detect a train's approach, assuming the lead locomotive to be equipped with a radar unit. FRA will continue to work with the Federal Highway Administration and other transportation bodies to identify promising strategies for priority vehicle warning system.

Consideration has also been given to transmitting train proximity warnings through new generations of car radios equipped to receive such transmissions, sound audible warnings, and display text messages. This Emergency Radio Data System (ERDS) is used in several European countries and is proposed for demonstration in the U.S. as part of ITS development. This approach would use consumer electronics as the in-vehicle platform.

Successful in-vehicle systems will need to meet several criteria in order to be candidates for wide-scale application to all passenger motor vehicles: 1. Systems must be fail-safe; or they must be shown to be so highly reliable that their utility as a warning system exceeds the loss of safety associated with inappropriate reliance on the system when in the failure mode. 2. Systems must be affordable for the vehicle owner, as well as the railroad charged

with equipping locomotives. 3. False alarms must be infrequent, or the system will lack credibility and may be subject to being defeated (if false alarms produce annoyance).

Clearly, before train horns could be silenced, essentially all trains and motor vehicles would need to be equipped with the in-vehicle warning system. With respect to private motor vehicles, such a feature is most likely to be implemented as part of a multi-function ITS package. Although Intelligent Transportation Systems offer significant promise for enhancing rail safety and perhaps entirely replacing the function currently served by the train horn, this alternative is not available as a realistic option on a community-by-community basis at the present time.

G. Proposed Rule

FRA has reviewed information obtained through our "outreach" efforts, comments submitted to the public docket and other unsolicited comments sent to the agency by concerned citizens, communities, and legislators. FRA has considered that information and has attempted, within the statutory framework established by Congress, to accommodate many of the legitimate concerns expressed. We anticipate that many constructive comments will result from public analysis of this proposal and that the proposed rule may be changed as a result of the public input. In drafting this proposed rule, FRA has attempted to reconcile Congress' two, somewhat conflicting, directives. The first directive, which is unambiguous, is that "The Secretary of Transportation shall prescribe regulations requiring that a locomotive horn shall be sounded while each train is approaching and entering upon each public highway-rail grade crossing." This directive does not allow any discretion as to issuance of the regulation requiring the sounding of horns. The Secretary, and by delegation, the Federal Railroad Administrator, must require that horns are sounded at every public grade crossing. The second directive, however, is entirely discretionary. The Secretary "may" exempt from the requirement to sound the locomotive horn certain categories of rail operations or categories of crossings. While exceptions may be crafted, they are not required. This proposed rule, which does contain provisions for such exceptions, is essentially a rule which reduces the impact of the Congressional locomotive horn mandate. It provides communities with the ability to reduce the impact of locomotive horns within their jurisdictions.

The basis of this proposed rule is the determination by Congress that locomotive horns provide a measure of safety at highway-rail grade crossings beyond that provided by the conventional stationary grade crossing warning systems of crossing gates and flashing lights. Because of the added safety benefits afforded by locomotive horns, they must be sounded unless an effective substitute is provided. The proposed rule is crafted to detail when and how locomotive horns must be sounded. For the first time, FRA proposes limits to the sound level of locomotive horns to provide some relief to the surrounding population while still ensuring that the sound level is high enough to provide the required warning to the motorist.

The rule requires that horns be sounded at every public highway-rail crossing. FRA has provided an exception to this requirement for crossings within a designated "quiet zone." If all crossings within that zone are equipped with approved supplementary safety measures in addition to conventional gates and flashing lights, locomotive horns will not need to be sounded (subject to the rule requirements). The rule further provides that if a community wishes to establish a quiet zone, but it can not, for some reason, fully comply with the rule's requirements for supplementary safety measures at every crossing within the zone, it may apply to the FRA with its proposed program of safety measures. FRA will evaluate the community proposal to determine if the safety measures will compensate for the lack of a locomotive horn. Finally, the rule provides a very limited exception to the requirement that supplementary or alternative safety measures must be in place if locomotive horns are to be silenced.

As required in section "j" of the Act, any regulations issued pursuant to the Act shall not take effect for one year following the date of publication of the final rule. As a result, the regulation's requirements to sound the locomotive horn (absent establishment of a quiet zone) will not be effective until one year after publication of the final rule. The one year period, in addition to the period between publication of this proposed rule and the final rule, will enable communities to assess options and plan for those actions deemed best for that particular community. FRA anticipates that during the one year between final rule publication and its effective date, communities will wish to initiate the administrative process involved in establishing quiet zones so that, if desired, they can have quiet zones in place on the anniversary of the rule publication. Therefore, FRA anticipates that for administrative purposes only, the final rule will have an effective date 60 days after publication. The final rule, of course, would not impose any requirement for the sounding of locomotive horns before one year after final rule publication. FRA requests comments on this proposal.

Section-By-Section Analysis

Section 229.129 Audible Warning Device

As noted earlier, FRA has a rule at, 49 CFR 229.129, which requires that each lead locomotive be provided with an audible warning device. That provision currently requires that the warning device produce a minimum sound level of 96 dB(A) at 100 feet forward of the locomotive in its direction of travel. Over the past few years FRA has received many complaints regarding the loudness of various locomotive horns. While the regulation appropriately required a minimum sound level in order to assure the horn's effectiveness, it did not restrict the maximum sound level of a locomotive horn. This section would correct that situation and would establish a maximum sound level that an audible warning device may produce. (Proposed language for this section can be found at the end of this document following proposed regulatory language for new Part 222.) This section would also revise the directionality requirements of the regulation. It would establish a maximum sound level to the side of the locomotive in order to reduce the horn's effect on the surrounding community. FRA is faced with the task of balancing the need for an effective warning to the motorist while minimizing the horn's intrusion into the surrounding community.

There are a number of factors which influence the ability of a motorist to hear a train horn. These include: The sound spectrum level (intensity at each frequency) of the horn, distance from the horn, ambient noise spectrum level in the motor vehicle, the acoustic insertion loss of the vehicle (sound reflected and absorbed by the vehicle which does not enter the vehicle interior), and the characteristics of the grade crossing. The human ear is only sensitive to sounds between 20 and 20,000 hertz (Hz), and is most sensitive in the range between 500 and 5,000 Hz. Hearing sensitivity declines sharply for higher and lower frequencies. As distance from a sound source increases, the effective intensity of the sound

decreases by approximately 7.5 dB for every doubling of the distance. For instance, if the calibrated intensity of the train horn at 100 feet is 100 dB(A), then at 200 feet it is 92.5 dB(A). Ambient noise in the vehicle can reduce the motorist's ability to hear the train horn through masking. Masking would be strongest when the frequency of the noise is at the same frequency of the train horn. In general, this means that the spectrum level of the horn inside the vehicle must exceed that of ambient noise for the horn to be heard. Determining the required minimum level and the required maximum level for the train horn requires a balance between effectiveness as a safety warning and mitigation of undesirable community noise impacts. In the past, some mitigation of noise impacts has occurred through exercise of discretion by locomotive engineers who have sought to limit community impacts by "going easy" on the air horn control. A Federal mandate to use this warning device will inevitably change accepted practice. Although engineers have undoubtedly sought to exercise good judgment in this regard, whether this exercise of discretion has been uniformly benign is not known and not determinable using existing data.

Recent installation on some newer locomotives of electronic controls for operation of horns may have resulted in the maximum intended sound levels routinely under all circumstances. Again, whether this automation of the horn function has improved safety cannot be determined from available data. Although highway-rail crossing safety has continued to improve during this period despite increased exposure, many other variables (such as improved education and awareness programs, strengthened law enforcement, equipping of locomotives with alerting lights, installation of warning devices at high-risk crossings, and crossing closures) are likely responsible for most of this improvement.

Even the maximum sound level available from the horn has varied widely among segments of the locomotive and cab car fleets. FRA is aware that a major commuter authority sets the output of the horns on at least a portion of its commuter equipment at the minimum allowed (96 dB(A) at 100 feet, "plus or minus" 4 dB(A) for actual field testing). By contrast, many freight locomotives have horns that deliver as much as 114 dB(A) at 100 feet in front of the locomotive. Locomotive horns that proved highly effective in the warm climate through which the Florida East Coast Railway operates (where many motorists may have driven with open vehicle windows in mild nighttime hours) have apparently been set at about 104 dB(A), but it may not be reasonable to expect similar effectiveness at this level under other conditions. FRA is particularly concerned that railroads not be required to reduce horn levels across the board to accommodate local community sensitivities, if that will result in reduced horn effectiveness at the majority of crossings that are not located in tightly-developed noise-sensitive areas.

The Volpe National Transportation Systems Center (Volpe Center) has been studying train horn issues for FRA in support of this rulemaking. Based upon field data collection and analysis the Volpe Center has suggested that, for peak safety effectiveness, train horns should be set at approximately 111–114 dB(A). This range takes into consideration the need to provide adequate advance warning to as many motorists as practical.

This would include a high percentage of motorists stopped, or approaching at low speed, crossings with automated warning devices. Behavioral science suggests that these motorists may have an expectation that a train is nearing the crossing. Under these circumstances, the train horn can be very effective because the motorist is listening for an auditory cue. Even if the "insertion loss" associated with closed vehicle windows and sound insulation is in the range of 18 to 45 dB(A), and despite some degree of background noise associated with the vehicle's engine and other interfering noise, the train horn should add significant value in these cases. Preliminary analysis by the Volpe Center appears to indicate that under most circumstances of crossing configuration and train speed, a train horn set in the range of 104–105 dB(A) at 100 feet in front of the locomotive may provide a sufficient auditory cue to alert the motorist who pauses at a crossing with active warning systems that the arrival of the train is imminent.

The greater challenge is presented by passively signed crossings. Although FRA does not propose to allow banning of train horn use at passively signed crossings and crossings with only flashing lights, the train horn will nevertheless remain an important warning system at those crossings. Reducing the allowed sound level by setting a maximum in this proceeding could thus lead to a net reduction in safety. At passively signed crossings, overall risk to the public is generally less because of fewer conflicting movements of trains and vehicles. However, the risk to any given motorist seeking to use the crossing during the period a train is approaching is much higher. Motorists seeking to act wisely by yielding to the train are entitled to fair warning of the train's approach. Even with all lights (headlight and "ditch" lights) functioning, a train is sometimes difficult to pick out against the visual background. Further, due to such factors as buildings, mature stands of trees, track curvature, and the angle of motorists' approach, sight distances at many crossings do not permit a long preview of the train's approach. A sufficiently loud auditory warning will tell the motorist that a train is approaching and from what direction (within about 10 degrees for a person of good hearing in both ears under optimum circumstances). This will give the motorist more opportunity to sight the oncoming train at the first opportunity, evaluate its rate of approach, and make a safe decision.

The challenge at passively signed crossings is to provide warning sufficiently early to affect motorist behavior. This is more difficult, because the motorist approaching the crossing in most cases (except where an enforced STOP sign is present) will not stop and may not slow down except as required by unevenness of the road surface. The motorist's decision point is thus farther away from the crossing and (in the typical case) from the train horn. According to the Volpe Center, a vehicle traveling at 30 miles per hour may have interior noise level in the range of 21 to 63 dB(A) from its engine and typical road noise. A loud sound system playing music or other programming will add to this background noise. Depending upon the train horn harmonics, the Volpe Center estimates that a horn sound level in the range of 111–114 dB(A) may be sufficient to warn most motorists at passive crossings for all conventional train speeds, despite the fact that the horn sound as inserted into the vehicle must exceed the background noise by a larger margin than at crossings with automated warning devices in order to seize the motorists' attention. However, reducing the train horn level from that range is expected to result in a rather rapid fall-off of effectiveness at passively signed crossings. The result will be that the horn will be effective only at lower combined closing speeds for the vehicle and train approaching the crossing, leaving motorists without effective warning under a larger number of real-life scenarios.

Community impacts are also highly sensitive to train horn levels—but in the opposite direction. Volpe Center calculations suggest, for instance, that just reducing train horn levels from 114

dB(A) to 111 dB(A) would almost double the number of train movements permitted before a common 24-hour measure of acceptable community noise levels (Ldn=65 dB(A)) is exceeded at any given distance from the railroad right-of-way. This measure of acceptable community noise levels was developed to evaluate noise from frequent transportation movements (aircraft overflights, transit vehicle passes), in connection with public investments in new transportation facilities and equipment. FRA has grave reservations concerning whether such a standard could be appropriately applied to evaluate the acceptability of short-duration warning sounds necessary for safety in an existing transportation system. Train horn noise has been excepted from Environmental Protection Administration limits on railroad noise emissions because of these kinds of differences. Nevertheless, FRA recognizes the importance of imposing no greater noise impacts on local communities than may be necessary for safety. Accordingly, as discussed below FRA will be conducting an environmental assessment in parallel with this rulemaking and utilizing the results of that effort in preparing a final rule.

FRA does not propose to conclude this rulemaking without setting a maximum level for the train horn. Although FRA is skeptical, based on noise readings taken in locomotive cabs, that train horns have been set at levels exceeding approximately 114 dB(A)—a level that does not appear excessive given the safety needs involved—FRA does recognize that the mandate to use the horn implicates a responsibility to set a maximum level. For purposes of this proposed rule, therefore, FRA is proposing two specific options, with a third concept suggested for comment. Under both options the minimum level would remain at 96 dB(A). However, in order to avoid significant loss of warning effectiveness, field tests would not include the current "plus or minus" allowance for error. Tests in the field would be required to demonstrate a sound level of at least 96 dB(A) at 100 feet in front of the locomotive and to comply with a specified maximum level. To avoid non-representative results caused by environmental extremes, testing would be required to be conducted within a range of temperature of 36 and 95 degrees Fahrenheit with relative humidity between 20 and 90 percent. Both temperature and humidity affect the propagation of sound waves.

Options for maximum level. Under the first option, the maximum permissible train horn sound level would not exceed 104 dB(A), which is believed to be sufficient in most circumstances to provide adequate warning at crossings using automated warning devices (where the motorist makes a decision while at rest near the crossing, expecting the train to arrive). Under the second option, the train horn could be set at up to 111 dB(A), which is in the range where the horn is believed to be effective under many circumstances at passively signed crossings (where the motor vehicle is in motion at the decision point and the motorist have been provided no contemporaneous reason to expect to see a train). As soon as they are completed, FRA will place in the docket Volpe Center studies providing information pertinent to this analysis.

Variable level option. FRA notes that one possible approach to addressing this issue is a variable horn level. Under this approach, train horns would be required to be capable of sounding within a low range (*e.g.*, 96–104 dB(A)) approaching any crossing with active warning devices and within a higher range (*e.g.*, 104–111 dB(A)) at any crossing not equipped with automated warning systems. FRA notes concern that this could place an additional burden on the locomotive engineer and that sounding the horn in this pattern would not be feasible where crossings are closely spaced and are not uniformly treated with automated warning devices. Accordingly, at a minimum simplified procedures requiring the engineer to take the safe course would be required in these circumstances. Commenters are asked to evaluate this approach as a third option.

Directionality. Under current regulations, some locomotive horns have been placed near the center of the locomotive in order to reduce crew noise exposure. Although providing at least 96 dB(A) at 100 feet in front of the locomotive, these arrangements have sometimes led to higher sound levels at right angles to the locomotive than to the front or rear. This has resulted from obstructions such as diesel exhaust stacks and air conditioning units causing the horn noise to disperse. FRA believes that this approach is not necessary for crew safety and is inconsistent with the responsibility of the transportation company to limit community noise impacts. Accordingly, the proposed rule would require that the sound levels at 90 degrees and 100 feet from the center of the locomotive not exceed the value 100 feet in front of the locomotive. FRA also requests comment whether this community exposure should be measured at 90 degrees from the horn placement location, rather than the center of the locomotive.

Crew safety concerns. FRA does not expect locomotive crew exposure to be a limiting factor in this rulemaking. In a 1996 Report to Congress entitled Locomotive Crashworthiness and Cab Working Conditions, FRA described the results of a survey of cab noise levels and the literature dealing with occupational hearing loss. The report found noise exposure for most locomotive assignments to fall within acceptable levels and noted that cabs of new locomotives are exceptionally quiet because they provide an environment that is isolated from the locomotive structure and temperature controlled (permitting windows to remain closed). However, the report identified the need to improve FRA's noise exposure standard for locomotive cabs and to adopt a hearing conservation approach to this area of occupational safety and health. A working group of the Railroad Safety Advisory Committee is currently pursuing these improvements, and comments from within that working group have prompted the suggestion noted above for a variable sound level for the horn. Depending upon the circumstances under which the low sound level might be selected by the locomotive engineer, having this option available could reduce the overall noise dose to which crew members are subjected during any duty tour. In any event, FRA expects that continued improvements in locomotive design, use of personal hearing protection, and other initiatives now under study should permit further reduction in occupational noise exposure over the coming years.

Costs. FRA recognizes that varying the loudness of the locomotive horn by adapting to a new maximum level, providing for a variable level, or relocating a horn to avoid excessive levels to the "field" could result in costs to the railroads. FRA requests comment on the extent of the costs involved and the optimum means of achieving any necessary retrofit of locomotives, including the period that should be allowed to accomplish this work.

Section 222.3 Application

The requirements contained in this part apply to all railroads, both passenger and freight, which operate on the general railroad system of transportation, *i.e.*, the network of standard gage railroads over which the interchange of goods and passengers throughout the nation is possible. This part does not apply to exclusively freight railroads that operate only on track which is not part of the general

system of transportation. This part also does not apply to rapid transit operations within an urban area that are not connected to the general railroad system of transportation.

In other recent rulemakings, FRA has discussed the basis for its exercise of jurisdiction over "scenic" or "tourist" railroads. FRA has declined to exercise jurisdiction over insular scenic or tourist railroads *i.e.*, passenger railroads operating inside an installation so that the operations are limited to a separate enclave in such a way that there is no reasonable expectation that the safety of the public—except a business guest, licensee of the railroad or an affiliated entity, or a trespasser—would be affected the operation. FRA has determined that the presence of certain characteristics will prevent the railroad from being considered insular and thus will result in FRA's exercise of jurisdiction over that railroad. The presence of one of the following characteristics will trigger the assertion of FRA regulatory jurisdiction: (1) A public highway-rail crossing that is in use; (2) an at-grade rail crossing that is in use; (3) a bridge over a public road or waters used for commercial navigation; or (4) a common corridor with a railroad, *i.e.*, its operations are within 30 feet of those of any railroad. Inasmuch as this proposed rule is directed at locomotive horn use at public highway-rail grade crossings, the rule will thus apply to every tourist or scenic railroad crossing a public highway rail grade crossing, whether or not the railroad is part of the general railroad system of transportation. The language of this proposed section reflects that result.

FRA recognizes that additional public grade crossings may be found on plant railroads and freight railroads which are not part of the general railroad system of transportation. Operations on these railroads are typically low speed with small numbers of rail cars permitting relatively short stopping distances. Additionally, these operations typically also involve roadway crossings with relatively low speed vehicular traffic. These reasons, together with the historical basis for not asserting jurisdiction in these cases, leads FRA to propose not to exercise jurisdiction over public and private crossings at such plant and private railroads. FRA does, of course, retain the statutory right to assert jurisdiction in this area and will do so if circumstances so warrant. As in all aspects of this proposed rule, FRA invites comments on the jurisdictional determinations proposed in this notice.

Section (f) of the Act explicitly gives discretion to the Secretary on the question of whether to subject private highway-rail crossings, pedestrian crossings, and crossings utilized primarily by nonmotorized vehicles and other special vehicles to this regulation. At this time, FRA is proposing to exercise its jurisdiction in a limited manner regarding these crossings.

Although some private crossings experience heavy rail and motor vehicle use, we do not have sufficient information as to present practices, the number and type of such diverse crossings, and the impacts of locomotive horns at such crossings. Thus, FRA will not at this time require that the locomotive horn be sounded at private highway-rail crossings. Whether horns must be sounded at such crossings will remain subject to state law (if any) and agreements between the railroad and the holder of crossing rights. FRA will, however, permit the establishment of quiet zones on rail line segments which include private crossings. To do otherwise would undermine a major purpose of the Act.

While we believe that, absent compensating warning or protective devices, sounding of locomotive horns provides a safer highway-rail crossing, it may be sufficient that the locomotive bell, rather than horn, be rung prior to entering a pedestrian or other non-highway crossing. At such crossings, pedestrians, horse-drawn vehicles, bicycles, and equestrians enter the crossing at a significantly slower speed than motor vehicles, are not enclosed as in an automobile or truck, and do not face the same distractions as those confronting motorists. FRA therefore proposes to decline to exercise jurisdiction over the use of locomotive horns at such crossings.

Section 222.5 Preemptive Effect

This section provides notice that pursuant to 49 U.S.C. 20106, issuance of these regulations preempts any State law, rule, regulation, or order covering the same subject matter, except a provision necessary to eliminate or reduce an essentially local safety hazard, that is not incompatible with Federal law or regulation and does not unreasonably burden interstate commerce. Accordingly, all existing local ordinances and state statutes relating to whistle bans or to the sounding of locomotive horns at public highway-rail crossings will be preempted by this regulation unless such ordinances or laws fall within the exception contained within 49 U.S.C. § 20106. This rule, however, does not confer authority on localities to establish quiet zones if state law does not otherwise permit such actions.

Section 222.7 Definitions

This proposed rule uses various terms which are not widely understood or which, for purposes of this rulemaking, have very specific definitions. This section defines the following terms:

"Barrier curb" means a highway curb designed to discourage a motor vehicle from leaving the roadway. FRA proposes to define such curb as a curb more than six inches, measured from the surface of the roadway. As with mountable curbs and channelization devices, additional design requirements are left to the standard specifications used by the governmental entity constructing the engineering improvements.

"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 a maximum of seven feet apart.

"Effectiveness rate" means the effectiveness of a supplementary safety measure in reducing the probability of a collision at a 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 .37 reduces the probability of a collision by 37 percent).

"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. Specifications concerning audible warning devices on locomotives other than steam locomotives are contained in 49 CFR 229.129.

"Median" means an "island" or 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 measured from the roadway surface, 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, for purposes of this part, a line of railroad on which railroad operations are governed by a train control system which is capable of determining the position of the train in relation to a highway-rail grade crossing and capable of computing the time of arrival of the train at the crossing which results in the automatic operation of the locomotive horn or the 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. Puhlic highway-rail grade crossing, also referred to in this part as "highway-rail crossings", "public grade crossing", and "grade crossing", includes pedestrian walkways or other pathways when associated or part of a larger public highway, road or street crossing.

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

"Railroad" means any form of nonhighway ground transportation that runs on rails or electromagnetic guideways and any entity providing such transportation, including (i) 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 (ii) 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.

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

Section 22.9 Penalties.

This provision provides civil penalties for violations of requirements of this regulation. Any person or railroad who violates or causes a violation is subject to a civil penalty of up to $11,000. Penalties may be assessed against individuals only for willful violations. Penalties of up to $22,000 can be assessed for violations caused by gross negligence, or where a pattern of violations has created a risk or was the cause of death or injury to any person. Maximum penalties of $11,000 and $22,000 are required by the Federal Civil Penalties Inflation Adjustment Act of 1990 (Pub.L. 101–410) (28 U.S.C. 2461 note), as amended by the Debt Collection Improvement Act of 1996 (Pub.L. 104–134, 110 Stat. 1321–373) which requires each agency to regularly adjust certain civil monetary penalties in an effort to maintain their remedial impact and promote compliance with the law.

Section 222.11 Petitions for Waivers

This section explains the process for requesting a waiver from a provision of this regulation. FRA has historically entertained waiver petitions from parties affected by an FRA regulation. In many instances, a regulation, or specific section of a regulation, while appropriate for the general regulated community, may be inappropriate when applied to a specific entity. Circumstances may make application of the regulation to the entity counter-productive; an extension of time to comply with a regulatory provision may he needed; or technological advancements may result in a portion of a regulation being inappropriate in a certain situation. In such instances, FRA may grant a waiver from its regulations. The rules governing FRA's waiver process are found in 49 CFR part 211. In summary, after a petition for a waiver is received by FRA, a notice of the waiver request is published in the **Federal Register**, an opportunity for public comment is provided, and an opportunity for a hearing is afforded the petitioning or other interested party. FRA, after reviewing information from the petitioning party and others, will grant or deny the petition. In certain circumstances, conditions may be imposed on the grant of a waiver if FRA concludes that the conditions are necessary to assure safety or if they are in the public interest. Because this regulation's affected constituency is broader than most of FRA's rail safety regulations, the waiver process is proposed to be somewhat different. Paragraphs (a) and (b) address the aspects which are different than FRA's customary waiver process. However, as paragraph (c) makes clear, once an application is made pursuant to either paragraph (a) or (b), FRA's normal waiver process, as specified in 49 CFR part 211, applies.

Paragraph (a) of this section addresses jointly submitted waiver petitions as specified by 49 U.S.C. 20153(d). Such a petition must be submitted by both the railroad whose tracks cross the highway and by the appropriate traffic control authority or law enforcement authority which has jurisdiction over the roadway crossing the railroad tracks. Although § 20153(d) requires that a joint application be made before a waiver of a provision of this regulation is granted, FRA, in paragraph (b), addresses the situation that may occur if the two parties can not reach agreement to file a joint petition. Section 20153(l)(3) gives the Secretary (and the Federal Railroad Administrator) the authority to waive in whole or part any requirement of § 20153 (with certain limited exceptions) if it is determined not to contribute significantly to public safety. FRA thus proposes to accept individually filed waiver applications (under certain conditions) as well as jointly filed applications. In an effort to encourage the traffic control authority and the railroad to agree on the substance of the waiver request, FRA proposes to require that the filing party specify the steps it has taken in an attempt to reach agreement with the other party. Additionally, the filing party must also provide the other party with a copy of the petition filed with the FRA.

It is clear that FRA prefers that petitions for waiver reflect the agreement of both entities controlling the two transportation modes at the crossing. If agreement is not possible, however, FRA will entertain a petition for waiver, but only after the two parties have attempted to reach an agreement on the petition.

Paragraph (c) provides that each petition for a waiver must be filed in the manner required by 49 CFR part 211.

Paragraph (d) provides that the Administrator may grant the waiver if the Administrator finds that it is in the public interest and that safety of highway and railroad uses will not be diminished. The Administrator may grant the waiver subject to any necessary conditions required to maintain public safety.

Subpart B—Use of Locomotive Horns

Section 222.21 When To Use Locomotive Horns

Paragraph (a) of this section would require that, except as provided elsewhere in this part, a locomotive horn on the lead locomotive of a train, or the lead locomotive of a consist of locomotives, or on an individual locomotive must be sounded when the locomotive or lead car is approaching and passes through each public highway-rail crossing. The locomotive horn must be sounded with a series of two long, one short, and one long horn blasts to signify the locomotive's approach to a crossing. FRA is adopting the industry standard as the required indicator of the approach of a locomotive to a crossing. This paragraph also requires that the horn be blown at the location required in paragraph (b) and that the horn warning be repeated or prolonged until the locomotive or train occupies the crossing.

The remaining paragraphs of this section address the specific location at which the sounding of the locomotive horn should be initiated. Establishment of this point is important both to provide adequate warning to the motorist and also to not unnecessarily impose the loud locomotive horn noise upon the surrounding community.

In drafting paragraph (b), FRA has attempted to address the fact that various states have long established requirements governing the location at which the horn must be sounded. Although those requirements would be preempted by this rule, rather than require immediate wholesale changes of whistle boards and timetable instructions, FRA is not proposing to immediately change the practical effects of present state requirements, if any. However, if a railroad changes the maximum authorized track speed on a line of railroad approaching a grade crossing, the location where the locomotive engineer is required to sound the horn (as indicated by whistle board or other method) must then be adjusted to reflect the change. The adjustment at that time would be made irrespective of conflicting state law.

This paragraph further establishes (within the ¼ mile limitation contained in paragraph (e)) the location at which the locomotive horn should be sounded. If using whistle boards, the railroad must place them at a distance from the 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. Because a fixed location for sounding of a horn results in differing periods of warning depending on the speed of the train or locomotive, the location of a whistle board must therefore be dependent on the fastest train operating over that track. If a railroad decreases the maximum authorized speed of trains operating over a crossing, the whistle board must be moved closer to the crossing in order to provide 20 seconds of warning. Conversely, if the maximum authorized speed is increased, then the whistle board must be placed farther from the crossing to maintain the 20 second warning time.

Paragraph (b) further provides that if the railroad uses methods or systems other than whistle boards to indicate when the horn should be sounded (such as positive train control systems), that system should ensure that the horn is sounded not less than 20, nor more than 24 seconds before the locomotive enters the grade crossing.

Paragraph (c) addresses the situation in which a state does not have on the effective date of this rule, a specific requirement for placement of whistle boards or specific distance requirements for the sounding of a horn. In that case, a railroad must take the same actions as are required when it adjusts maximum authorized speed in paragraph (b) above; if using whistle boards, the railroad must (within the ¼ mile limitation contained in paragraph (e)) place them at a distance from the 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. If the railroad uses methods or systems other than whistle boards to indicate when the horn should be sounded (such as positive train control systems), that system should ensure that the horn is sounded not less than 20 seconds, nor more than 24 seconds before the locomotive enters the grade crossing. These provisions, together with the definition of "positive train control" are based on the long held assumption that sounding the locomotive horn for 20 seconds before entering the grade crossing provides the optimum length of warning. Recent research, however, tends to indicate that 15 seconds of advance warning may be sufficient, especially where active warning systems are in place at the crossing. FRA requests comments on the proper length of time and under what circumstances locomotive horns should be sounded.

Paragraph (d) provides that each railroad, irrespective of state law to the contrary, must promptly adjust the location of each whistle board to reflect changes in maximum authorized track speeds, except where all trains operating over that crossing are equipped to be responsive to a positive train control system. This paragraph mandates that if a railroad decreases the maximum authorized speed of trains operating over a crossing, the whistle board must be moved closer to the crossing. Conversely, if the maximum authorized speed is increased, then the whistle board must be placed farther from the crossing. Railroads must ensure that whistle boards are placed at a distance from each crossing equal to the distance traveled by a train in 20 seconds while operating at the maximum speed allowed for any train operating in that direction of movement.

Paragraph (e) establishes a maximum distance of ¼ mile before a crossing, over which a train horn may be sounded, regardless of train speed. Sound diminishes at a rate of approximately 7.5dB(A) for each doubling of distance. Thus, a locomotive horn registering 100dB(A) at 100 feet in front of the locomotive will have diminished to roughly 75 dB(A) at ¼ mile (1,320 feet) in front of the locomotive. That distance is likely near the outer margin of utility in terms of alerting the motorist to oncoming trains at that particular crossing.

Section 222.23 Emergency and Other Uses of Locomotive Horns

Paragraph (a) of this section is meant to make clear that even at grade crossings subject to quiet zone conditions, locomotive engineers may sound the locomotive horn in emergency situations. 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. Establishment of a quiet zone does not prevent an engineer from sounding the horn in such situations, nor does it impose a legal duty to do so. Additionally, paragraph (b) provides

that nothing in this part restricts the use of the horn to announce the approach of the train to roadway workers in accordance with a program adopted under 49 CFR part 214. This regulation is not meant to restrict the use of the locomotive horn when active crossing warning devices have malfunctioned and use of the horn is required by either 49 CFR 234.105 (activation failure), 234.106 (partial activation), or 234.107 (false activation).

Subpart C—Exceptions To Use of the Locomotive Horn

Section 222.31 Train Operations Which Do Not Require Sounding of Horns at Individual Crossings

This section addresses the situation in which locomotive horns need not be sounded even though the crossing is not part of a quiet zone. Locomotive horns need not be sounded at individual highway-rail grade crossings at which 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 by 49 CFR 234.5) provide warning to motorists. These limited types of rail operations do not present a significant risk of loss of life or serious personal injury and thus, under the Act, may be exempted from the requirement to sound the locomotive horn. Locomotive horns will still be required to be sounded if automatic warning systems have malfunctioned and the crossing is being flagged pursuant to 49 CFR 234.105, 234.106, or 234.107. Horns will still be required in these limited circumstances in order to offset the temporary loss of the active warning which motorists have presumably come to rely on.

This section is an exception to the requirement that silencing of locomotive horns must include all crossings within a designated quiet zone. This section permits a railroad, on its own initiative, to silence its horns at individual crossings under certain circumstances in which the safety risk is low. The primary purpose of this section is not the same as that of § 222.35 ("Establishment of quiet zones"). Rather than silencing horns for the benefit of the surrounding community, this section will be used primarily at crossings located in industrial areas where substantial switching occurs, and would avoid unnecessary noise impacts on those railroad personnel working on the ground in very close proximity to the locomotive horn. This section recognizes that under the noted conditions, public and railroad safety do not require the sounding of locomotive horns—a railroad is thus free to eliminate them. Since the primary beneficiary of this section is not nearby residences, the reasoning for the establishment of quiet zones rather than individual quiet crossings would not be applicable here. There is no additional burden placed on an engineer in this situation since the flagger will generally be a member of the train crew itself, and the engineer will not be placed in the position of having to determine when horns must be silenced or sounded as would be the case if horns could be silenced on an individual crossing basis. Additionally, prevention of noise spill-over from a crossing would not be a consideration in these situations.

FRA has considered whether railroad operations involving less frequent service and slow speeds, such as railroad operations typically associated with short lines and secondary lines, should also be categorically excluded from the requirement to sound locomotive horns based on the premise that they do not present a significant risk of loss of life or serious personal injury. Another factor which could be considered in addition to the above factors is the level of highway traffic over the crossing. While FRA is not proposing at this time to categorically exclude crossings based on these factors, FRA solicits comments, and specific suggestions as to the desirability of categorically excluding certain crossings based on a combination of the above factors or other characteristics of crossings that significantly affect risk. Inclusion of supporting data and analysis is encouraged.

Section 222.33 Establishment of Quiet Zones

Methods of Establishing a Quiet Zone

This section addresses the manner in which quiet zones are established. A quiet zone is defined as a segment of rail line within which is situated one or a number of consecutive highway-rail crossings at which locomotive horns are not routinely sounded. The concept of quiet zones is crucial to understanding the intent and thrust of this proposed rule. While it would be possible to approve a ban on locomotive whistles on a case-by-case, or a crossing-by-crossing basis, the desired result of less disruption to the surrounding community by locomotive horn noise would be minimal. Because a locomotive horn must be sounded well in advance of a grade crossing, the noise spill-over from a crossing not subject to a ban could still disrupt the community near a crossing where horns are banned. As a result, the concept of a quiet zone was developed, which would essentially fulfill the following purposes: ensure that a whistle ban would have the greatest impact in terms of noise reduction; ease the added burden on locomotive crews of the necessity of determining on a crossing-by-crossing basis whether or not to sound the horn; and enable grade crossing safety initiatives to be focused on specific areas within the quiet zone.

FRA proposes two different methods of establishing quiet zones, depending on local circumstances. In one method (provided for in § 222.33(a)), every public grade crossing within the proposed quiet zone would have a supplementary safety measure applied to the crossing. These measures, which are listed in Appendix A, have been determined by FRA to he an effective substitute for the locomotive horn in the prevention of highway-rail grade crossing casualties. In other words, these measures each have an effectiveness rate which is at least equivalent to that of a locomotive horn. Because each highway-rail grade crossing would be upgraded from the standard flashing lights and automatic gates to a crossing with a supplementary safety measure, FRA's role would be minimal. The governmental entity establishing the quiet zone would only need to designate the extent of the quiet zone, install the supplementary safety measures, and comply with various notice and information requirements of § 222.35(a).

Another method (provided for in § 222.33(b)) of establishing a quiet zone permits a governmental entity greater flexibility in using supplementary safety measures or other types of safety measures (alternative safety measures) to deal with problem crossings. While Appendix A lists those measures which FRA believes fully compensate for the lack of a locomotive horn, Appendix B includes all Appendix A measures and adds other safety measures whose success in compensating for the locomotive horn is dependent on the level of time and effort expended by the community. Such measures include public safety education and increased law enforcement programs. Using a combination of supplemental safety measures from Appendix A, alternative safety measures listed in Appendix B, and tailoring supplemental safety measures to unique circumstances at specific crossings, the governmental entity is provided with a greater level of flexibility than is available using only supplementary safety measures from Appendix A. Another major difference in this approach from the earlier method

is the manner in which risk is viewed. In this more flexible approach, risk will be viewed in terms of the quiet zone as a whole, rather than at each individual grade crossing. Thus, FRA would consider a quiet zone under this approach that does not have a supplemental safety measure at every crossing as long as implementation of the proposed supplementary and alternative safety measures on the quiet zone as a whole will cause a reduction in risk to compensate for the lack of a locomotive horn. If the aggregate reduction in predicted collision risk for the quiet zone as a whole is sufficient to compensate for the lack of a horn, a quiet zone may be established.

Because of the greater flexibility and the greater variation in possible risk reduction, FRA would take a much more active role in reviewing the approach of the governmental entity. Paragraph (b) of this section provides that a state or local government may apply to the FRA Associate Administrator for Safety for acceptance of a quiet zone, within which one or more safety measures identified in Appendix B (alone or together with supplementary measures identified in Appendix A), will be implemented. The application for acceptance must contain a commitment to implement the proposed safety measures within the proposed quiet zone. The applying entity must demonstrate through data and analysis that implementation of the proposed measures will effect a reduction in risk at public highway-rail crossings within the quiet zone sufficient to equal the reduction in risk that would have been achieved through the use the locomotive horn.

It is important to note that, as required in paragraph (d) of this section, all public highway-rail crossings in a quiet zone, except for those exceptions contained in § 222.31 and Appendix C, must be equipped with automatic gates and lights that conform to the standards contained in the Manual on Uniform Traffic Control Devices.

Under paragraph (b)(2), the FRA Associate Administrator for Safety may take one of three actions in response to a state or local government application: (1) The quiet zone may be accepted as proposed; (2) the Associate Administrator 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 (3) the proposed quiet zone may be rejected 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.

Paragraph (c) addresses the 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. In the very limited situations listed, neither supplementary safety measures, nor lights, gates and bell are required at the crossing. Appendix C contains a list of those criteria which must be met for a quiet zone to be established under this provision. The criteria include: Maximum authorized train speed as established by the railroad does not exceed 15 miles per hour; the train travels between traffic lanes of a public street or on an essentially parallel course within 30 feet of the street; 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 the locomotive bell is rung when approaching and traveling through the crossing.

FRA'S Approach and Request for Comments. FRA has specified in Appendix B the manner in which the community must show the reduction in risk resulting from its proposed alternative safety measures. In proposing the very specific procedures cited in Appendix B (and in its introduction), FRA has been guided by the need to establish a predictable environment within which affected communities can plan and take action. FRA believes that such objective measures will help communities in their decision-making process, as well as assist FRA in determining which proposals will in fact provide for the safety of the motoring and rail public. One alternative to FRA's proposal would allow communities to perform their own effectiveness analyses based on methodology of their own choosing with subsequent reporting of the methodology and data results to FRA. That alternative would result in FRA review of both the methodology and the data involved in each submission from each locality wishing to establish a quiet zone. That approach might provide greater flexibility to communities to design countermeasures meeting their needs and circumstances. However, FRA is concerned that this approach might overwhelm FRA's resources and delay approvals beyond reasonable limits. This could backlog review of proposed new quiet zone proposals emanating from communities impacted by industry restructuring (such as the proposed acquisition of Conrail by Norfolk Southern and CSX Transportation). Further, ascertaining appropriate decisional criteria for evaluating community submissions might present a major challenge. The proposed alternative measures laid out in this notice already comprehend the broad range of safety measures within the traditional crossing safety categories of "engineering, education, and enforcement." Commenters are asked to note specific examples of opportunities that might be presented by less definite enumeration of alternative measures.

FRA encourages comments on the proposed regulatory approach, as well as alternative suggestions as to the best way to assure that alternative safety measures will in fact compensate for the lack of a locomotive horn.

Who May Establish a Quiet Zone

Under this proposed rule, a local political jurisdiction, in addition to a state, can establish a quiet zone. FRA does not intend that the proposed rule confer authority on localities to establish quiet zones if state law does not otherwise permit such actions. Local political jurisdictions are creations of their respective states and their powers are thus limited by their individual state law or constitution.

Under the Act and the proposed regulations, establishment of quiet zones requires specific action by a state or local governmental body. Therefore, if the appropriate political entity determines that sounding of locomotive horns at grade crossings is the proper course of action for their community, no specific action needs to be taken to ensure that locomotive horns are sounded at every public highway-rail grade crossing. This is, of course, a legitimate public policy result. However, if quiet zones are desired, there are a number of approaches that could be considered in terms of application and implementation.

First, one approach could be that all designations and applications under this section must come from a state agency. Under this approach, FRA would deal with only one entity from each state. How the state determines which quiet zones are designated and which should be the subject of an application for acceptance would be up to each individual state. The processes may be as varied as: the state agency acting only as a conduit for designations and applications; the agency acting as a filter to weed out "inappropriate" applications; or, the state agency acting solely on its own to determine the extent of designations and applications.

A second approach would limit authority for designations and

applications to the political subdivision with direct responsibility over traffic safety at a crossing. This approach would present problems inasmuch as a line of railroad typically crosses state highways, and city, county, and village roads.

A third approach would require the political subdivision in which the proposed quiet zone is located to be the applicant.

FRA at this time contemplates that both states and local jurisdictions (if they have the legal authority to do so) will establish quiet zones under both paragraphs (a) and (b) of this section. FRA encourages comments on this regulatory approach.

Length of Quiet Zone

Paragraph (d) addresses the minimum length of a quiet zone. FRA believes that if locomotive horns are to be prohibited along a segment of track, the underlying purpose of the prohibition will not be served unless the prohibition is effective on a corridor-like basis. Without a quiet zone requirement, the sounding of horns may be prohibited at one crossing, required at the next crossing two blocks away, and then prohibited at the next crossing one-quarter mile along the line. Because horns must be sounded in advance of a public highway-rail crossing, the horn being sounded at the one crossing in the example will effectively negate a large measure of the benefit of the prohibition elsewhere along the corridor.

In addition to ensuring the benefits of the prohibition within the zone, imposition of a horn prohibition on a zone basis will eliminate excessive, and unnecessary workload demands on the engineer, permitting greater attention to other locomotive operating requirements. Without a zone prohibition, the engineer will be faced with the need to constantly be aware of which crossings are subject to a prohibition and which are not. Such a situation provides a greater chance of human error than if the engineer need only concentrate on groups of crossings. Paragraph (d) establishes the minimum length of a quiet zone as 2,640 feet (one-half mile). The community which establishes a quiet zone has the discretion to determine the length (subject to the one-half mile minimum); however, certain factors should be taken into consideration in establishing such a quiet zone. While locomotive horns can not be routinely sounded at all crossings within the quiet zone, it is entirely possible that sound from a locomotive horn for a crossing just outside the quiet zone will begin in the quiet zone or will intrude into the area of the quiet zone. It is up to the community to devise the placement of a quiet zone to minimize that effect.

The following is an example of two different acceptable quiet zones in terms of placement: *Example No. 1:* A single grade crossing at milepost 4.5 is subject to a quiet zone. In this situation, the quiet zone would extend at least one-quarter-mile in each direction along the right-of-way. If there are public highway-rail grade crossings at milepost 4.2 or 4.8, (both of which are outside of the quiet zone), locomotive horns would need to be sounded for those crossings, despite beginning within the quiet zone or despite intruding into the quiet zone. In this example, a community could extend the quiet zone to include either, or both additional crossings. Those crossings must then either comply with the requirements contained in Appendix A, or the quiet zone as a whole must compensate for the lack of a horn through a combination of measures from Appendix A and Appendix B.

Example No. 2: Four public highway-rail grade crossings at every block for a distance of .4 mile. (Crossings at mileposts 4.5, 4.6, 4.7, 4.8 are subject to a quiet zone.) Additional crossings at mileposts 4.3 and 4.4 do not have to be included in a quiet zone if the quiet zone is extended in the other direction along the track—to milepost 5.0. That would be acceptable even if there were no crossings from milepost 4.8 to 5.0. The crossings within the quiet zone in this example, like the crossings in Example No. 1, must then either comply with the requirements contained in Appendix A, or the quiet zone as a whole must compensate for the lack of a horn through a combination of measures from Appendix A and Appendix B. It is clear that under this approach, locomotive horn noise for crossings at mileposts 4.3 and 4.4 will intrude or begin within the quiet zone. However, the approach set out here provides a community with the greatest flexibility in determining how to, and where to establish quiet zones.

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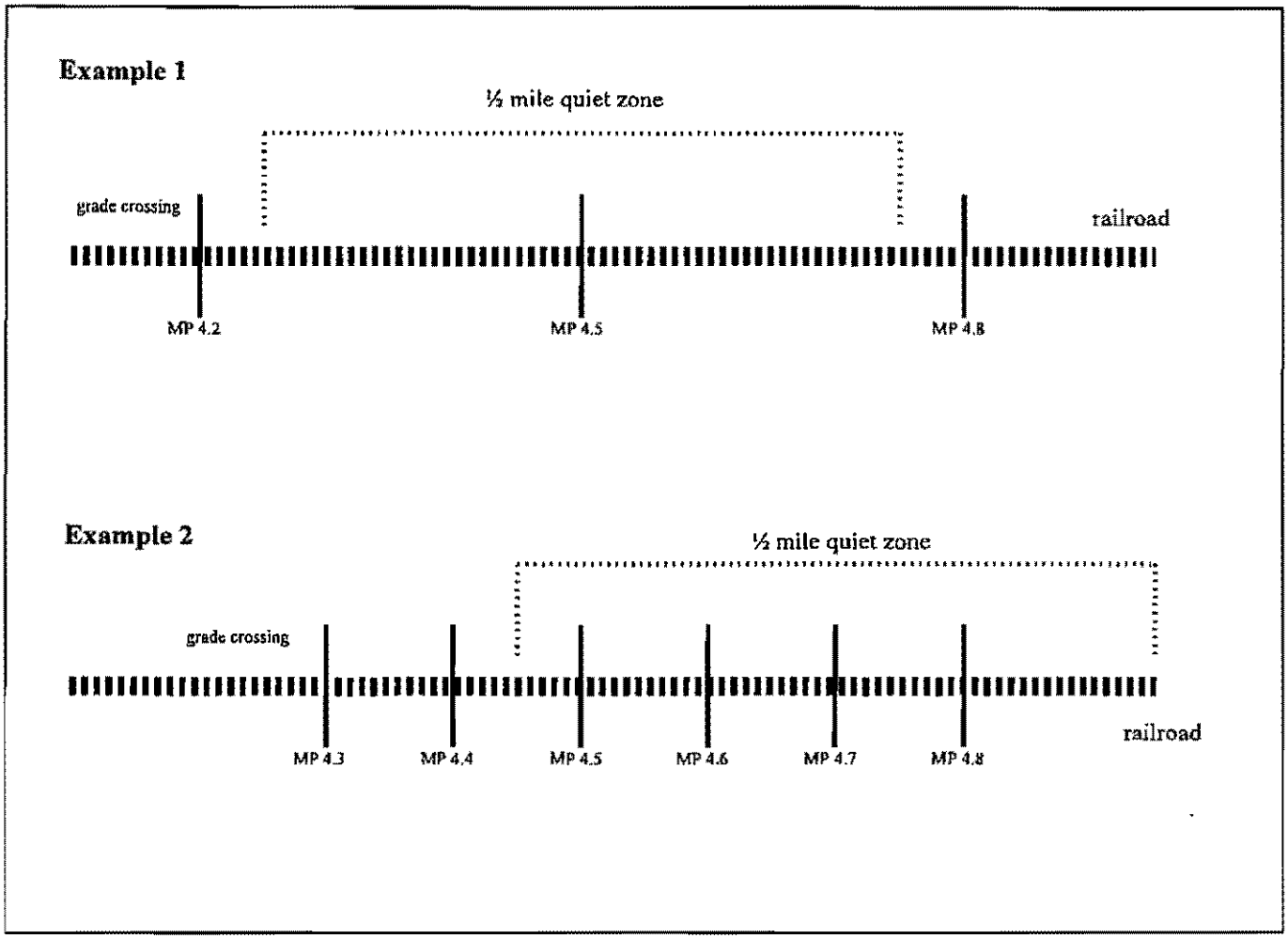

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Requirement for Active Warning Devices

Paragraph (e) provides that, except for slow speed train movements over public highway-rail grade crossings as addressed in § 222.31, and quiet zones established in accordance with paragraph (c) of this section, each crossing in a quiet zone must be equipped with automatic gates and flashing lights that conform to the standards contained in the Manual on Uniform Traffic Control Devices. This section makes it clear that installation or upgrading of these devices is not regarded as implementation of supplementary safety measures under this part, nor will the risk reduction resulting from the installation or upgrading be credited toward the compensating reduction in risk referenced in paragraph (b). If the new warning system exceeds the standards of the MUTCD and conforms to the requirements for supplementary safety measures contained in Appendix A, that risk reduction attributable to the supplementary safety measure in accordance with Appendix A may be credited toward the risk reduction referenced in paragraph (b).

Requirement for Advance Warning Signs

Paragraph (f) ensures that motorists are notified wherever horns are not required to be sounded. The paragraph requires that each highway approach to each public highway-rail 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. FRA will leave to individual states the decision as to specific size and design of the required signs, however, they must be in conformance with the MUTCD. FRA is not at this time proposing that approaches to each private highway-rail crossing be equipped with such advance warning signs. FRA solicits comments as to whether such signs should be required, and if so, who should be responsible for installation and maintenance. A factor to consider is that by definition, the approaches to these crossings are on private, rather than public property.

Section 222.35 Notifications, Affirmations, and Required Information

Paragraph (a) requires a state or local government designating a quiet zone under § 222.33(a) to provide written notice of the designation to all railroads operating over public highway-rail grade crossings within the quiet zone, the highway or traffic control authority and 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. In order to ensure that all parties have notice and sufficient time to prepare for the change at the crossings, all notices required under this section must be provided by certified mail, return receipt requested.

Paragraph (b) contains the notice requirements which apply to the

situation in which a state or local government has proposed a quiet zone for acceptance by FRA under § 222.33(b). Upon acceptance of a quiet zone by FRA, the state or local government must provide written notice by certified mail, return receipt requested, of the 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.

Paragraph (c) ensures that certain needed information is provided to FRA. This section requires that certain information be provided to the FRA Associate Administrator for Safety.

Paragraph (1) requires an accurate and complete U.S. DOT–AAR National Highway-Rail Grade Crossing Inventory Form (Inventory Form) for each crossing dated within six months prior to the designation of FRA acceptance of the quiet zone. The information from this form will establish a base-line from which FRA can determine the measures taken by the state or locality to compensate for the lack of a locomotive horn.

Paragraph (2) requires submission of a current Inventory Form which reflects the supplementary and alternative safety measures which have been put in place upon establishment of the quiet zone.

Paragraph (3) requires the name and title of the state or local official responsible for monitoring compliance with this regulation and the manner in which the person can be contacted.

Section 222.37 Quiet Zone Implementation

Paragraph (a) provides that a quiet zone can not be implemented until all requirements of § 222.35 are complied with and at least 14 days have elapsed since the required parties have received the notifications required by that section. The notification provision and two-week delay will ensure that the various interested parties have time to inform employees and others regarding the changes at the crossings. Paragraph (b) provides that all railroads operating over public highway-rail grade crossings within a quiet zone established in accordance with this regulation shall cease routine use of the locomotive horn as of the date established by the state or local government, which of course can be later than the 14 day minimum period. This paragraph prohibits the routine use of the locomotive horn within the quiet zone. However, the rule is not meant to prohibit the occasional use of the horn for railroad operating purposes such as for crew and flagger communications when radios fail. The rule does not prohibit use of the horn in emergency situations or as a method of warning railroad workers of the approach of the train. (See § 222.23.)

Section 222.39 Quiet Zone Duration

Paragraph (a) governs the duration of quiet zones designated by state or local governments under § 222.33(a) i.e., zones in which supplementary safety measures are in place at each crossing. A quiet zone may remain in effect indefinitely if all the requirements of this rule are complied with, and if, within six months before the expiration of five years from the original designation made to FRA, the designating entity (the state or local government) affirms in writing, by certified mail, return receipt requested, to the same parties receiving the original notification of implementation of the quiet zones under § 222.35(a), that the supplementary safety measures implemented within the quiet zone continue to conform to the requirements of Appendix A of the regulation. The designating entity must thereafter affirm within six months before the fifth anniversary of the prior affirmation that the supplementary safety measures implemented within the quiet zone continue to conform to the requirements of Appendix A of the regulation.

This paragraph, as well as paragraph (b), also requires that along with 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 form (FRA F6180.71) (available through the FRA Office of Safety Analysis, 202–493–6299) for each public highway-rail grade crossing. This requirement will ensure that the National Inventory is kept current regarding all crossings within quiet zones.

Paragraph (b) governs the duration of quiet zones accepted by FRA under § 222.33(b), *i.e.*, zones that, as a whole, comply with Appendix B. This provision is similar to paragraph (a), with the exception that the period between affirmations is 3, rather than 5 years and that the state or local government must affirm that the supplementary and alternative safety measures in place continue to be effective and continue to fully compensate for the absence of the warning provided by the locomotive horn. FRA is proposing a shorter period between affirmations because of the greater possibility that changed circumstances will affect the effectiveness of the safety measures put in place in the quiet zone. Because every public highway-rail crossing subject to the five year affirmation period has in place a supplementary safety measure providing sufficient compensation for lack of a locomotive horn, as long as such measures remain in place, FRA can be assured that safety is being maintained along the entire quiet zone. However, because the safety measures instituted at crossings subject to the three year affirmation period are dependent on local circumstances and local effort, review on a more frequent basis is appropriate. FRA solicits comment on this proposal.

Paragraph (d) provides that the FRA Associate Administrator for Safety may, at any time, review the status of any quiet zone and determine whether the safety measures in place fully compensate for the absence of the warning provided by the locomotive horn under the conditions then present at the public highway-rail grade crossings within the quiet zone. This oversight will enable FRA to take action in the event that conditions at the crossings have changed sufficiently so that safety measures originally installed and implemented are insufficient to compensate for the lack of a horn. Under this provision, if the Associate Administrator makes a preliminary determination that the safety measures in place do not fully compensate for the absence of the locomotive horn, notice of the determination will be published in the **Federal Register** and an opportunity for comment and informal hearing will be provided. The Associate Administrator may thereafter require that additional safety measures be taken to ensure that there is full compensation for the absence of the locomotive horn. This paragraph also provides for termination of the quiet zone if conditions so warrant.

Section 222.41 Supplementary and Alternative Safety Measures

Paragraph (a) states that a list of approved supplementary safety measures are listed in Appendix A to this regulation. These measures, based on the best available data, have been determined by FRA to be an effective substitute for the locomotive horn in the prevention of highway-rail casualties.

Paragraph (b) states that 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.

Paragraph (c) states that Appendix C contains a list of those situations 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 very limited situations listed, supplementary safety measures are not required because the requisite level of safety has already been achieved.

Paragraph (d) provides that the Administrator will add new listings to Appendices A or B when the Administrator determines that such measures or standards are effective substitutes for the locomotive horn in the prevention of highway-rail grade crossing casualties. The Administrator will add new listings to Appendix C when it is determined that no negative safety consequences result from the establishment of a quiet zone under the listed conditions.

Paragraph (e) is based on language contained in the Act, and makes clear that the following traditional highway-rail grade crossing safety measures do not individually, or in combination, constitute supplementary safety measures: standard traffic control devices or 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.

Section 222.43 Development and Approval of New Supplementary Safety Measures

This section discusses the manner in which new supplementary safety measures may be demonstrated and approved for use. Paragraph (a) provides that interested parties may demonstrate proposed new supplementary safety measures to determine if they are an effective substitute for the locomotive horn in the prevention of highway-rail grade crossing casualties. Paragraph (b) provides that the Administrator may order railroad carriers operating over a crossing or crossings to temporarily cease the sounding of locomotive horns at such crossings to demonstrate proposed new supplementary safety measures. This paragraph reflects statutory language and requires that such proposed new supplementary safety measures have been subject to prior testing and evaluation before such an order is issued. The Administrator's order to the railroads to temporarily cease sounding of horns may contain any conditions or limitations deemed necessary in order to provide the highest level of safety. These provisions provide an opportunity for the testing and introduction of new grade crossing safety technology which would provide a sufficient level of safety to enable locomotive horns to be silenced. FRA has, in one case to date, ordered a railroad to cease sounding horns for the purposes of testing. In Spokane, Washington, the Burlington Northern Santa Fe Railway (BNSF), Spokane County, Washington State Public Utilities Commission and the FRA worked together to test the effectiveness of median barriers as a substitute for the locomotive horn. See 62 FR 54681, August 21, 1997. To accomplish this test, BNSF was ordered to cease sounding of the horn after installation of engineering improvements at the two subject crossings. This test is continuing.

Paragraph (c) provides that upon the successful completion of a demonstration of proposed supplementary safety measures, interested parties may apply for their approval. This section requires certain information to be included in every application for approval.

Paragraphs (d) and (e) provide that if the FRA Associate Administrator for Safety is satisfied that the proposed supplementary safety measure fully compensates for the absence of the locomotive horn, its use as a supplementary safety measure (with any conditions or limitations deemed necessary) will be approved and it will be added to Appendix A.

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

Section 222.45 Communities With Pre-existing Restrictions on Use of Locomotive Horns

Section (i)(1) of section 20153 requires that in issuing these regulations, FRA take into account the interests of communities that "have in effect restrictions on the sounding of a locomotive horn at highway-rail grade crossings, or have not been subject to the routine * * * sounding of a locomotive horn at highway-rail grade crossings. This section is meant to address that statutory requirement. FRA requests public comment regarding the provisions of this section. Paragraph (a) provides that communities which as of the date of issuance of this NPRM have enacted ordinances restricting the sounding of locomotive horns, or communities which as of the same date have not been subject to the sounding of locomotive horns at public highway-rail crossings due to formal or informal agreements with the railroad may continue those restrictions for a period of up to three years from the date the final rule is issued. This period will enable the community to plan for, and implement additional safety measures at the affected crossings without the sounding of horns in the intervening period. This three-year period is dependent on compliance with paragraph (b).

Paragraph (b) states that if a community with pre-existing restrictions on locomotive horns has not designated a quiet zone (under § 233.33(a)) or had a quiet zone accepted by FRA (under § 233.33(b)) within two years after the date of issuance of the final rule, the community must, within two-years of issuance of the final rule, initiate or increase highway-rail grade crossing safety public awareness initiatives and grade crossing traffic law enforcement programs in an effort to offset the lack of supplementary safety measures at the affected crossings. If, however, the community does not take actions to initiate or increase public awareness initiatives and traffic law enforcement programs, locomotive horns must be sounded in accordance with § 222.21. Thus, the effect of paragraphs (a) and (b) provides communities with pre-existing whistle bans a three-year grace period to comply with §§ 233.33(a) or (b). If those communities do not initiate or increase public awareness initiatives and traffic law enforcement programs by the end of the second year after issuance of the final rule, then the three year grace period is reduced to two years.

A number of communities wishing to implement quiet zones have worked with FRA in developing programs of supplementary safety measures. These programs reflect the early commitment of local officials to both improve railroad safety and to minimize the disruption caused by train horns. These communities were concerned that if they invested funds in engineering improvements prior to issuance of this rule, those improvements might not be among those approved in the final rule, and thus they would be forced to spend more tax dollars installing other safety improvements after the final rule was issued. Given the absence of a regulation in force, the communities were free to ban sounding of the locomotive horn without implementing any grade crossing safety improvements at all. Neither these communities, nor FRA, wanted a whistle ban without supplementary safety measures in place. Therefore, FRA partnered with these

communities to develop workable, sound safety plans. As a result of these efforts, communities were able to reduce noise intrusion while FRA reaped the benefits of "real world" experience in the implementation of supplementary safety measures.

The quiet zones established, or planned to be established, by the following communities have been evaluated by FRA as being in compliance with the requirements of proposed § 222.33(b): crossings in Burlington, Vermont suburbs on the Vermont Railway; crossings in Louisville, Kentucky on CSX Transportation Company; single crossing at McNabb Road on Southeast Florida Rail Corridor; single crossing in Richardson, Texas; five crossing in Yakima, Washington, on the BNSF Railway; single crossing in Spokane, Washington on BNSF Railway; eleven crossings in Covina, California on MetroLink; and a single crossing in Westfield, New Jersey on the Lehigh Valley Railroad.

Accordingly, FRA proposes to exempt those communities from the initial acceptance requirements of that paragraph. Provisions of § 222.39(b) (Quiet Zone Duration) which contains periodic reaffirmation and notification requirements would apply to those quiet zones. FRA solicits comments regarding this, or any other suggested regulatory approach to those communities which have pre-existing restrictions on the use of locomotive horns.

Appendices A and B

Appendix A lists those supplementary safety measures which FRA has determined effectively compensate for the lack of a locomotive horn. Because each supplementary safety measure in this appendix fully compensates for the lack of a locomotive horn, a quiet zone may be established without specific FRA approval.

Appendix B lists those alternative safety measures which may compensate for the lack of a locomotive horn depending on the extent of implementation of the safety measure. Because of the many possible variations, FRA acceptance of the proposed implementation plan is required.

Community Guide

The introduction to Appendix A discusses the issues and actions that state and local governments should be aware of in determining how to proceed in implementing quiet zones. The guide is meant to assist in the community's 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 guide also contains details regarding the methods to be used in performing analyses which must accompany applications for acceptance of a quiet zone under § 222.33(b). If a crossing within a proposed quiet zone can not be addressed with a supplementary safety measure from Appendix A, the applicant community (or state) will need to show that once a quiet zone is implemented under the alternative safety measures listed in Appendix B, the number of accidents that can be expected on that quiet zone corridor will not increase. As a basis for that series of calculations, which are described in detail in the Introduction, FRA proposes to require that communities use the DOT Highway-Rail Crossing Accident Prediction Formula. The Accident Prediction Formula provides a means of calculating the expected annual number of accidents and casualties at a crossing on the basis of the crossing's characteristics and the crossing's historical accident experience. FRA's Regional Managers for Highway-Rail Crossing Safety who are located throughout the United States will he available to assist the communities in performing that analysis. Thus, all calculations involving a specific corridor proposed for a quiet zone will be based on the accident history at those crossings together with the characteristics of the crossing.

Appendix A

This Appendix lists those supplementary safety measures which FRA has determined effectively compensate for the lack of a locomotive horn. Included in the discussion of each supplementary safety measure is an "effectiveness" figure for that measure. That figure indicates the effectiveness of the supplementary safety measure in reducing the probability of a collision at a highway-rail grade crossing.

The effectiveness (see definition of effectiveness rate in § 222.7) figures discussed for each supplementary safety measure are based on available empirical data and experience with similar approaches. The effectiveness figures used in Appendix A are subject to adjustment as research and demonstration projects are completed and data is gathered and refined. FRA proposes to use these estimates as benchmark values to determine the effectiveness of an individual supplementary safety measure and the combined effectiveness of all supplementary safety measures along a proposed quiet zone. FRA seeks comments, including any data or analysis, concerning the appropriateness of the individual estimates. FRA also encourages public comments on the appropriateness of this approach in general.

FRA's national study of train horn effectiveness indicated that collision probabilities increase an average of 62 percent when horns are silenced. As such, the 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. For example, if a select group of 1,000 crossings are expected to have 100 collisions per year with train horns being sounded, this same group of crossings would be expected to have 162 collisions per year once the train horn is banned if no other safety measures are implemented and other factors remain unchanged. Conversely, if these same crossings were experiencing 162 collisions per year while the horn was banned, it would be expected that this number would reduce to 100 once use of the horn is reinstituted. This would equate to an effectiveness of 62/162, or .38.

FRA is aware this figure is an average, but it has the benefit of reflecting the broadest range of exposure available to the agency. FRA is willing to consider well founded arguments that train horn effectiveness is heightened or reduced under specific circumstances. However, any such argument would need to be grounded in sound data and analysis. This could potentially create significant difficulty in administration of the final rule, since historic collision patterns over a small number of crossings are not, by themselves, meaningful predictors of future exposure. FRA requests comment as to whether it is practical to use any value other than a national average with respect to train horn effectiveness.

There is one case for which FRA has sufficient data to estimate train horn effectiveness on a particular corridor. That is the Florida East Coast Railroad and the territory subject to Emergency Order 15. In that case, FRA can point to exposure for over 500 crossings over a period of eight years with experience both before and after the whistle ban period indicating consistent results. For that territory, FRA proposes to apply an effectiveness rate of 68% (.68) for the train horn. It should be noted that the extraordinary impacts shown in Florida have been segregated from the "national" data, and the national average of effectiveness of .38 (38 percent reduction) for train horns does not include the Florida experience. FRA requests comment as to what extent the

Florida experience may be relevant to other areas.

Much of the data available today to evaluate the effectiveness of supplementary safety measures reflects the reduction in violation rates, not collision rates. (Collisions are rare, and determination of a collision rate reduction for any one supplementary safety measure requires long term data collection.) Only one study (in Los Angeles) has contrasted collision rates with violation rates, and out of necessity (until additional data is available), this finding is used in these analyses. In the Los Angeles demonstration it was noted that a carefully administered and well publicized program of photo enforcement reduced violation rates by 92 percent, while collisions were reduced by only 72 percent. This ratio, 72:92 or .78, is proposed to be used to adjust violation rate reductions in order to estimate resultant reductions in collision rates for law enforcement and education/awareness options described in Appendix B. Violations that result in collisions constitute a small subset of all violations. It is reasonable to infer that education and legal sanctions may lack effectiveness for several segments of the population, including those who do not become aware of the countermeasures (e.g., because they are not residents of the area, do not follow public affairs in the media, or are difficult to reach because they are not fluent in English or other principal languages in which information is disseminated) and those who are particularly inclined to violation of traffic laws. As such, for law enforcement and education/awareness options the rate of violations must be reduced at least 49 percent (measure must have an effectiveness value of at least .49) in order to realize the required 38 percent reduction in the risk of collision.

In contrast, engineering improvements such as those described in Appendix A appear to work in synergy with existing warning systems to condition and modify motorist behavior, reducing both the number of violations and the number of very close calls (violations within a few seconds of the train's arrival). Four-quadrant gates installed to date, for instance, appear to have been completely successful in preventing collisions. Although we would not expect this extraordinarily high level of success to be sustained over a broader range of exposure, excellent results would be expected. Accordingly, for engineering improvements contained in Appendix A this notice adopts estimates of success drawn from carefully monitored studies of individual crossings.

FRA is aware that the number and duration of observations in site-specific studies is small. However, FRA is working with a variety of parties to gather additional information that may be helpful in achieving further refinement of effectiveness rates and greater confidence that they predict future outcomes in circumstances not identical to those specifically studied. FRA has sought partnerships with communities to implement or preserve quiet zones through use of supplementary safety measures. Unfortunately, many communities have taken the view that they will wait to see how the rulemaking might proceed before acting. Accordingly, FRA will proceed with the information available and will continue to gather effectiveness data as this rulemaking proceeds.

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

This supplementary safety measure has the advantage of obvious safety and thus will more than compensate for the lack of a locomotive horn during the periods of crossing closure. The required conditions for closure are intended to ensure that vehicles are not able to enter the crossing. In order to avoid driver confusion and uncertainty, the crossing must be closed during the same hours every day and may only be closed during one period each 24 hours. FRA believes that such consistency will avoid unnecessary automobile to automobile collisions in addition to avoiding collisions with trains. Activation and deactivation of the system is the responsibility of the local traffic control authority or the entity responsible for maintenance of the street or highway crossing the railroad. Responsibility for activation and deactivation of the system may be contracted to another party, however the appropriate governmental entity shall remain fully responsible for compliance with the requirements of this section. In addition, the system must be tamper and vandal resistant to the same extent as other traffic control devices.

Effectiveness: Because an effective closure system prevents vehicle entrance onto the crossing, the probability of a collision with a train at the crossing is zero during the period the crossing is closed. Effectiveness would equal 1. However, traffic would need to be redistributed among adjacent crossings or grade separations for the purpose of estimating risk following imposition of a whistle ban, unless the particular "closure" was accomplished by a grade separation.

2. Four-Quadrant Gate System

A four-quadrant gate system involves the installation of gates at a public highway-rail grade crossing to fully block highway traffic from entering the crossing when the gates are lowered. This system includes at least one gate for each direction of traffic on each approach. A four quadrant gate system is meant to prevent a motorist from entering the oncoming lane of traffic to avoid a fully lowered gate in the motorist's lane of traffic. Because an additional gate would also be fully lowered in the other lane of the road, the motorist would be fully blocked from entering the crossing.

In defining "supplementary safety measures" Congress approved use of four quadrant gates as supplementary safety measures. The definition states in part: "A traffic control arrangement that prevents careless movement over the crossing (e.g., as where adequate median barriers prevent movement around crossing gates extending over the full width of the lanes in the particular direction of travel), and that conforms to the standards prescribed by the Secretary * * * shall be deemed to constitute a supplementary safety measure." The Association of American Railroads (AAR) has shared with FRA its views on four-quadrant gates. The AAR states, "Since the operation of 4-quadrant gates has not yet been fully tried and proven, a false perception has been conveyed to [municipalities and state transportation agencies]. Continual advocacy of 4-quadrant gates * * * has put undue burdens on the railroads and its supply industry. The railroads are committed to grade crossing safety but are not exactly sure how 4-quadrant gates shall operate or if they will provide any additional benefits. * * *" The AAR requested that FRA "abstain from advocating the application of 4-quadrant gates until the operational and liability issues have been resolved." The AAR also submitted for FRA consideration a study entitled "Design of Gate Delay and Gate Interval Time for Four-Quadrant Gate System at Railroad-Highway Grade Crossings" by Dr. Fred Coleman of the University of Illinois. Dr. Coleman studied safe operating time parameters of four quadrant gates.

FRA has participated with the AAR, the Federal Highway Administration, the Brotherhood of Railroad Signalmen and railroad suppliers in discussions regarding four-quadrant gate systems. Those discussions resulted in some broad areas of agreement which have been incorporated into this proposed rule. Among areas of agreement are: (1) The need to do a location-specific

engineering study of the exit gate delay time; (2) that failure of the system would place the exit gates in the up position; and (3) highway presence detectors would be installed and maintained at the election of, and by, the local highway authorities. If detectors are provided, exit gates would remain up during the period the crossing is determined to be occupied by highway traffic.

Four-quadrant gate systems have been in existence for many years, and FRA believes that they have been fully tried and proven. There have been installations in several states: Wyoming; Tennessee; New Jersey; North Carolina; and Ohio, as well as in Canada, which involve various railroads, including the Burlington Northern Santa Fe, Norfolk Southern, New Jersey Transit Rail Operations, and Calgary Transit. Further, FRA understands that the Metropolitan Transportation Authority of Los Angeles is implementing four-quadrant gates on one of its transit lines. FRA welcomes a discussion of the efficacy of four-quadrant gates, timing and other safety considerations and any proposed alternatives to these gates.

FRA proposes that the following be required for all four-quadrant gate systems: When a train is approaching the crossing, all highway approach and exit lanes on both sides of the grade crossing must be spanned by gates to deny 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. When the gates are fully lowered the gap between the ends of the gates must be less than two feet if no median between lanes is present. If there is a median or if channelization devices are installed, the gap between the gate end and the median or channelization device must be within one foot. If "break-away" channelization devices are used they must be frequently monitored and broken elements replaced. FRA also proposes to require that constant warning time devices activate the gates. This requirement will ensure that the gates are activated at the same amount of time prior to the arrival of a train irrespective of its speed. This will avoid long unnecessary waits at crossings being approached by very slow moving trains. FRA would also require that signs be posted alerting motorists that the train horn does not sound.

FRA also strongly recommends that the following conditions be applied when new four-quadrant gates are installed: Gate timing should be established by qualified traffic engineers. Because each crossing presents unique topographic and traffic conditions, such timing should be established based on site specific determinations. Consideration should be given to the need for a delay in the descent of the exit gates following the descent of the entrance gates (equivalent to conventional gates) to prevent a motorist from being "locked in" between the gates. Factors that should be considered include available storage space between the gates that is outside the fouling limits of the tracks (beyond the width of trains) and the possibility that traffic flows may be interrupted as a result of nearby intersections. Fail-safe mode of the gate system should include exit gates failing in the raised, or up position. Further, a determination should be made as to whether to provide vehicle presence detectors (VPDs) to open or keep open the exit gates until all vehicles are clear of the crossing. Among the factors to consider are the presence of the 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.

FRA further recommends that highway approaches on one or both sides of the highway-rail crossing be provided with medians or channelization devices between the opposing lanes.

Effectiveness: FRA is confident that four-quadrant gates will provide a safe alternative to the locomotive horn. No highway-rail crossing collisions have been documented at any of the five four-quadrant gate installations in the United States nor at a demonstration site in Knoxville, Tennessee during 1985–1986. The oldest of the permanent installations dates from 1952. Recognizing the limited number of installations, however, FRA proposes very conservative estimates for effectiveness of this countermeasure. FRA estimates effectiveness as follows:

Four-quadrant gates only, no presence detection: .82.

Four-quadrant gates only, with presence detection: .77.

Four-quadrant gates with medians of at least 60 feet (with or without presence detection): .92.

The estimate of .82 for free-standing four-quadrant gates (no medians and no presence detection) is a highly conservative figure involving a discount from documented experience. As noted above, four-quadrant gates installed in the United States thus far have been highly successful; and, in fact, these installations have been of this basic configuration. More formal investigation attempted thus far includes a recent four-quadrant gate installation in North Carolina, without medians, which reduced violations 86 percent compared to previous experience at the same crossing, which was previously equipped with standard gates. This North Carolina test ran for a period of 5 months, including base and test periods. However, it should be noted that the North Carolina observations involved simultaneous use of the train horn (both during the base period and the evaluation period). It is not known whether there is a significant synergistic effect between the train horn and the engineering improvements, but the short duration of the study and possibility of such effects suggest the need for the modest discount to the effectiveness rate.

Four-quadrant gate installations undertaken thus far in the United States have generally not employed vehicle presence detection (VPD). However, some future installations will incorporate this feature to ensure coordination with other traffic signals and for other purposes. For instance, tight geometry may not allow for any storage space within the gates should queuing of traffic at a STOP sign on one side of the crossing prevent prompt clearance by a motor vehicle. In such cases, leaving the exit gates in the raised position may be elected. Installing VPD will cause exit gates to remain up indefinitely as one or more vehicles pass over the crossing. Although providing VPD avoids the scenario of "entrapment" (long feared by some in the railroad community as a liability risk), it also allows the possibility that some motorists will follow violators through the crossing in a steady stream, defeating the intended warning. Accordingly, where medians are not provided to prevent this pattern, we assume a lower effectiveness rate. FRA estimates that four-quadrant gates with presence detection, but without median barriers, would have an effectiveness rate of approximately .77.

By contrast, where four-quadrant gates are supplemented by lengthy median barriers to discourage the violation minded driver, the use of presence detection should make little or no difference in the safety effectiveness of the arrangement. The North Carolina demonstration showed that, when the four-quadrant gate installation was supplemented by medians (channelization devices) of at least 50 feet on each highway approach, the crossing experienced a 97 percent drop in violations. Again applying a discount

to this illustration, FRA estimates an effectiveness rate of .92 for four-quadrant gates with median barriers of reasonable length.

It is important to re-emphasize that use of data regarding violations to estimate collision risk itself involves some hazard that effectiveness will be over- or under-estimated. FRA believes that the likelihood is that these estimates for four-quadrant gates are conservative, not only because of the excellent effectiveness of in-service four-quadrant installations, but also because of the North Carolina findings. In the North Carolina observations, as the number of violations decreased, the average number of seconds prior to arrival of the train also significantly increased (predicting that collisions might fall off at a faster rate than violations). The effectiveness of four-quadrant gates may thus be higher than the range stated above, both with and without medians and with presence detection.

It is also true that a variety of applications for these systems may result in a variety of effectiveness rates. FRA solicits comments, including any available data and analysis, regarding the effectiveness estimates on four-quadrant gates, as well as other supplementary safety measures described in this notice.

3. Gates With Medians or Channelization Devices

Keeping highway traffic on both highway approaches to a public highway-rail grade crossing in the proper lane denies the highway user the option of circumventing gates in the approach lanes by switching into the opposing (oncoming) traffic lane in order to drive around a lowered gate to cross the tracks.

FRA therefore proposes to require that gates with medians or channelization devices be considered supplementary safety measures if the following conditions are met. 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. Such medians must extend at least 100 feet from the gate, unless there is an intersection within that distance. If so, the median or channelization device must extent at least 60 feet from the gate. Intersections within 60 feet of the gate must be closed or moved. The crossing warning system must be equipped with constant warning time system. Additionally, the horizontal gap between the lowered gate and the median or channelization device must be one foot or less. As in other installations, "break-away" channelization devices must be monitored frequently, and broken elements replaced. Also, as at all crossings within a quiet zone, signs must be posted alerting motorists to the fact that the train horns are not sounded.

FRA estimates that mountable curbs with channelization devices have an effectiveness of .75 and barrier curbs with or without channelization devices have an effectiveness of .80. FRA has found that a gate installation in North Carolina with channelization devices 60 feet long and longer reduced violations by 77 percent. The period of data collection was 22 months. FRA requests that commenters address whether the estimate of .75 should be further reduced to reflect the novelty effect of the improvements at this crossing?

A gate installation in the State of Washington equipped with barrier curbs (with channelization devices), 99 feet long on one approach and 30 feet long on the other, experienced reductions in violations of 97.5 and 95.6 percent respectively during a 4-month test period while train horns continued to sound. Given the short period of observation, the novelty effect of the installation would be expected to result in somewhat superior performance to that which would be expected over the long term, particularly on the approach with the 30-foot median. Further, the particular application involved allowed for a clearly channelized two-lane, tangent roadway on level ground with median separation between two main tracks. In this setting, expectations concerning motorist behavior were exceptionally clear. As noted, the train horn continued to blow, reinforcing the engineering improvements. Accordingly, these data are not taken as indicative of the average or typical installation in a whistle ban environment.

It may be possible to describe combined effectiveness rates for barrier medians and mountable medians of varying lengths. Comments are requested on how this can best be accomplished.

4. One Way Street With Gates

This installation consists of one way streets with gates installed so that all approaching highway lanes are completely blocked. FRA would require that the gate arms on the approach side of the highway-rail grade crossing extend across the road to within one foot of the far edge of the pavement. If two gates are used, with one on each side of the road, the gap between the ends of the gates when they are in the down position should be no more than two feet if no median is present. If the highway approach is equipped with a median, the lowered gates should reach to within one foot of the median. In this and other similar measurements, the measurement should be horizontal across the road from the end of the lowered gate to the median or to a point over the median edge. The gate and the median top do not have to be at the same elevation. In situations in which only one gate is used, the edge of the road opposite the gate mechanism must have a barrier curb extending to and around the nearest intersection for at least 100 feet, so that the motorist cannot veer onto the shoulder of the road and drive around the gate tip.

FRA also proposes that the warning system be equipped with constant warning time systems as well as equipped with signs alerting motorists that the train horn does not sound.

Effectiveness: Lacking real world data from one way streets with gates, we are applying the effectiveness rate of .82 to this type supplementary safety measure which is the effectiveness rate for four-quadrant gates without medians. However, a case can be made that this arrangement should be as secure as four-quadrant gates with medians. Comment is requested on this issue. To what extent does current collision experience at existing gated one-way streets (with or without train horns sounding) impact the appropriate effectiveness rate?

5. Photo Enforcement

An automated means of gathering valid photographic or video evidence of violations of traffic laws relating to highway-rail grade crossings can be an effective supplementary safety measure if there is sufficient support and follow through by the law enforcement and judicial community. FRA would require that state law authorize use of photographic evidence both to bring charges against the vehicle owner and sustain the burden of proof that a traffic law violation has occurred. This would need to be accompanied by the commitment of the law enforcement and judicial communities to vigorously enforce the traffic laws in this area. Evidence of sufficient commitment would be traffic law violation penalties (and collection) sufficiently large to deter violations. Although we do not intend to mandate any specific penalty, we suggest that a fine of at least $100 be assessed against the violator. We note that some states have substantially higher penalties, such as Illinois and Florida with $500 fines. Other possible measures of sufficient deterrence could

include one or more points posted against a violator's driving license. We specifically invite comment as to whether FRA should require specific minimum penalties before acceptance as a supplementary safety measure, and if so, what the minimum level of penalty should be.

The proposed rule would also require that the photo enforcement system have a means to reliably detect violations (such as loop detectors and video imaging technology) and photo or video equipment deployed to capture images sufficient to convict violators under state law. FRA does not propose to require that every public highway-rail grade crossing be equipped with cameras for continual monitoring. FRA believes the goal of deterrence may be accomplished by moving the surveillance equipment among several crossing locations, as long as the motorist perceives the strong possibility that a violation of the law will lead to sanctions. Therefore, each location should appear identical to the motorist, whether or not the camera or video equipment is actually within the housing or equivalent equipment. We invite comment as to whether FRA should specify a minimum ratio of operating equipment to empty housings (such as 25 percent), or a minimum number of monitoring hours per housing, and if so, what the minimum levels should be.

FRA also proposes to require appropriate integration, testing and maintenance of the system to provide evidence supporting enforcement. Periodic data analysis would be performed to verify that violation rates remain below a baseline level (level with train horns sounding). Also required would be signs alerting motorists that train horns are not sounded and that the crossings are monitored for compliance with the law. Public awareness efforts are critical to the success of this program. The public must be informed that the horns are not being sounded and that violation of crossing laws will result in fines and penalties.

Effectiveness: FRA's estimate of the effectiveness of photo enforcement programs is discussed below.

As discussed earlier, the Los Angeles photo enforcement demonstration project showed that a carefully administered and well publicized program of photo enforcement reduced violation rates by 92 percent, while collisions were reduced only 72 percent. This ratio, 72:92 or .78, is proposed to be used to adjust reduced violation rates to estimate projected reductions in collision rates (effectiveness) for law enforcement and education/awareness options described in Appendix B. As discussed above, it is reasonable to infer that education and legal sanctions may lack effectiveness for several segments of the population. These persons, while a small portion of the overall population, may be over represented in the population of those involved in violations and thus in collisions. As such, for law enforcement and education/awareness options violations must be reduced at least 49 percent (the measure must reduce violations by at least 49 percent) in order to realize a 38 percent reduction in the risk of collision.

Where train horns routinely sound prior to the evaluation. Effectiveness would be determined by comparison of a violation/train count ratio based on the number of violations divided by the number of train movements in any calendar quarter to the violation/train count ratio during a baseline monitoring period (minimum of four weeks if conducted without public notice or media coverage, 16 weeks if conducted with public notice or media coverage). The reduction in violations should be at least 49 percent prior to implementation of the quiet zone. Effectiveness would be considered unacceptable if, following establishment of the quiet zone, violations are greater than the original baseline level. The discussion below addresses actions when effectiveness becomes unacceptable.

Where a whistle ban is to be continued within a quiet zone. Effectiveness would be determined by comparison of a violation/train count ratio based on the number of violations divided by the number of train movements in any calendar quarter to the violation/train count ratio during a baseline monitoring period (minimum of four weeks if conducted without public notice or media coverage, 16 weeks if conducted with public notice or media coverage). The violation rate should be at least 49 percent lower than the baseline rate. Effectiveness would be considered unacceptable if, at any time following establishment of the quiet zone, the rate of violations is greater than a value less than 49 percent below the baseline level. The following discussion addresses actions when effectiveness becomes unacceptable.

Unacceptable effectiveness after establishment of quiet zone. Initial effectiveness of the photo enforcement program would be determined by calculating violation rates for at least two consecutive calendar quarters following establishment of the quiet zone. The railroad would be notified to resume sounding of the train horn if results are not acceptable. FRA and all parties required to be informed in § 222.35(b) would be informed of such notification. If, in a subsequent calendar quarter the violation rate rises above the acceptable level, the quiet zone may be continued temporarily provided the state or municipality takes reasonable steps to increase the effectiveness of the supplementary safety measure. If, in the second calendar quarter following the quarter for which results were not acceptable, the rate is still unacceptable, the quiet zone would be terminated until requalified.

Appendix B—Alternative Safety Measures

A state or local government seeking acceptance of a quiet zone under § 222.33(b) of this part may include in its proposal alternative safety measures listed in Appendix B. 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 nearby grade separations are expected to carry that traffic). FRA Regional Managers for Grade Crossing Safety can assist in performing the required analysis.

As stated above, the introduction to Appendices A and B contains details regarding the decision-making process in determining whether to designate a quiet zone under § 222.33(a) or to apply for an acceptance of a quiet zone under § 222.33(b). The introduction also contains details regarding the methods to be used in performing required analyses. FRA requests comments on both the proposed process and the calculations required in that process.

The first five alternative safety measures listed are the same as those listed in Appendix A. A community may of course include one or more of these supplementary measures in its proposed program. However, if there are unique circumstances pertaining to a specific crossing or number of crossings, the specific requirements associated with a particular safety measure may be adjusted or revised in the community's proposal. As provided for in section 222.33(b), using Appendix B alternative safety measures 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 the community has established that the predicted accident rate applied to the quiet zone as a whole (rather than on a crossing-by-crossing basis), is reduced to a level which would be at least equivalent to that occurring with the sounding of the locomotive horn.

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 may be used for purposes of alternative safety measures. If one or more of the requirements associated with that supplementary safety measure as listed in Appendix A is revised or deleted, data or analysis supporting the revision or deletion must be provided to FRA for review.

A discussion of the following alternative safety measures may be found above in the discussion of Appendix A:

1. Temporary closure of the highway-rail crossing;
2. Four quadrant gate system;
3. Gates with medians or channelization devices;
4. One way street with gates; and
5. Photo enforcement.

6. Programmed Enforcement

An additional alternative safety measure which may be proposed for use within a specific quiet zone proposal is programmed enforcement. This safety measure involves community and law enforcement officials committed to a systematic and measurable crossing monitoring and traffic law enforcement program at the subject public highway-rail grade crossings. This may be accomplished alone, or in conjunction with the public education and awareness program. Programmed enforcement entails a sustainable law enforcement effort combined with continued crossing monitoring.

Effectiveness: In order to determine the program effectiveness, a valid baseline violation rate must first be determined through automated or systematic manual monitoring or sampling at the subject crossing or crossings. FRA believes that the effectiveness rates would be similar to those of the photo enforcement measures discussed in Appendix A, above. Procedures similar to those outlined in Appendix A for photo enforcement should be applied to assess the effectiveness of programmed law enforcement efforts.

FRA would impose conditions upon acceptance of a programmed enforcement safety measure. Included in those conditions would be monitoring and sampling to determine that the enforcement effort results in continuation of the reduction in violation rate. FRA would reserve the right to terminate the quiet zone if, after a reasonable period of time as established at the commencement of the program, improvement is not shown.

7. Public Education and Awareness

This alternative safety measure, alone, or in conjunction with Programmed Law Enforcement is a program of public education and awareness directed at motor vehicle drivers, pedestrians and residents near the railroad to emphasize the risks associated with highway-rail crossings and applicable requirements of state and local traffic laws at those crossings. This program would require establishment of a valid baseline violation rate which has been determined through automated or systematic manual monitoring or sampling at the subject crossing.

Effectiveness: Procedures similar to those outlined in Appendix A for photo enforcement should be applied to assess effectiveness of public education and awareness programs. Like Programmed Law Enforcement, a public education and awareness program must be defined, established and continued along with continued monitoring. FRA would impose conditions upon acceptance of a public education and awareness safety measure. Included in those conditions would be monitoring and sampling to determine that the education effort results in continuation of the reduction in violation rate. FRA would reserve the right to terminate the quiet zone if, after a reasonable period of time as established at the commencement of the program, improvement is not shown.

FRA recognizes the importance of public education and awareness efforts to safety at highway-rail crossings. FRA and other modal administrations and offices within the U.S. Department of Transportation have promoted the "Always EXpect a Train" campaign, Operation Lifesaver, Inc., and other public outreach efforts. However, FRA is concerned that the desire of communities to implement quiet zones could lead to redirection of scarce safety resources from safe community initiatives and could seriously tax the capacity of crossing safety programs provided by railroads and supported by the Federal government, leading to a net reduction in crossing safety. Accordingly, it is critical that programs proposed under this appendix represent valid new increments of effort generated from the local level where quiet zone benefits will accrue.

FRA is prepared to provide technical assistance to communities seeking to implement quiet zones, including information regarding public education and awareness resources. However FRA does not wish, nor is it able, to step into the shoes of local authorities responsible for public safety.

A second concern related to the public education and awareness option is sustaining the required level of effort. Public safety campaigns generally have temporary value when conducted over a short period or during widely separated periods of emphasis. Campaigns such as those promoting seat belt use or child safety seat use have long-term and sustained impact only to the extent the message is delivered repeatedly and with varied or innovative techniques. FRA is concerned that government entities wishing to utilize the public education and awareness option will need to find effective means of targeting the relevant audience (concentrating the impact where it will have utility) and ensuring that the message is reinforced over time. FRA seeks comments regarding communities that have had notable success in addressing particularly serious highway-rail crossing problems in their areas. To what extent did those successes derive from methods that might be transferred elsewhere? To what extent were prior very well publicized collisions the immediate impetus for those campaigns? To what extent is the public receptive to well-structured messages prior to the occurrence of one or more serious and well-publicized events?

Other Alternatives for Consideration

Wayside horns. During FRA's outreach process several commenters asked whether placement of a horn at the crossing and directed at oncoming motorists might be entertained as a supplementary safety measure. Such a device would typically be activated by the same track circuits used to detect the train's approach for purposes of other automated warning devices at the crossing. At FRA's direction, the Volpe Center bas conducted an initial evaluation of two wayside horn installations at Gering, Nebraska. (The report of that evaluation will be placed in the docket of this proceeding when finalized.) This evaluation noted that use of the wayside horn in lieu of the train horn reduced net community noise impacts. However, the report also contains analysis that suggests questions (related to the loudness of the subject wayside "horn") regarding the

effectiveness of that particular installation in alerting motorists. Further, this evaluation did not contain adequate data or analysis to permit a determination of whether a wayside horn could fully substitute for a train-borne audible warnings. At least three questions must be answered in this regard:

1. Does the particular system provide the same quality of warning, determined by loudness at appropriate frequencies, within the motor vehicle while it is approaching the motorist's decision point.

2. As currently conceived, a single stationary horn cannot give the motorist a cue as to the direction of approach of the train or trains. To what extent does this lack of directionality detract from the effectiveness of the warning? Can wayside installation design be altered to compensate?

3. To what extent will the stationary horn suffer from the lack of credibility sometimes associated with automated warning devices, due to the fact that it is activated by the same means? Over what period of time may this problem arise, if at all?

FRA will continue to identify opportunities for developing data and analysis that may be responsive to these questions. However, for the present it is not possible to have confidence that the wayside horn can fully compensate for the absence of the train horn at any individual crossing.

Articulated gates. Concepts have been presented for articulated gates that would descend from a single apparatus to block the approach to the crossing in the normal direction of travel and continue down to block the exit lanes from the crossing (on one or both sides). The State of North Carolina, as part of an FRA-funded "sealed corridor initiative," will be evaluating articulated gates as a low-cost safety measure in the context of the Next-Generation High Speed Ground Transportation Program. Articulated gates appear to be particularly attractive for two-lane roads where the highway-rail crossing is at a sufficient distance from other intersections or obstructions that could cause traffic to back up on the crossing. In principle, such gates should have the same effectiveness as other four-quadrant gate arrangements.

FRA reserves the right to expressly approve use of articulated gates as four-quadrant gate arrangements in the final rule. FRA seeks comment on the extent to which articulated gates present special issues (such as maintainability, performance in high winds, etc.) that should be addressed specifically in the final rule.

Different treatment during daylight and night-time hours. It has been suggested that variable level horns could be used at higher range during daylight hours with lower range used at night when vehicle traffic is lower and train traffic is often higher. Also, it is has been argued, lower level horns are more appropriate at night when the ambient noise level is lower than during daylight hours.

It has also been suggested that perhaps in some circumstances it might be appropriate to allow locomotive horns to be sounded during the day while banning them only at night when people are typically sleeping. This, it is argued, bas the benefit of attacking the problem when it is most serious (locomotive horns disturbing the sleep of nearby residents) and when the risk is ostensibly lower (during periods in which train traffic may be higher, and motor vehicle traffic is generally less). While the NPRM addresses temporary closure of the roadway as a means of accomplishing a night-time only ban, it has been suggested that non-engineering safety measures such as increased law enforcement during the ban hours and increased public education addressing the night-time motorist population may also be appropriate. FRA is concerned that locomotive horns being sounded during daylight hours and remaining silent at other times could very well lead to fatal confusion on the part of the motorist. We note that the Florida whistle ban was a night-time only ban which resulted in substantially higher collision and injury rates than if a ban had not been in effect.

FRA requests comments on the issues surrounding different treatment during different periods of the day and night.

Regulatory Impact

Executive Order 12866 and DOT Regulatory Policies and Procedures

This proposed rule has been evaluated in accordance with existing policies and procedures and is considered "significant" under Executive Order 12866. It is also considered to be significant under DOT policies and procedures. See 44 FR 11034.

FRA has prepared a Regulatory Evaluation addressing the economic impact of the proposed rule. This regulatory evaluation has been placed in the public docket and is available for public inspection and copying. Copies may also be obtained by submitting a written request to the FRA Docket Clerk at Mail Stop 10, 1120 Vermont Avenue, N.W., Washington, D.C. 20950.

The problems considered by this rule are collisions and their associated casualties and property damage involving vehicles on public highways and the front ends of trains at whistle-ban grade crossings. Although accident severity and the probability of a fatal accident is most strongly related to train speed, every grade crossing where locomotive horns are not sounded is a potential accident site. In 1996 there were 79 collisions at whistle-ban crossings which resulted in 2 fatalities, 39 injuries to non-railroad employees, and 2 injuries to railroad employees.

The estimated safety benefits of this proposed rule are derived from the prevention of collisions and the resulting fatalities and injuries. Benefits also exist for railroads in terms of reduced train delay, debris removal and repairs. The costs of this rulemaking will be incurred predominantly by communities, however there are also costs to railroads and to the federal government. The benefits in terms of lives saved and injuries prevented will exceed the costs imposed on society for this proposed rule. Even under the best case scenario (falling accident rates over time) the safety benefits alone, excluding any benefit to railroads, exceed the most costly realistic scenario for community safety enhancements. FRA has a preliminary assessment of the effects to homeowners or businesses adjacent to railroads tracks, where an existing whistle-ban exists, should the community elect not to pursue a qualifying quiet zone. The results of this study are summarized in Section VII of this report, and conclude that there is not a significant long-run impact on residential housing markets. For purposes of this analysis FRA assumes that such communities will choose to take actions that have the least cost (i.e. a cost that will not exceed the costs of supplementary or alternative safety measures).

The estimated benefits of this proposed rule exceed the estimated costs over a 20 year period at a 7% discount rate. Various benefit and cost scenarios are established in the following sections. The costs are summarized in Table 1, the benefits resulting from casualties prevented are shown in Table 2. These findings are somewhat preliminary as FRA does not have detailed data for the effectiveness or costs for some of the Supplementary Safety Measures. FRA does not have adequate information on what choices a given community will make regarding either blowing the train whistle or installing or implementing alternatives

to the train whistle. FRA seeks comment and additional information from communities regarding choices they will make so that a more complete estimate of the costs and benefits of this rule may be made prior to the issuance of the final rule.

TABLE 1.—ESTIMATED COSTS [1]

Whistle Boards	$20,250
Directionality Provision	10,982,000
Installation of Gates & Lights (878 crossings) [2]	67,109,706
Increased Maintenance Gates/ Lights (878)	11,201,974
Signs	375,500
Community Planning	134,000
Government Costs	134,000
Medians (mountable at 878 crossings)	11,060,183
Medians (mountable at all crossings)	26,453,740
Police Enforcement	24,805,600
Photo Enforcement	124,955,453

[1] This table cannot be summed for a total cost of the rule, much of the cost depends on community choice. Numbers for Police and Photo Enforcement are shown, however they are also contained in the benefits section.

[2] The number of passive crossings in the data set that are assumed to require upgrades.

The estimated safety benefits of this proposed rule are derived from the prevention of accidents and the resulting fatalities and injuries. Benefits also exist for railroads in terms of reduced train delay, debris removal and repairs. Two benefit scenarios were estimated, one where the accident rate remains constant over time and one where the accident rate declines by about 4% per year.

TABLE 2.—ESTIMATED BENEFITS

Category	Effectiveness = .38 [1]	Effectiveness = .75 [2]
Collision Rate Constant	$258,641,800	$510,477,200
Collision Rate Decline	188,273,400	371,592,200

[1] Equivalent to effectiveness of train whistle at crossings with gates and lights.

[2] Equivalent to effectiveness of median barrier with frangible delineators at crossings with gates and lights.

A scenario where 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 (At 2,100 crossings, total costs for all required improvements, including changes in direction of horn sound, and maintenance equal $116,395,343).

The following table identifies costs and benefits of alternative implementation scenarios:

TABLE 3.—COSTS AND BENEFITS OF ALTERNATIVE IMPLEMENTATION SCENARIOS FOR PROPOSED RULE, NET PRESENT VALUE 1999–2019 [1]

Implementation scenario	Costs monetized/ non-monetized	Benefits		Net monetized benefits
		Injury/fatality reduction	Monetized injury/ fatality	
Train whistles at crossing with gates and lights, collision rate constant [2].	$89,313,931 Indeterminate level of noise costs	(68 Fatalities) (342 Injuries)	$258,641,800	$169,327,869
Train whistles at crossing with gates and lights, collision rate decline [3].	$89,313,931 Indeterminate level of noise costs	(47 Fatalities) (235 Injuries)	188,273,400	98,959,469
Median barrier with frangible delineators at crossings with lights and gates, collision rate constant [4].	$116,395,343	(135 Fatalities) (75 Injuries)	510,477,200	394,081,857
Median barrier with frangible delineators at crossings with lights and gates, collision rate decline [5].	$116,395,343	(97 Fatalities) (463 Injuries)	371,592,200	255,196,857

[1] All figures assume 7% discount rate. The baseline to which these scenarios are compared is the continuation of the whistle-bans in the communities that now have them. See table below for categories of costs and benefits included in these monetized estimates.

[2] Assumes a 38% reduction in fatalities and injuries and an accident rate that is constant over time. Reduction in fatalities and injuries is the same 38%, the equivalent effectiveness of a train horn whether the horn is sounded or not. Costs include installation and maintenance of gates and lights at 878 passive crossings.

[3] Assumes a 38% reduction in fatalities and injuries and an accident rate that declines by about 4% per year. Reduction in fatalities and injuries is the same 38%, the equivalent effectiveness of a train horn whether the horn is sounded or not. Costs include installation and maintenance of gates and lights at 878 passive crossings.

[4] Assumes a 75% reduction (effectiveness rate of median barrier) in fatalities and injuries and an accident rate that is constant over time.

[5] Assumes a 75% reduction (effectiveness rate of median barrier) in fatalities and injuries and an accident rate that declines by about 4% per year.

TABLE 4.—CATEGORIES OF MONETIZED AND NON-MONETIZED COSTS AND BENEFITS INCLUDED IN ABOVE ANALYSIS

Category		Monetized	Non-monetized
Costs	Train whistles at crossings with gates and lights.	—Whistle boards (see § 222.21) —Directionality provision (see § 229.129) —Upgrades to gates and lights at passive crossings	—Indeterminate level of noise costs.

TABLE 4.—CATEGORIES OF MONETIZED AND NON-MONETIZED COSTS AND BENEFITS INCLUDED IN ABOVE ANALYSIS—Continued

Category		Monetized	Non-monetized
	Supplementary safety measures	—Upgrades to gates and lights at passive crossings. —Community costs —Government costs —Whistle boards —Directionality —Supplementary Safety Measures and Alternative Safety Measures (see § 222.33)	None.
Benefits	Train whistles at crossings with gates and lights.	—Reduction in injuries and fatalities	—Community noise reduction through whistle boards and the directionality provision.
	Supplementary safety measures	—Reduction in injuries and fatalities (greater reduction than train horn is likely as all SSM's have higher effectiveness rate than train horn).	—Reduced train delay, debris removal and repairs. —Collisions/incidents involving pedestrians and bicyclists. —Incidents where car struck train at behind the first five cars. —Community noise reduction through quiet zones in communities where state law currently requires the use of the train horn.

FRA recognizes that it is possible to imagine a situation under which the disbenefits of the proposed rule might exceed the benefits as applied to an individual community. FRA does not believe that this condition would occur through excessive expenditures on supplementary of alternative safety measures, since those measures can be scaled to the safety need within the quiet zone (taken as a whole) and since most such measures will yield benefits well in excess of the value of the train horn if applied to all crossings.

However, should a community elect NOT to implement the proffered alternatives, and should the negative societal impact of train horns be valued in excess of the safety benefits of the horn, a net dishenefit would, by definition, occur. This situation might arise where the persons adversely affected by the train noise constituted a minority in the community, and the community as a whole did not wish to invest in the alternatives. Thus far, vocal minorities in affected communities have succeeded in having the train horn silenced despite negative safety impacts for motor vehicle users in the community at large. Thus, it does not seem likely that they will be wholly without influence in the future. However, given the competing demands on local elected decision-makers, underinvestment in alternatives could occur. FRA requests comment on any options that may exist, consistent with the statutory mandate we are implementing, to address this concern. In this regard, FRA notes the availability of the Federal funding, through the Surface Transportation Program, which State departments of transportation might elect to commit on behalf of the affected minority should county or municipal institutions not be responsive.

Regulatory Flexibility Act

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) requires a review of final rules to assess their impact on small entities unless the Secretary certifies that a final rule will not have a significant economic impact on a substantial number of small entities. FRA is not able to certify that this proposed rule would not have a significant economic impact on a substantial number of small entities. FRA has performed an Initial Regulatory Flexibility Assessment (IRFA) on small entities that potentially can be affected by this proposed rule. The IRFA is summarized in this preamble as required by the Regulatory Flexihility Act. Copies of the full IRFA are available as an appendix to the Regulatory Impact Analysis, and is available in the public docket of this proceeding. Written public comments that will clarify what the impacts will be for the affected small entities are requested. Comments must be identified as responses to the IRFA, and must be filed by the deadlines for comments on the NPRM provided above.

This is a proposed rule which essentially is a safety rule that implements as well as minimizes the potential negative impacts of a Congressional mandate to blow train whistles and horns. It provides provisions for exceptions, and it provides communities with the ability to reduce the impact of the locomotive horns within their jurisdictions. However, this proposed rule will be responsible for an amount of impact on small entities, no matter how the outcome for each whistle ban is determined. This basically means that if a community elects to simply follow the mandate, and become subject to whistle blowing at crossings where a whistle ban had been prior, then there will be a noise impact to any potential small business that exists along that route. If a community elects to implement supplementary safety measures that are necessary to establish a "quiet zone," then the governmental jurisdiction will be impacted by the cost of such program or system.

Some communities believe that the sounding of train whistles at every crossing is excessive and an infringement on community quality of life, and therefore have enacted "whistle bans" that prevent the trains from sounding their whistles entirely, or during particular times (usually at night). FRA is concerned that with the increased risk at grade crossings where train whistles are not sounded, or another means of warning utilized, collisions and casualties may increase significantly. In 1996 at least 52 percent of the 79 grade crossing collisions that occurred at crossings with whistle bans in place, occurred in a small community

where the governmental jurisdiction is considered to be a small entity.

FRA is concerned that there are potential small entities that might be affected by this proposal. Hence, FRA encourages small businesses, small railroads, and governmental jurisdictions that are considered to be small entities to participate in the comment process if they feel they will be adversely impacted by this proposed rule. The Agency encourages such small entities to submit written comment to the docket and/or participate in one of the public hearings.

FRA's Regulatory Impact Analysis notes that the costs of this proposed rulemaking will predominately be on the governmental jurisdictions of communities. Thus, FRA is concerned about potential adverse economic impact on small entities which are "small governmental jurisdictions." As defined by the Small Business Administration (SBA) this term means governments of cities, counties, towns, townships, villages, school districts, or special districts with a population of less than fifty thousand. Currently, FRA has knowledge of Whistle Bans in 265 communities.

FRA has recently published an interim policy which establishes "small entity" as being railroads which meet the line haulage revenue requirements of a Class III railroad. As defined by 49 CFR 1201.1–1, Class III railroads are those railroads who have annual operating revenues of $20 million per year or less. Hazardous material shippers or contractors that meet this income level will also be considered as small entities. FRA is proposing to use this definition of small entity for this rulemaking. Since this is still considered to be an alternative definition, FRA is using this definition in consultation with the Office of Advocacy, SBA, and therefore requests public comments to the docket for its use.

The IRFA concludes that only a few small railroads might be minimally impacted by this proposed rule. In addition, some small businesses that operate along or nearby rail lines that currently have whistle bans in place that potentially may not after the implementation of this proposed rule, could be moderately impacted. The most significant impacts from this proposed rule will be on 265 governmental jurisdictions whose communities currently have either formal or informal whistle bans in place. FRA estimates that approximately 70 percent (*i.e.* 186 communities) of these governmental jurisdictions are considered to be small entities. Alternative options for complying with this proposed rule include allowing the train whistle to be blown. This alternative has no direct costs associated with it for the governmental jurisdiction. Other alternatives include "gates with median barriers" which are estimated to cost $11,070 for the median barrier. Four-quadrant gate system is estimated to cost $244,000, and have an annual maintenance of $2,500–$5,000. "Photo enforcement is estimated to cost $55,000–$75,000, and bave an annual costs of $20,000–$30,000. A "law enforcement" program is estimated to cost $3,000 annually, and it has an expected annual benefit $10,600. An alternative that does not impact the governmental jurisdiction with any costs is running trains at speeds of 15 miles per hour or less with flagging being performed at the crossing. Finally, FRA has not limited compliance to the lists provided in Appendix A or Appendix B of the proposed rule. The NPRM provides for supplementary safety measures that might be unique or different. For such an alternative an analysis would have to accompany the option that would demonstrate that the number of motorists that violate the crossing is equivalent of less than that of blowing the whistle. FRA intends to rely on the creativity of communities to formulate solutions which will work for that community. FRA is aware that there are a few Class III railroads that are subject to local whistle bans. This number is estimated to be less than ten.

FRA does not know how many small businesses are located within a distance of the affected highway-rail crossings where the noise from the whistle blowing could be considered to be nuisance and bad for business. Concerns have been advanced by owners and operators of hotels, motels and some other establishments as a result of numerous town meetings and other outreach sessions in which FRA has participated during development of this proposed rule. If supplementary safety measures are implemented to create a quiet zone then such small entities should not be impacted. Hence FRA requests comments to the docket from small businesses that feel they will be adversely impacted by this proposed rule.

In the IRFA FRA discusses the ways in which each type of small entity could be affected. However, since FRA does not know the manner which each affected community will elect to proceed, it is not possible to quantify or estimate the total or average cost for each type of small entity. Comments and input from potentially affected small entities will assist us in being able to determine the real impact of this proposed rule.

Paperwork Reduction Act

The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq.* The sections that contain the new information collection requirements and the estimated time to fulfill each requirement are as follows:

CFR section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost
222.11—Petitions for Waivers	270 communities	92 petitions	1 hour	92 hours	$2,208
222.33—Establishment of quiet zones	(see § 222.35)	(see § 222.35)	(see § 222.35)	(see § 222.35)	(see § 222.35)
—Community Designation	270 communities	97 applications	40 hours	3,880 hours	116,400
—FRA acceptance	270 communities	1,600 signs	1 hour	1,600 hours	38,400
—Requirement for advance warning signs					
222.35—Notice and information requirements:					
—Notifications	280 communities	383 notifications	20 minutes	128 hours	3,840
—U.S. DOT–AAR National Highway-Rail Grade Crossing Inventory Form (FRA F 6180.71).	280 communities	800 forms	1 hour	821 hours	24,630
		85 letters	15 minutes		
222.39—Quiet zone duration:					
—222.39(a)—Notification	N/A (requirement will not take effect until 5 years after the rule's publication).				
—222.39(b)—Notification	N/A (requirement will not take effect until 6 years after the rule's publication).				

CFR section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost
—222.39(c)—Notification	N/A (requirement will not take effect until 6 years after the rule's publication).				
222.43—Development and approval of new supplementary safety measures:					
—Applications	270 communities	54 applications	40 hours	2,160 hours	64,800
—Appeal letter	54 communities	1 letter	1 hour	1 hour	30
222.45—Communities with pre-existing restrictions on use of locomotive horns.	270 communities	73 documents	8 hours	584 hours	17,520
Appendix A:					
—Temporary closure of a public highway-rail grade crossing.	270 communities	60 signs 20 signs daily	1 hour	60 hours	1,440
—Photo Enforcement	270 communities	10 reports	40 hours	400 hours	12,000
Appendix B:					
—Alternative Safety Measures	270 communities	5 reports	40 hours	200 hours	6,000

All estimates include the time for reviewing instructions; searching existing data sources; gathering or maintaining the needed data; and reviewing the information. Pursuant to 44 U.S.C. 3506(c)(2)(B), FRA solicits comments concerning: whether these information collection requirements are necessary for the proper performance of the function of FRA, including whether the information has practical utility; the accuracy of FRA's estimates of the burden of the information collection requirements; the quality, utility, and clarity of the information to be collected; and 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.

FRA believes that soliciting public comment will promote its efforts to reduce the administrative and paperwork burdens associated with the collection of information mandated by Federal regulations. In summary, FRA reasons that comments received will advance three objectives: (i) reduce reporting burdens; (ii) ensure that it organizes information collection requirements in a "user friendly" format to improve the use of such information; and (iii) accurately assess the resources expended to retrieve and produce information requested. *See* 44 U.S.C. 3501.

Comments must be received no later than March 13, 2000. Organizations and individuals desiring to submit comments on the collection of information requirements should direct them to the Office of Management and Budget, Attention: Desk Officer for the Federal Railroad Administration, Office of Information and Regulatory Affairs, Washington, DC 20503, and should also send a copy of their comments to Robert Brogan, Federal Railroad Administration, RRS–211, Mail Stop 25, 400 7th Street, SW, Washington, DC 20590.

OMB is required to make a decision concerning the collection of information requirements contained in this proposed rule between 30 and 60 days after publication of this document in the **Federal Register**. Therefore, a comment to OMB is best assured of having its full effect if OMB receives it within 30 days of publication. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

FRA cannot impose a penalty on persons for violating information collection requirements which do not display a current OMB control number, if required. FRA intends to obtain current OMB control numbers for any new information collection requirements resulting from this rulemaking action prior to the effective date of a final rule. The OMB control number, when assigned, will be announced by separate notice in the **Federal Register**.

For information or a copy of the paperwork package submitted to OMB please contact Robert Brogan at 202–632–3318.

Environmental Impact

FRA is evaluating these proposals in accordance with its procedures for ensuring full consideration of the environmental impact of FRA actions, as required by the National Environmental Policy Act (42 U.S.C. 4321 *et seq.*), other environmental statutes, Executive Orders, and DOT Order 5610.1c.

The principal environmental effect and potentially significant impact of these proposals is additional horn noise where there whistle bans currently exist. FRA has studied the potential costs of noise from locomotive horns by examining residential property values. Other studies have also been conducted on the value of noise impacts captured in residential prices, including studies by the FAA. FAA conducted studies that concluded that residential property values were diminished from exposure to substantial quantities of aircraft noise. FAA studied significant changes in aircraft generated noise levels in consideration of actions that would change the total noise emitted by each aircraft. The DEIS discusses the substantial estimated costs associated with given increments of noise over a 24-hour period in the FAA studies. FRA may be faced with a significantly different question, because this regulation has the potential to add incremental noise at certain locations to the considerable noise, vibration and other impacts generated by train locomotives and train movements. In studying residential property values where the horn noise was added as an increment to noise from train operations, FRA found that it did not produce a significant lasting effect on residential prices. The DEIS seeks to elicit comment as to the potential relevance of the FAA studies to the current issue and the relative weight they should be accorded given the findings of the train horn property value research.

These proposals also contain various provisions that have the potential to reduce existing train horn noise exposure over time. The provision limiting the distance over which horn sounding would occur could reduce the total amount of horn noise generated. Because this provision is proposed to be implemented slowly, the potential benefits are indeterminate. The provision for a maximum horn sound level to the front and to the side of locomotives has the potential to greatly reduce horn noise generated depending upon the limits selected. Unlike the sounding distance provision, this is proposed to occur a three-year period

and the value of any potential benefit is indeterminate, however it is expected to be significant (2 to 4 million people). Finally, these proposals contain provisions that would make it possible for many communities, currently exposed to train horn noise, to establish quiet zones and thus relieve themselves of noise exposure. Any potential benefit from these new quiet zones is indeterminate, as it is impossible to estimate how many would be implemented and when; however, FRA has noted the interest of many communities impacted by recent mergers in abating the train horn impacts of recent changes in traffic flows.

FRA has prepared a draft environmental impact statement (DEIS) analyzing the environmental impacts associated with these proposals. The DEIS is being issued concurrently with this NPRM. Copies of the DEIS are being distributed to organizations and individuals who participated in the environmental scoping process and those who filed comments in the pre-rulemaking stage of this proceeding. The DEIS is also available on FRA's Internet Site *www.fra.dot.gov*. or from the FRA at the following address: David Valenstein, Office of Railroad Development, FRA, 400 Seventh Street, SW. (Mail Stop 20), Washington, DC 20590. The public comment period on the DEIS and this NPRM will run concurrently. Interested parties may comment on the DEIS, the NPRM, or both documents. Because FRA is soliciting comments on both the DEIS and this NPRM, separate public dockets have been established for each. Interested parties wishing to comment on the DEIS should include the docket number for the environmental docket, "Docket Number FRA–1999–6440" on the first page of their comments. Those persons wishing to comment on this NPRM should include the docket number for this rulemaking proceeding, "Docket Number FRA–1999–6439" on the first page of their comments.

Federalism Implications

Executive Order 13132, entitled, "Federalism," issued on August 4, 1999, requires that each agency "in a separately identified portion of the preamble to the regulation as it is to be issued in the **Federal Register**, provides to the Director of the Office of Management and Budget a federalism summary impact statement, which consists of a description of the extent of the agency's prior consultation with State and local officials, a summary of the nature of their concerns and the agency's position supporting the need to issue the regulation, and a statement of the extent to which the concerns of State and local officials have been met; * * *."

FRA will adhere to Executive Order 13132 when issuing a final rule in this proceeding. FRA has already taken the opportunity to consult extensively with state and local officials prior to issuance of this NPRM, and we will, of course, take very seriously the concerns and views expressed by State and local officials as the public comment stage of this rulemaking proceeds. FRA staff will be providing briefings to many State and local officials and organizations during the comment period to encourage full public participation in this rulemaking. As discussed earlier in this preamble, because of the great interest in this subject throughout various areas of the country, FRA has been involved in an extensive outreach program to inform communities which presently have whistle bans of the effect of the Act and the regulatory process. Since the passage of the Act, FRA headquarters and regional staff has met with a large number of local officials. FRA has also held a number of public meetings to discuss the issues and to receive information from the public. In addition to local citizens, both local and state officials attended and participated in the public meetings. Additionally, FRA took the unusual step of establishing a public docket before formal initiation of rulemaking proceedings in order to enable citizens and local officials to comment on how FRA might implement the Act and to provide insight to FRA. FRA received comments from representatives of Portland, Maine; Maine Department of Transportation; Acton, Massachusetts; Wisconsin's Office of the Commissioner of Railroads; a Wisconsin state representative; a Massachusetts state senator; the Town of Ashland, Massachusetts; Bellevue, Iowa; and the mayor of Batavia, Illinois.

Since passage of the Act in 1994, FRA has consulted and briefed representatives of the American Association of State Highway and Transportation Officials (AASHTO), the National League of Cities, National Association of Regulatory Utility Commissioners, National Conference of State Legislatures, and others. Additionally we have provided extensive written information to all United States Senators and a large number of Representatives with the expectation that the information would be shared with interested local officials and consitituents.

FRA has been in close contact with, and has received many comments from Chicago area municipal groups representing suburban areas in which, for the most part, locomotive horns are not routinely sounded. The Chicago area Council of Mayors, which represents over 200 cities and villages with over 4 million residents outside of Chicago, provided valuable information to FRA as did the West Central Municipal Conference and the West Suburban Mass Transit District, both of suburban Chicago.

Another association of suburban Chicago local governments, the DuPage [County] Mayors and Managers Conference, provided comments and information. Additionally, FRA officials have met with Members of Congress, including Senator Kennedy, and Representatives Rick Boucher, Henry Hyde, William Lipinsky, Martin Meehan, Tim Roemer and John Tierney, who have invited FRA to their districts and have provided citizens and local officials with the opportunity to express their views on this rulemaking process. These exchanges, and others conducted directly through FRA's regional crossing managers, have been very valuable in identifying the need for flexibility in preparing the proposed rule. For further discussion regarding the nature of state and local concerns please see paragraph F. "Comments received by FRA." above.

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

Compliance With the Unfunded Mandates Reform Act of 1995

Pursuant to the Unfunded Mandates Reform Act of 1995 (Public Law 104–4) each federal agency "shall, unless otherwise prohibited by law, assess the effects of Federal Regulatory actions on State, local, and tribal governments, and the private sector (other than to the extent that such regulations incorporate requirements specifically set forth in law)." Section 201. Section 202 of the Act further requires that "before promulgating any general notice of proposed rulemaking that is likely to result in promulgation of any rule that includes any Federal mandate that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $ 100,000,000 or more (adjusted annually for inflation) in any 1 year, and before promulgating any final rule for which a general notice of proposed rulemaking was published, the agency shall prepare a written statement * * *" detailing the effect on

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.

Subpart B—Use of Locomotive Horns

Subpart C—Exceptions to Use of the Locomotive Horn

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 raile 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 is 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 grode 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 he 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 he 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 han 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 he 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 he 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-han 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 bighway 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 hy 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 extent 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 he 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 harriers, 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

RESOLUTION NO. R97-047

A RESOLUTION BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS, AUTHORIZING THE CITY MANAGER TO ENTER INTO AN INTERLOCAL AGREEMENT BETWEEN THE TOWN OF ADDISON AND DART FOR THE SPECTRUM RAILROAD CROSSING.

WHEREAS, in a continued effort by the Town of Addison to improve traffic congestion throughout the Town, the town desires to extend Spectrum Drive north across DART's railroad tracks and DART's right-of-way at Mile Post 598.09; and

WHEREAS, the at-grade crossing of Spectrum Road across DART's railroad tracks will require $300,000 worth of safety improvements to the crossing to be paid by the Town of Addison; and

WHEREAS, the granting of this license shall not be construed in any way to constitute a dedication of the property to the public; now, therefore,

BE IT RESOLVED BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS:

THAT, the City Council does hereby authorize the City Manager to enter into an interlocal agreement between the Town of Addison and DART for the Spectrum Railroad Crossing.

DULY PASSED BY THE CITY COUNCIL OF THE TOWN OF ADDISON, TEXAS, this the 24th day of June, 1997.

Mayor

ATTEST:

City Secretary

OPEN

Dallas Area Rapid Transit
P.O. Box 660163
DART Dallas, Texas 75266-0163
214/749-3278

September 5, 1997

Mr. John R. Baumgartner, P.E.
Director of Public Works
Town of Addison
P. O. Box 144
Addison, Texas 75001

Re: License Agreement No. 970904 covering the proposed Spectrum Drive crossing

Dear Mr. Baumgartner:

Enclosed is a fully-executed agreement as referenced above. Should you need to contact us in the future regarding this document, please reference the agreement number above.

Please contact me at (214) 749-2917 if I can be of assistance with any future crossings of DART-owned railroad properties.

Sincerely,

Jan Seidner
Manager, Railroad Facilities
Commuter Rail & Railroad Management

JMS:
Enclosure

AGREEMENT # 970904

LICENSE AGREEMENT

THIS AGREEMENT, by and between DALLAS AREA RAPID TRANSIT, ("DART"), a regional transportation authority, created, organized and existing pursuant to Chapter 452, Texas Transportation Code, as amended (the "Act"), and the TOWN OF ADDISON, a home rule city ("Licensee"), acting herein by and through its duly authorized city manager, whose mailing address is P. O. Box 144, Addison, Texas 75001,

WITNESSETH:

1. **Purpose.** DART hereby grants a license to Licensee for the purpose of constructing, installing, and maintaining a paved four-lane Public Road Crossing (the "Permitted Improvements"), forty-eight (48) feet in width, extending Spectrum Drive across DART's tracks on the DART right-of-way at Mile Post 598.09 in Addison, Dallas County, Texas, more particularly described and shown on the plat marked Exhibit "A" attached hereto and incorporated herein for all pertinent purposes, (the "Property").

The term Permitted Improvements shall include the concrete pre-cast crossing material, pavement, grading, barricades, street lighting, drainage facilities, signs, warning protection devices and approaches as designated by DART.

The Property shall be used by Licensee solely for construction of the Permitted Improvements and use by the public, **EXCEPT, HOWEVER, AND IT IS UNDERSTOOD BY BOTH DART AND LICENSEE THAT THE GRANTING OF THIS LICENSE SHALL NOT BE CONSTRUED IN ANY WAY TO CONSTITUTE A DEDICATION OF THE PROPERTY TO THE PUBLIC.** Licensee's right to enter upon and use the Property shall be entirely subject to the terms and provisions of this License Agreement.

2. **Consideration.** The consideration for the granting of this License shall be the following:

2.01. The performance by Licensee of each of the obligations undertaken by Licensee in this License.

2.02. As further consideration for the granting of this License, and in lieu of closure of two (2) public or private at-grade highway/rail crossings within the town limits of Addison, Licensee shall place the sum of $300,000.00 into a special fund (the "Crossing Fund") to be used for providing additional warning/median protection devices at certain high traffic count highway-rail crossings within the Town of Addison as mutually determined and agreed upon between DART and Licensee. Licensee shall monitor all expenditures from the Crossing Fund until money is depleted, subject to audit by DART.

3. Term. The term of this license shall be perpetual subject, however, to termination by either party as provided herein.

4. Non Exclusive License. This license is non-exclusive and is subject to (a) any existing utility, drainage or communication facility located in, on, under, or upon the Property owned by DART, any railroad, utility, or communication company, public or private; (b) to all vested rights presently owned by any railroad, utility or communication company, public or private, for the use of the Property for facilities

presently located within the boundaries of the Property; and (c) to any existing lease, license or other interest in the Property granted by DART to any individual, corporation or other entity, public or private.

5. Design, Construction, Operation and Maintenance. DART's use of the Property and adjoining property may include the use of electrically powered equipment. Notwithstanding DART's inclusion within its system of measures designed to reduce stray current which may cause corrosion, **Licensee is hereby warned that such measures may not prevent electrical current being present in proximity to the Permitted Improvements and that such presence could produce corrosive effects to the Permitted Improvements.**

5.01. All design, construction, reconstruction, replacement, removal, operation and maintenance of the Permitted Improvements on the Property shall be done in such a manner so as not to interfere in any way with the operations of DART or other railroad operations, (the "Railroad", whether one or more). In particular, cathodic protection or other stray current corrosion control measures of the Permitted Improvements as required shall be made a part of the design and construction of the Permitted Improvements.

5.02. During the design phase and prior to commencing any construction or installation on the Property, a copy of the construction plans showing the exact location, type and depth of the construction, any cathodic protection measures and any working area, shall be submitted for written approval to DART and the Railroad when the construction is going to be within the area of Railroad operations. Such approval shall not be unreasonably withheld. No work shall commence until said plans have been approved by DART and Railroad.

5.03. By acceptance of this license, Licensee agrees to design, construct, install and maintain the Permitted Improvements in such a manner so as not to create a hazard to the use of the Property, and further agrees to pay any damages which may arise by reason of Licensee's use of the Property under this Agreement.

5.04. By acceptance of this license, Licensee covenants and agrees to institute and maintain a reasonable testing program to determine whether or not additional cathodic protection of its Permitted Improvements is necessary and if it is or should become necessary, such protection shall be immediately instituted by Licensee at its sole cost and expense.

5.05. **Absence of markers does not constitute a warranty by DART that there are no subsurface installations on the Property.**

5.06. If at any time, traffic volume or other circumstances should warrant a grade separation for the crossing licensed hereunder, Licensee shall be responsible for the installation of such grade separation to DART's standards, at no cost to DART.

6. Governmental Approvals. Licensee, at its sole cost and expense, shall be responsible for and shall obtain, any and all licenses, permits, or other approvals from any and all governmental agencies, federal, state or local, required to carry on any activity permitted herein.

7. DART's Standard Contract and Insurance. No work on the Property shall be commenced by Licensee or any contractor for Licensee until such Licensee or contractor shall have executed DART's Standard Contractors Agreement covering such work, and has furnished insurance coverage in such amounts and types as shall be satisfactory to DART.

8. Duty of Care in Construction, Operation and Maintenance. Licensee or its contractor shall use reasonable care during the construction, operation and maintenance period and thereafter, to avoid damaging any existing buildings, equipment and vegetation on or about the Property and any adjacent property owned by or under the control of DART. If the failure to use reasonable care by the Licensee or its contractor causes damage to the Property or such adjacent property, the Licensee and/or its contractor shall immediately replace or repair the damage at no cost or expense to DART. If Licensee or its contractor fails or refuses to make such replacement, DART shall have the right, but not the obligation, to make or effect any such repair or replacement at the sole cost and expense of Licensee, which cost and expense Licensee agrees to pay to DART upon demand.

9. Environmental Protection.

9.01 Licensee shall not use or permit the use of the Property for any purpose that may be in violation of any laws pertaining to health or the environment, including without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), the Resource Conservation and Recovery Act of 1976 ("RCRA"), the Texas Water Code and the Texas Solid Waste Disposal Act.

9.02. Licensee warrants that the Permitted Use of the Property will not result in the disposal or other release of any hazardous substance or solid waste on or to the Property, and that it will take all steps necessary to insure that no such hazardous substance or solid waste will ever be discharged onto the Property by Licensee or its Contractors.

9.03. The terms "hazardous substance" and "release" shall have the meanings specified in CERCLA and the terms "solid waste" and "disposal" (or "disposed") shall have the meanings specified in the RCRA; PROVIDED, HOWEVER, that in the event either CERCLA or RCRA is amended so as to broaden the meaning of any term defined thereby, such broader meaning shall apply subsequent to the effective date of such amendment; and PROVIDED FURTHER, that to the extent that the laws of the State of Texas establish a meaning for "hazardous substance", "release", "solid waste", or "disposal", which is broader than that specified in either CERCLA or RCRA, such broader meaning shall apply.

9.04. Licensee shall indemnify and hold DART harmless against all cost of environmental clean up to the Property resulting from Licensee's use of the Property under this Agreement.

10. Mechanic's Liens Not Permitted. Licensee shall fully pay for all labor and materials used in, on, or about the Property and will not permit or suffer any mechanic's or materialmen's liens of any nature to be affixed against the Property by reason of any work done or materials furnished to the Property at Licensee's instance or request.

11. Maintenance of Completed Improvements. After the Permitted Improvements have been constructed, they shall be maintained by the Licensee in such a manner as to keep the Property in a good and safe condition with respect to Licensee's use; PROVIDED, HOWEVER, with respect to the warning protection devices installed as Permitted Improvements, such devices shall be maintained by the Railroad, upon acceptance of installation in accordance with approved plans, subject to reimbursement therefor by Licensee. In the event the Licensee fails to maintain the Property as required, upon discovery, DART shall notify Licensee of such occurrence in writing. In the event Licensee shall not have remedied the failure within ten (10) days from the date of such notice, DART shall have the right, but not the obligation to remedy such failure at the sole cost and expense of Licensee. In the event DART exercises its right to

remedy Licensee's failure, Licensee agrees to immediately pay to DART all costs incurred by DART upon demand.

12. Future Use by DART.

12.01. This license is made expressly subject and subordinate to the right of DART to use the Property for any purpose whatsoever.

12.02. In the event that DART shall, at any time subsequent to the date of this Agreement, at its sole discretion, determine that the relocation of the Permitted Improvements shall be necessary or convenient for DART's use of the Property, or that the crossing must be modified, including but not limited to the installation of grade crossing signals, Licensee shall, at its sole cost and expense make such modifications or relocate said Permitted Improvements so as not to interfere with DART's or DART's assigns use of the Property. In this regard, DART may, but is not obligated to, designate other property for the relocation of the Permitted Improvements. A minimum of thirty (30) days written notice for the exercise of one or more of the above actions shall be given by DART, and Licensee shall promptly commence to make the required changes and complete them as quickly as possible.

13. Duration of License. This license shall terminate and be of no further force and effect (a) in the event Licensee shall discontinue or abandon the use of the Permitted Improvements; (b) in the event Licensee shall relocate the Permitted Improvements from the Property; (c) upon termination in accordance with paragraph 18 of this Agreement, whichever event first occurs.

14. Compliance With Laws and Regulations. Licensee agrees to abide by and be governed by all laws, ordinances and regulations of any and all governmental entities having jurisdiction over the Licensee and by railroad regulations, policies and operating procedures established by the Railroad, or other applicable railroad regulating bodies, and Licensee agrees to indemnify and hold DART harmless from any failure to so abide and all actions resulting therefrom. **Licensee acknowledges the current applicability of federal and state railroad regulatory agency requirements for the blowing of whistles when approaching at-grade public and private road crossings.**

15. Indemnification.

15.01. Licensee shall defend, protect and keep DART and Railroad forever harmless and indemnified against and from any penalty, or damage, or charge, imposed for any violation of any law, ordinance, rule or regulation arising out of the use of the Property by Licensee, whether occasioned by the neglect of Licensee, its employees, officers, agents, contractors or assigns, or those holding under Licensee;

15.02. Licensee shall at all times protect, indemnify and **it is the intention of the parties hereto that Licensee** hold DART and Railroad harmless against and from any and all loss, cost, damage or expense, including attorney's fees, arising out of, or from any accident or other occurrence on or about the Property causing personal injury, death, or property damage, except when caused by the willful misconduct or negligence of DART or Railroad, their officers, employees or agents, and then only to the extent of the proportion of any fault determined against DART for its willful misconduct or negligence;

15.03. Licensee shall at all times protect, indemnify and hold DART and Railroad harmless against and from any and all loss, cost, damage or expense, including attorney's fees, arising out of or from any and all claims or causes of action resulting from any failure of Licensee, its officers,

employees, agents, contractors or assigns in any respect to comply with and perform all the requirements and provisions hereof.

16. Action Upon Termination of License. At such time as this license may be terminated or cancelled for any reason whatever, Licensee, upon request by DART, shall remove all improvements and appurtenances owned by it, situated in, under or attached to the Property and shall restore the Property to the condition existing at the date of execution of this License, at Licensee's sole expense.

17. Assignment. Licensee shall not assign or transfer its rights under this Agreement in whole or in part, or permit any other person or entity to use the License hereby granted without the prior written consent of DART which DART is under no obligation to grant.

18. Methods of Termination. This Agreement may be terminated in any of the following ways:

18.01. Written Agreement of both parties;
18.02. By either party giving the other party thirty (30) days written notice.
18.03. By either party, upon failure of the other party to perform its obligations as set forth in this Agreement.

19. Miscellaneous.

19.01. Notice. When notice is permitted or required by this Agreement, it shall be in writing and shall be deemed delivered when delivered in person or when placed, postage prepaid, in the U.S. Mail, Certified, Return Receipt Requested, and addressed to the parties at the following addresses:

LICENSOR: Dallas Area Rapid Transit
P. O. Box 660163
Dallas, Texas 75266-7210
Attn: Railroad Management

LICENSEE: Town of Addison
P. O. Box 144
Addison, Texas 75001
Attn: Director of Public Works

Either party may from time to time designate another and different address for receipt of notice by giving notice of such change of address.

19.02. Attorney Fees. Any signatory to this Agreement who is the prevailing party in any legal proceeding against any other signatory brought under or with relation to this Agreement shall be entitled to recover court costs and reasonable attorney fees from the non-prevailing party.

19.03 Governing Law. This Agreement shall be construed under and in accordance with the laws of the State of Texas.

19.04 Entirety and Amendments. This Agreement embodies the entire agreement between the parties and supersedes all prior agreements and understandings, if any, relating to the Property and the matters addressed herein, and may be amended or supplemented only by a written instrument executed by the party against whom enforcement is sought.

19.05. Parties Bound. This Agreement shall be binding upon and inure to the benefit of the executing parties and their respective heirs, personal representatives, successors and assigns.

19.06. Number and Gender. Words of any gender used in this Agreement shall be held and construed to include any other gender; and words in the singular shall include the plural and vice versa, unless the text clearly requires otherwise.

IN WITNESS WHEREOF, the parties have executed this Agreement in multiple originals this 4th day of September, 1997.

LICENSOR: DALLAS AREA RAPID TRANSIT

By: _____
Roger Snoble
President/Executive Director

LICENSEE: TOWN OF ADDISON

By: _____
Printed Name: RON WHITEHEAD
Title: CITY MANAGER

APPROVED AS TO FORM:

_____
Office of DART General Counsel

EXHIBIT A

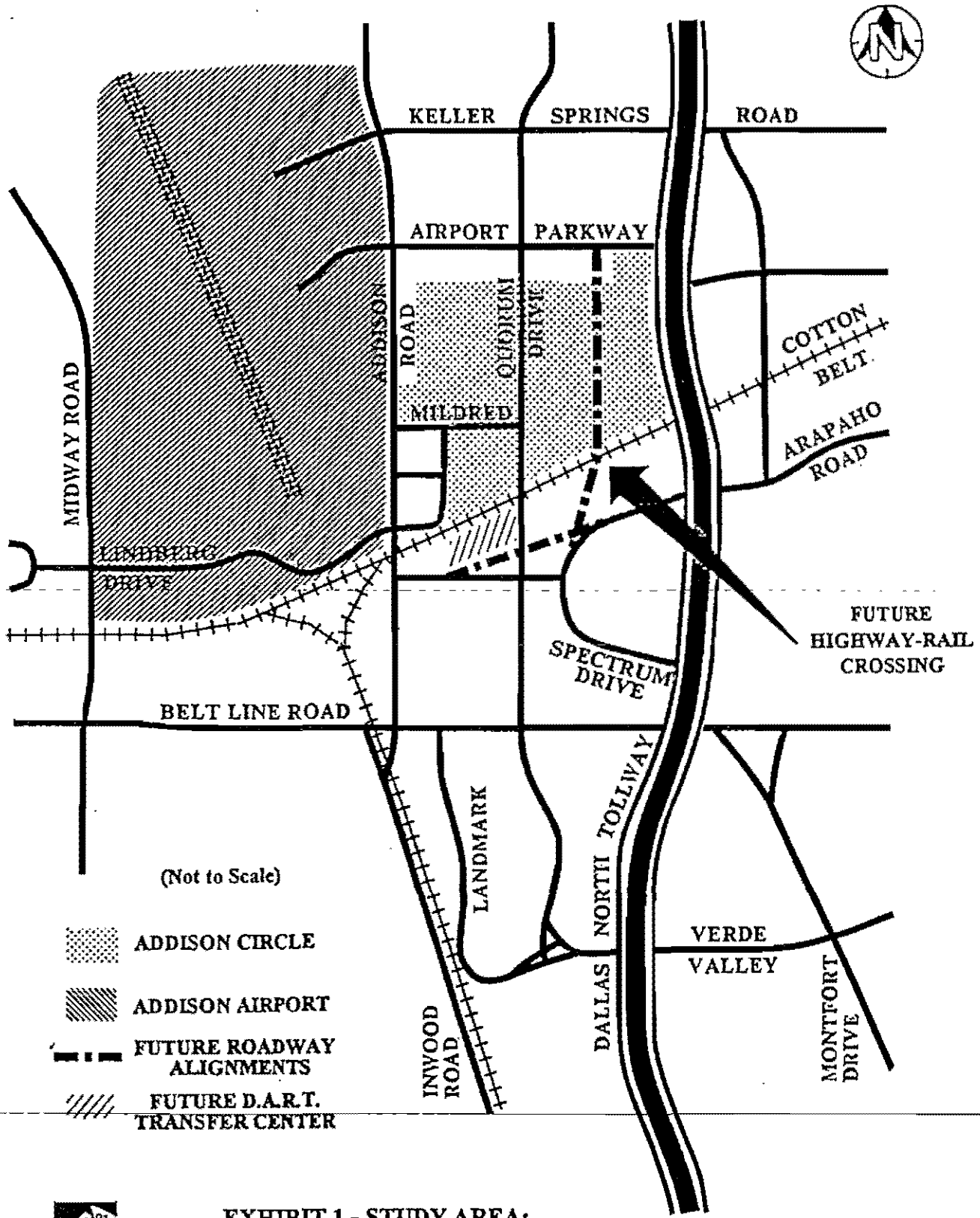


EXHIBIT 1 - STUDY AREA:
FUTURE SPECTRUM DRIVE EXTENSION

960138

Dallas Area Rapid Transit

RESOLUTION

of the

RESOLUTION

DALLAS AREA RAPID TRANSIT
(Executive Committee)

Grant of a License for an At-Grade Public Road Crossing in Addison

WHEREAS, the Town of Addison has requested an at-grade public road crossing on Spectrum Drive to cross the Cotton Belt railroad right-of-way; and

WHEREAS, by Board Resolution No. 960033, DART adopted a policy to reduce the number of public and private at-grade crossings; and

WHEREAS, the Federal Railroad Administration and the Texas Department of Transportation have similar policies to eliminate or consolidate public and private at-grade, highway-rail crossings; and

WHEREAS, because no realistic closure possibilities exist, and the proposed at-grade road crossing is a critical element in Addison's proposed Addison Circle development, additional warning protection devices will be added at existing crossings in lieu of closure.

NOW, THEREFORE, BE IT RESOLVED by the Dallas Area Rapid Transit Board of Directors that the President/Executive Director or his designee is authorized to execute a license for an at-grade public road crossing in Addison, as shown in Attachment 1, subject to the Town of Addison providing additional warning protection devices at existing at-grade public road crossings in Addison, Texas at a cost to the Town of $300,000.

Sandy Greyson
Sandy Greyson
Secretary

Billy J. Ratcliff
Billy J. Ratcliff
Chairman

APPROVED AS TO FORM:

DART Counsel

ATTEST:

Roger Snoble
President/Executive Director

August 13, 1996
Date

960138

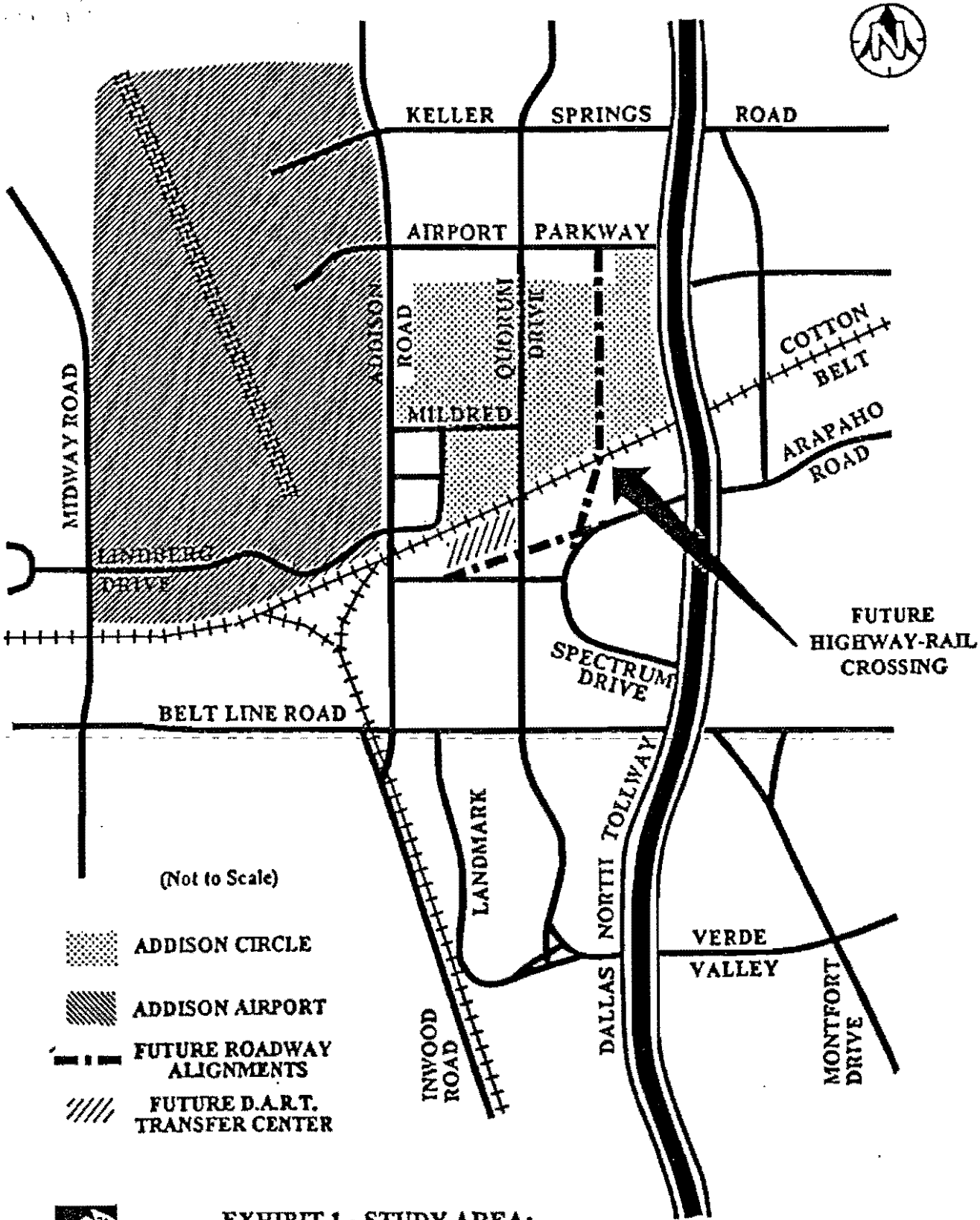


EXHIBIT 1 - STUDY AREA:
FUTURE SPECTRUM DRIVE EXTENSION

Agreement No. 970904

Sept 4th 1997

Whitehead
Smith

Bill Brown — Engr. Hutt Zollars

No cost plans 300,000
+ 1000
$ 213,000

Anytime condition

Jan 2 @ 2917

Drainage — Wanted it in
DART ROW — Denied

Open one, close two

$26,400 — Signal upgrades has been spent

Crossing fund $300,000 set aside to
Make existing crossing safer
Cannot be used for Spectrum

Irving to spend $30 million on project to ensure quieter, safer rail crossings

Continued from Page 25A.

Railway Express and passes through north Irving and Las Colinas. This north-south line is used only for freight traffic but may carry commuter trains someday.

The east-west line was purchased in the early 1980s by the cities of Dallas and Fort Worth from the remnants of the bankrupt Chicago, Rock Island & Pacific. Ownership was transferred last year to DART and the Fort Worth Transit Authority, known as the T.

Commuter rail service on the line began in 1996.

The most ambitious portion of the project involves elevating the east-west rail line for almost two miles, taking it over the major arteries of Story and Belt Line roads. That part of the project would cost about $25 million.

Smaller projects to shift the line over or under the road are planned for three other crossings.

Remaining crossings would receive so-called quad gates that stretch across all lanes of traffic, preventing motorists from weaving around the gates when they are down.

Others would undergo a less costly modification that involves building several hundred feet of median on either side of the rail line to discourage motorists from inching around lowered crossing gates.

When the work will be done depends on financing and the timeline for building the elevated portion of the line, Mr. Blaydes said.

A mix of city, DART, state and federal dollars probably will be funneled toward the project.

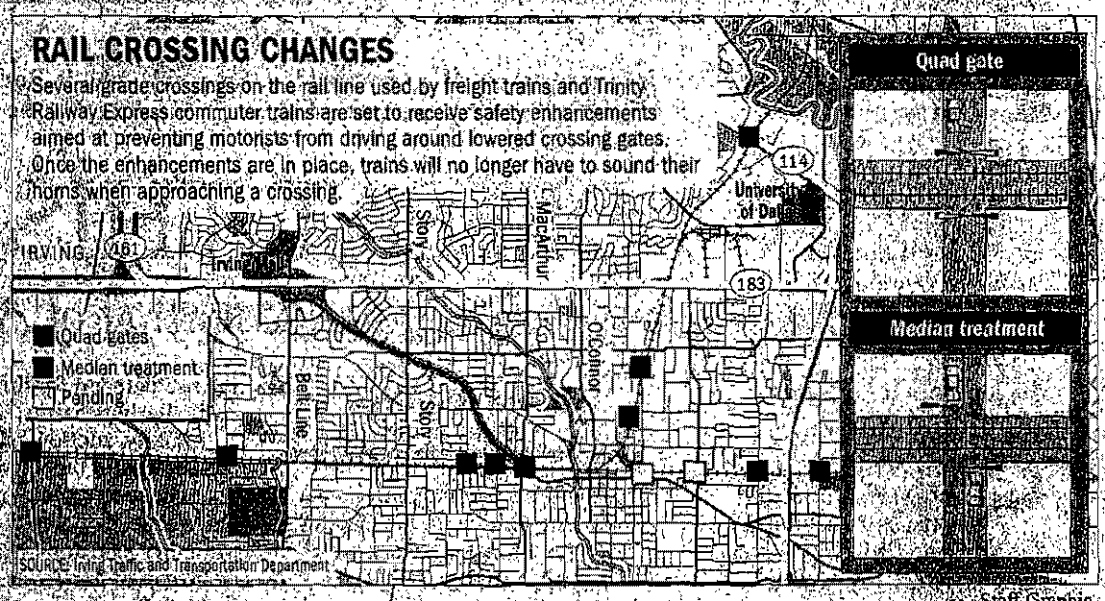
Officials are also waiting for new rules governing quiet zone crossings being developed by the Federal Railroad Administration. The rules are expected to come out this summer.

Some of the work, particularly elevating a section of the line, will probably be done in conjunction with a project already under way to add a second track so more trains can be run.

Elected officials say they hope the project will reduce the complaints they field from constituents about train whistles.

"When you're discussing quality of life and the trains that run through our city, this is the most important opportunity we have to improve," said Irving City Council member Linda Harper-Brown, who chairs the council's planning and development committee.

This story also appears in the Irving Morning News.



Staff Graphic

$30 million Irving plan seeks quieter, safer rail line crossings

Gates, medians, elevated tracks among project's proposed changes

By Lee Powell
Irving Bureau

IRVING — The bone-rattling train whistles heard in Irving soon may fall silent.

A $30 million plan is in the works to modify 18 rail crossings with additional gates and safety enhancements or to eliminate them by elevating stretches of track or tunneling beneath them. With the changes, trains would no longer need to sound their horns when approaching a crossing.

Although so-called quiet zones have been created at a few crossings in other area cities such as Richardson, nothing has been attempted on the scale of what is being proposed in Irving.

"In terms of a significant stretch of railroad, this is the biggest project I'm aware of in the area," said Lonnie Blaydes, Dallas Area Rapid Transit commuter rail vice president. "Irving's very interested in it, we're very interested in it, and it has lots of trains going through it."

The line most affected stretches less than 10 miles through Irving and is part of a 34-mile line between Dallas and Fort Worth that carries everything from Trinity Railway Express commuter trains to coal trains.

The plan is being designed to reduce traffic backups caused by the frequently passing trains.

Work also would be done on a rail line that begins near the South Irving station of the Trinity

Please see IRVING, 28A.

DMN 6-20-07