



# Community Transportation Plan

## Appendix B: Rail Road Quiet Zone



# Appendix B: Railroad Quiet Zone

## Federal Process to Create a New Quiet Zone

The following information provided on the creation of quiet zones has been referenced from the Final Rule: 49 CFR Parts 222 and 229 – *Use of Locomotive Horns at Highway-Rail Grade Crossings*. The document first went into effect on June 24, 2005, and was amended on August 17, 2006. This federal document preempts all state documents regarding the use of locomotive horns at public highway-railroad crossings; however, it does not preempt state documents regarding private highway-rail crossings or pedestrian crossings. If a new quiet zone is created and includes within its boundaries one or more private highway-rail crossings or pedestrian crossings, the crossings must be included in the quiet zone as well, and therefore, would fall under the regulations set forth by it. According to the FRA national inventory (website), there are no private highway-rail crossings in Decatur.

Diagnostic review teams must be created in order to review the private and pedestrian crossings and to provide recommendations. These crossings must have both cross-bucks and “STOP” signs at both approaches to the railroad crossing.

Four minimum requirements exist for all new quiet zones:

- The quiet zone must be a minimum length of one-half mile. The distance along the railroad corridor between the crossing at McDonough Street to the crossing at Atlanta Avenue is 0.54 miles. The distance between the crossing at Candler Street and the overpass over East Lake Drive is 1.17 miles. The quiet zone is permitted to cross jurisdictional boundaries as long as all affected parties are involved and in agreement.
- Flashing lights and gates must be installed at all at-grade crossings (public and private) as well as constant warning-time devices and power-out indicators.
- Advance warning signs must be installed that inform drivers that train horns are not being utilized at the crossings. These signs must be installed at all public and private crossings and must comply with all Manual on Uniform Traffic Control Devices (MUTCD) standards.
- All public, private, and pedestrian crossings within the quiet zone which have active automatic bells are required to maintain the use of these bells.

The final requirement that Decatur must meet is required safety standards which are determined by a group of calculations set forth by the FRA. If existing conditions do not meet the safety standards, any of three methods of meeting these criteria can be implemented which are:

- Supplementary Safety Measures (SSMs),
- Engineering Alternative Safety Measures (Engineering ASMs), or
- Non-Engineering Alternative Safety Measures (Non-Engineering ASMs).

If Decatur is able to meet the criteria using one of these methods, it is able to apply to create a new quiet zone. It must update its record of existing conditions on the national inventory within six months of notification of the quiet zone, notify all involved parties, and install all necessary signage and horns. Depending on the level of criteria which Decatur is able to meet, it will need to update the FRA either every four and a half to five years (SSMs installed) or every two and a half to three years (all other criteria).

The following section will outline the calculations and criteria used as well as the requirements of the SSM, Engineering ASM, and Non-Engineering ASM methods.

## Quiet Zone Calculations and Criteria

After all initial requirements have been met (or agreed to), the existing risk index is calculated for each public highway-railroad crossing within the proposed quiet zone. This calculation can be done using the FRA’s web-based quiet zone calculator: <http://www.fra.dot.gov/us/content/1337>. Averaging the risk

indices for all applicable crossings determines the Crossing Corridor Risk Index which equates to the Risk Index With Horns (RIWH). In order to calculate the Quiet Zone Risk Index (QZRI) or Crossing Risk Index Without Horns, each crossing's risk index is divided by 66.8% to account for the lack of horns at each crossing. The average of these new risk indices equals the QZRI.

The QZRI is then compared to the Nationwide Significant Risk Threshold (NSRT) which is calculated each year by the FRA. If the QZRI is less than the NSRT (that is, local risk is less than the nationwide index), then the corridor can be considered a quiet zone without additional measures being taken. Because the FRA recalculates the NSRT yearly, it would be possible for a corridor to meet the criteria one year but fail to meet the NSRT criteria in a future year, which would necessitate mitigating factors in order to maintain the quiet zone designation.

#### Supplemental Safety Measures (SSMs)

Supplementary Safety Measures (SSMs) should be considered if the QZRI is greater than the NSRT (local risk is greater than the nationwide index) or if Decatur would like to make safety improvements regardless of the calculations. The approved SSMs include the following:

- A four-quadrant gate system (includes one gate for each approach to prevent movement around gates, with or without presence detection);
- Gates with medians or channelization devices (to prevent vehicles from entering the opposing lane to circumvent the approach gates);
- One-way streets with gates (the travel lane must be completely blocked by the gate);
- Temporary closure of a public highway-rail grade crossing (only if partial quiet zones are implemented during segments of the day or night; most likely a 10 pm to 6 am quiet zone); or
- Permanent closure of a public highway-rail grade crossing.

If SSMs are applied at all at-grade crossings, Decatur can designate the area as a quiet zone without the formal approval of the FRA. Additionally, if SSMs are implemented at some crossings (but not all), and the resulting QZRI value is lower than the RIWH or the NSRT, Decatur also can designate the area as a quiet zone without the formal approval of the FRA. If the QZRI is still greater than both reference measures or SSMs are not feasible, then Modified or Alternative Safety Measures may be considered.

#### Modified Supplemental Safety Measures (Modified SSMs)

If one or more crossings have special circumstances which do not allow them to utilize SSMs, Decatur may present Modified SSMs to the FRA for approval. It is necessary for the jurisdiction to calculate estimates of effectiveness for the Modified SSMs using the quiet zone calculator on the FRA's website. If the FRA approves of the measures to be implemented, Decatur can proceed with the application. If the new QZRI for all crossings is less than the RIWH or the NSRT (or both), the application can be filed and is subject to FRA review. If the FRA approves the application, all SSMs (original and modified) would be installed, the national inventory would be updated, all necessary parties would be notified, and all signs and horns would be installed.

#### Engineering Alternative Safety Measures (Engineering ASMs)

Other engineering solutions can be determined in addition to the Modified SSMs. The Engineering ASMs include geometric modifications such as sight distance changes. In order to calculate the effectiveness of an Engineering ASM, it is necessary to conduct before and after studies (in three month intervals) to determine violation rates at the crossing. The violation rates are calculated as the number of violations per gate activation and must be determined using a statistically valid sample. A percent decrease is calculated by subtracting the old rate from the new rate and then dividing by the old rate. This measure of effectiveness is applied to the individual crossings and a new QZRI can be calculated. Once again, if the QZRI is less than the RIWH and/or the NSRT, the corridor can qualify for a new quiet zone, with approval from the FRA. All follow-up measures as in the Modified SSMs must be implemented as well.

#### Non-Engineering Alternative Safety Measures (Non-Engineering ASMs)

If SSMs, Modified SSMs, and Engineering ASMs are not feasible for crossings in the corridor, Decatur may use Non-Engineering ASMs in the creation of a new quiet zone. Three types of Non-Engineering ASMs may be implemented including programmed enforcement, public education and awareness, or photo enforcement. As with Engineering ASMs, violation rates must be calculated through field studies for the existing and modified scenarios. If the new QZRI value calculated is less than the RIWH and/or the NSRT, the public authority may apply to the FRA for approval of the new quiet zone. If the FRA approves the new quiet zone, all SSMs and ASMs must be installed and all final updates and notifications must be completed.

If none of the four measures are feasible or approved by the FRA, the corridor may not be able to be designated as a quiet zone. Continued communication between the City of Decatur and the FRA throughout the application period will allow for a more efficient and clearly defined process.

## **Decatur Calculations**

The best estimate of conditions in Decatur was used to test new quiet zone treatments. More detailed data collection is recommended to obtain updated daily traffic counts and crash statistics for the streets and intersections near each of the three at-grade rail crossings in Decatur.

Registration and Log-In: The FRA website listed earlier in this chapter includes the “quiet zone calculator” that was used in March 2007 by Kimley-Horn to test scenarios for the creation of a new quiet zone in Decatur. The on-line process was terminated just prior to completion so that no official application was made to FRA.

Create and Name Quiet Zone: A “dummy” new 24-hour quiet zone was created and named. A nighttime-only quiet zone was not tested.

Add Crossings to Zone: The FRA calculator accesses the national inventory, showing six active crossings between (and including) Sam’s Crossing on the east and East Lake Drive on the west. There appear to be three inactive crossings within this segment, so noted with a “n/a”. The inventory may need updating since Sam’s Crossing does not cross the railroad. East Lake Drive is an overpass so no at-grade crossing exists here. Similarly, there is a railroad overpass at Commerce Drive. East Lake Drive and Commerce Drive are accurately reported in the national inventory. Three at-grade rail-highway crossings are reported in the national inventory: Candler Street (RR milepost 164.73), McDonough Street (RR milepost 164.98), and Atlanta Avenue (RR milepost 165.52).

Update and Verify Crossing Information: The national inventory shows traffic counts on the roadway as well as the railroad (number of trains per day and number of trains during daylight hours). The maximum train speed to maintain the timetable is shown. Also shown are the number of tracks and the number of roadway travel lanes. It is possible to update this data and available traffic count data were used to update the inventory. The calculator indicates one train-vehicle crash reported in the past five years. For information, the FRA website contains crash histories for each crossing which show the following:

- Candler / CSX Crossing: 4 train-vehicle collisions (1978, 1986, 1987 and 2000) with no injuries.
- McDonough / CSX Crossing: 3 train-vehicle collisions (1992, 2002, 2006) with no injuries.
- Atlanta / CSX Crossing: 2 train-vehicle collisions (1987 and 1988) with 3 injuries.
- The past five-year crash history for each crossing was included as a factor in the on-line quiet zone calculation.

Manage Scenarios: While alternative engineering and non-engineering solutions (such as sight distance improvements, public education, photo enforcement and programmed enforcement) should be considered, these scenarios are not included in the calculator scenario testing module on the website. Instead, engineering solutions and scenarios were tested.

Existing Scenario: The existing condition in the Decatur corridor results in a Quiet Zone Risk Index (QZRI) of 75,000 which is higher than the Nationwide Significant Risk Threshold (NSRT) of 17,000 and

the Risk Index with Horns (RIWH) of 45,000. Therefore, Decatur's existing conditions do not qualify for a quiet zone.

Supplemental Safety Measure Testing: "Future Scenario A" tested with the FRA on-line "Quiet Zone Calculator" in March 2007 indicate that four-quadrant gates at the Atlanta Avenue crossing and a median island at the Candler / Trinity crossing may be close enough to qualify the CSX rail corridor through Decatur as a new quiet zone. However, the Nationwide Significant Risk Threshold changes yearly. The risk index variability may trap Decatur into a situation of initially. The combination of supplemental safety measures at Atlanta Avenue and Candler / Trinity result in a Quiet Zone Risk Index of 50,000 which is still 11 percent higher than the Risk Index With Horns of 45,000. Further measures are recommended for consideration.

"Future Scenario B" tested with the FRA calculator indicates that supplemental safety measures at the McDonough crossing, together with the aforementioned measures at Atlanta Avenue and Candler / Trinity crossings, would be sufficient to qualify for a new quiet zone. The supplemental safety measures tested at McDonough / Howard / College and the CSX rail corridor were median islands. Under this scenario, SSMS would be implemented at all three at-grade crossings, which means that the corridor qualifies as a quiet zone regardless of whether it meets the risk index criteria. However, the effect of all three SSMS is to change the Quiet Zone Risk Index in Decatur to 18,500 which is well within the requirement to be less than the Risk Index With Horns of 45,000, although it would still be (slightly) higher than the National Significant Risk Index of 17,000. The construction cost is estimated by FRA to be \$13,000 for the median islands and \$128,000 for the four-quadrant gates. These cost estimates have not been independently verified by the CTP.