

CHAPTER 2.0 - HORN NOISE

2.1 OVERVIEW

SEA determined early in the EIS process that the construction and operation of the proposed project had the potential, in certain areas, to result in significant adverse impacts as a result of increases in train-generated noise. SEA's review showed that these impacts would result from wayside noise—locomotive engines and wheel/rail noise—and horn noise—noise from locomotive horns when trains approach grade crossing locations to warn motorists and pedestrians of the on-coming train.

For the Draft EIS, SEA conducted a thorough analysis of noise, including actual noise readings along the existing rail line that included both wayside and horn noise. The number of noise sensitive receptors (homes, schools, churches, libraries, hospitals, etc.) along the alternatives proposed for new construction, as well as the entire existing DM&E mainline proposed for rehabilitation to support movement of unit coal trains, and the alternative alignments proposed by some communities to avoid use of the existing line through certain cities that could be exposed to adverse levels of noise, were evaluated.¹ SEA determined, as part of the Draft EIS evaluation, that project construction and operation could result in significant noise impacts, particularly from the increased traffic that would result on the existing line proposed for rehabilitation (from an average of 3 trains per day to as many as 37 trains per day). SEA proposed a variety of mitigation measures to address potential noise impacts should the project be approved.

¹ Draft EIS, Chapter 3, pages 3.1-34 to 3.1-55, 3.2-29 to 3.2-62, 3.3-16 to 3.3-18, 3.3-64 to 3.3-67, 3.4-19 to 3.4-20; Chapter 4, pages 4.1-35 to 4.1-55, 4.2-19 to 4.2-23, 4.3-28 to 4.3-61, 4.4-58 to 80, 4.5-10 to 4.5-13, 4.6-15 to 4.6-21, 4.7-6, 4.8-5, 4.9-20 to 4.9-24, 4.10-6, 4.10-12, 4.10-17, 4.10-22, 4.10-27, 4.10-32, 4.11-3 to 4.11-4, 4.11-11, 4.11-17, 4.11-25, 4.11-31, 4.11-35, and Appendix F.

The City of Rochester and others submitted comments on SEA's noise methodology and the results of the analysis presented in the Draft EIS. SEA reviewed its methodology and results for the Final EIS. In the Final EIS, SEA explained that its methodology was appropriate and its results accurate.² Thus, no substantive changes to SEA's earlier analysis were made or presented in the Final EIS. However, SEA recommended additional noise mitigation measures beyond those included in the Draft EIS. The Final EIS contained 11 separate conditions addressing the impacts of increased noise and vibration during rail construction, operation, and maintenance of the line.³ Nevertheless, consistent with its practice in other cases, SEA declined to recommend mitigation for horn noise because of safety concerns in the absence of final Federal Railroad Administration (FRA) standards for establishing quiet zones (areas where horns do not have to be sounded).

On judicial review of the Board's 2002 Decision in Mid States, the court affirmed SEA's noise methodology and the results it produced,⁴ and those issues are not part of this proceeding on remand. However, the court found that SEA had not taken the requisite hard look at whether to recommend any mitigation for horn noise, such as insulation treatments. The court stated:⁵

“[U]nlike the treatment given to wayside noise, SEA's discussion of the effects and mitigation possibilities for horn noise was relatively perfunctory. . . . We do not believe [that SEA's deference to FRA on safety issues] relieves SEA of the obligation to consider mitigation not involving the use of horns. . . . [Without] a reasoned discussion of its rationale, we cannot say that SEA has taken a “hard

² Final EIS, Chapter 9, page 9-44 to 9-47, Appendix M.

³ Final EIS, Chapter 12, pages 12-41 to 12-46.

⁴ 345 F.3d at 534-37.

⁵ Id. at 536.

look” at [horn noise and potential mitigation]. This is not to say that the Board must ultimately mitigate for horn noise, but it must at least explain why mitigation is unwarranted. Even though NEPA’s requirements are predominantly procedural, they do require that SEA ‘explain fully its course of inquiry, analysis, and reasoning.’”

In response to the court’s remand of the horn noise issue, the following sections provide an overview of the noise analysis presented in the EIS and the noise mitigation recommended in the Final EIS, all of which was imposed as part of the Board’s 2002 Decision. Then, SEA’s additional analysis of potential mitigation for horn noise, and what, if any, additional mitigation is appropriate for the City of Rochester and other communities, is presented and explained.

2.2 SUMMARY OF PREVIOUS ANALYSIS

SEA conducted a thorough analysis for the EIS of both wayside and horn noise that would result from the entire project (both the new line and the existing line) to determine the potential noise impacts of the proposed increases in rail traffic. Consistent with SEA’s standard procedure in cases such as this, the number of noise sensitive receptors (homes, schools, churches, libraries, hospitals, etc.) that could be exposed to adverse levels of noise⁶ from either wayside noise or horn noise (or both) were identified and evaluated.⁷ Adverse levels of noise were defined as exposure to an average daily noise level (L_{dn}) above 65 decibels (dB) on an A-

⁶ Other federal agencies including the Federal Aviation Administration and the Department of Housing and Urban Development, like the Board, consider noise levels up to 65 dBA L_{dn} to be compatible with most noise sensitive receptors and noise levels at or above that level to be adverse.

⁷ Footnote 1 of this Chapter.

weighted scale.⁸ Noise sensitive receptors that would be exposed to L_{dn} levels of at least 65 dBA and at least 70 dBA were presented in the Draft EIS.⁹

Furthermore, SEA studied the potential adverse noise impacts of three potential operating scenarios (20, 50, and 100 million tons of coal moving annually). SEA's noise methodology is explained in detail in the Draft EIS, Appendix F - Noise and Vibration.

Following its analysis, SEA concluded that the proximity of residential development along many portions of the existing line and the significant increases in rail traffic that would result from this project would expose large numbers of noise sensitive receptors to adverse levels of noise. This is an approximately 900-mile project when the approximately 600 miles of existing rail line are taken into account. Given the scope of the project, SEA determined that hundreds of noise sensitive receptors could be exposed to adverse levels of wayside noise and that thousands of noise sensitive receptors could be exposed to adverse levels of noise from horn soundings.¹⁰ SEA proposed a variety of mitigation measures to address these potential noise impacts, all of which the Board imposed in the 2002 Decision. These measures are summarized in the following section.

⁸ "dBA" refers to decibels of noise on an A-weighted scale (noise audible to the human ear). " L_{dn} " means average noise exposure over a 24-hour period, typically weighting the night-time noise more heavily. Here, each night-time train was counted as the equivalent of 10 daytime trains.

⁹ Draft EIS, Chapter 3, Tables 3.2-5 to 3.2-20, 3.3-3 to 3.3-5, 3.3-13 to 3.3-16, 3.4-3, Chapter 4, Tables 4.1-9, 4.2-6, 4.3-5 to 4.3-19, 4.4-18 to 4.4-37, 4.5-7 to 4.5-18, 4.6-10 to 4.6-27, 4.9-3 to 4.9-8, 4.10-2, and 4.10-11.

¹⁰ See footnote 1 of this chapter and previous footnote.

2.3 SUMMARY OF PREVIOUS NOISE MITIGATION

As discussed above, during the environmental review process, SEA recognized the potential for significant adverse impacts from increases in train-generated noise as a result of construction and operation of the proposed project. Indeed, 11 of the 147 environmental conditions imposed in the 2002 Decision (numbers 86-96 reproduced at Appendix C, pages 30 to 32) were specifically designed to address impacts from increased noise and vibration.

Consistent with prior Board approaches, the Board's noise mitigation (see condition number 95) included mitigation for noise-sensitive receptors, in communities without voluntary agreements, at various levels of rail traffic, that would be exposed to L_{dn} levels of 70 dBA and higher as a result of wayside noise generated by this project.¹¹ In the course of the environmental review, DM&E submitted negotiated agreements it had executed with 51 of the 56 affected communities on its existing line, setting forth mutually satisfactory measures for addressing potential environmental impacts on those communities and other issues of local concern. Condition number 120 would require DM&E to comply with all negotiated agreements developed with local communities.¹² SEA therefore determined that additional noise or other site-specific mitigation was unnecessary for these communities.

¹¹ That condition requires DM&E to mitigate wayside noise with a design goal of a 10 dBA noise reduction. The minimum noise reduction achieved must be 5 dBA.

¹² The Board encourages voluntary agreements between an applicant railroad and affected communities because privately negotiated solutions often are more effective, and in some cases more far-reaching, than any environmental mitigation options the Board could impose unilaterally. Therefore, when such agreements are submitted to it, the Board will generally require compliance with such negotiated agreements in lieu of local or site specific mitigation that it otherwise would impose. See Final EIS, Chapter 12 at 12-5 to 12-6; 49 CFR 1180.1(f)(2). Consistent with Board practice, the site-specific mitigation imposed in the 2002 Decision in this case (Condition numbers 121-144 and 145-147) apply only to those communities without negotiated agreements. But the general mitigation measures that were imposed (Condition number 1-119) would apply across-the-board unless specifically noted in the conditions themselves.

Two additional conditions (numbers 86 and 88) address construction noise and detail how DM&E must minimize noise and vibration impacts during rail line construction and rehabilitation activities. Other conditions (numbers 92 and 94) address rail design and the use of construction materials to eliminate or minimize certain types of rail noise through appropriate rail line design. The Board also included four measures associated with railroad maintenance (numbers 87, 91, 93, and 96) to minimize wheel, rail, and engine exhaust noise.

With respect to horn noise, the Board imposed one condition (number 90) requiring DM&E to consult with interested communities along both the new and existing rail line to identify measures, consistent with FRA standards, to eliminate the need to sound train horns. Another condition (number 89) requires compliance with established noise limits, including those for locomotive horns, for train operations. Although numerous comments on the Draft EIS, and again on judicial review in Mid States, raised concerns about train horn sounding and associated noise, SEA declined to develop its own mitigation addressing such issues as when horns could be sounded, horn volume, and the duration time of the horn blast in the EIS because of safety concerns. SEA was aware that FRA, the agency with primary expertise in matters involving railroad safety, had recently proposed nation-wide standards for horn soundings that would include standards for establishing “quiet zones”(areas where horns do not have to be sounded).¹³ While the FRA regulations were not finalized at the time the Final EIS was prepared, SEA expected that the final rule would be available prior to full operation of the proposed project.

SEA also anticipated that other conditions recommended in the Final EIS would reduce horn noise. For example, conditions 1, 121, 123, 129, 138, and 144 (reproduced at Appendix C,

¹³ Since the year 2000, FRA has allowed communities, state Departments of Transportation, and railroads mutually to establish quiet zones, if the state Department of Transportation agrees that this can be done safely. See Use of Locomotive Train Horns at Highway-Rail Grade Crossings, 64 Fed. Reg. 22302234 (January 13, 2000).

pages 22-23, and 35-37) provide for up-graded and more advanced crossing protection devices, which would indirectly assist communities in establishing quiet zones. The two grade separations required in Rochester, Minnesota and in Pierre, South Dakota (see condition numbers 121 and 138 reproduced at Appendix C, pages 35-36) would eliminate the need for horn soundings in those locations.

On judicial review, the court in Mid States recognized “*the important role that train horns play in reducing traffic accidents*” and “*declined to second guess the decision of SEA in refusing to limit the use of train horns.*”¹⁴ While the court specifically stated that it was not requiring the Board on remand to mitigate horn noise,¹⁵ the court directed the Board on remand to consider if there were any viable alternatives not involving limitations on the use of horns, such as insulation treatments.¹⁶

2.4 SEA’S ADDITIONAL REVIEW

In response to the court’s decision in Mid States, SEA has re-examined the issue of mitigation for horn noise. Following its further consideration of the matter, SEA has again decided that specific horn noise mitigation in this case would not be appropriate. The reasons for SEA’s decision are discussed below.

At the outset, SEA considers safety to be of paramount importance and consideration when evaluating rail projects and potential mitigation. It is well documented that train horn soundings play a vital role in protecting vehicles and pedestrians at grade crossings. In recent

¹⁴ 345 F. 3d. at 536.

¹⁵ Id.

¹⁶ Id.

years, FRA has reported in several different studies, that discontinuance of horn sounding at grade crossings results in dramatic increases in train-vehicle accidents. In fact, FRA ended whistle bans in Florida by emergency order on July 26, 1991, in response to the increase in collisions at whistle ban crossings.¹⁷

Recognizing the importance of safety at rail/vehicle grade crossings and issues regarding horn sounding and quiet zones, Congress directed FRA to develop and issue regulations requiring the use of locomotive horns at public grade crossings. In doing so, Congress provided FRA with authority to allow exceptions to the horn sounding requirement. On December 18, 2003, FRA published its Use of Locomotive Horns at Highway-Rail Grade Crossings; Interim Final Rule.¹⁸ The interim rule took effect on December 18, 2004. The Interim Rule establishes requirements for locomotive horn soundings while a train is approaching and entering a public highway-rail crossing. It mandates the sounding of locomotive horns at grade crossings and establishes guidelines for those soundings on such issues as volume of horn, sounding time, and sounding distance from a grade crossing.

An important part of the Interim Rule is the establishment of conditions under which locomotive horn soundings can be eliminated without compromising safety. Under the Interim Rule, horn sounding can be eliminated where there is not a significant risk of loss of life or serious personal injury, use of locomotive horns is impractical, or safety measures fully compensate for the absence of the warning provided by the horns.

¹⁷ FRA has evaluated experience with horn-free crossings in Florida and determined that train/vehicle accidents increased between 195% and 500% at crossings where horn soundings were banned. See Draft EIS, Chapter 3 at 3.2-61.

¹⁸ 49 CFR, Parts 222 and 229.

With the publication of the Interim Rule, communities now have an established process under which they can work with FRA to eliminate locomotive horn soundings and develop quiet zones, when appropriate. For example, horns can be eliminated with supplementary or alternative safety measures (SSMs or ASMs) such as flashing lights and gates, following consultation with local officials, the public, and approval by FRA.

Because FRA approval is required for any elimination of locomotive horn soundings under the Interim Rule, SEA continues to believe that any attempt by the Board to allow for the elimination of locomotive horn soundings, address the level of horn sound, how long the horn should be sounded, or establish quiet zones would be inappropriate. In short, while SEA reaffirms here that the noise mitigation conditions previously imposed by the Board (including conditions 89 and 90 related to horn noise discussed above) are reasonable and warranted, SEA continues to believe that, given the process set out in the Interim Rule, it would not be appropriate for the Board to impose any measures adopting its own standards for when locomotive horn soundings should take place.

Furthermore, SEA notes that the installation of grade crossing protection measures imposed by the Board in its 2002 Decision, and the grade separated crossings that would be required in Rochester and Pierre, will have the effect of limiting horn noise if the construction and operation of this line is approved and implemented. Also, as discussed above, some 51 negotiated community agreements address horn noise.

As directed by the court, SEA's evaluation of horn noise here has focused on whether potential mitigation at the noise sensitive receptors themselves would be warranted to address potential horn noise in this case. For example, to mitigate noise sensitive receptors where horn noise (either alone or in connection with wayside noise) would exceed L_{dn} 70 dBA, SEA could recommend that the Board impose measures to improve the sound-proofing of the noise sensitive

receptors themselves, such as requiring additional insulation, newer insulated windows, or air conditioning to reduce the need to open windows for ventilation.

Based on the information available at this point, SEA has decided not to recommend mitigation for horn noise at the receptors themselves in this matter. Doing so would depart from the Board's prior approach, in rail merger and construction cases such as this, of only imposing mitigation for wayside noise. Moreover, the EIS indicated that many of the noise sensitive receptor locations with substantial horn noise also would experience wayside noise levels of L_{dn} 70 dBA or higher. Thus, these locations would already benefit from the Board's noise mitigation. The record here also makes it clear that DM&E would not reach its full operational level of 100 million tons of annual coal transportation for several years after coal operations begin. In fact, several alternative interchange locations along DM&E's existing system would allow interchange of coal traffic with other carriers so that, even at the full 100-million-ton level, some communities, especially those further east, might never experience the full level of 37 trains per day and associated levels of noise, including horn noise.¹⁹ Additionally, as discussed above, horn noise would be reduced to some extent by the grade crossing improvements and grade-separated crossing that the Board's current mitigation would require, as well as the negotiated agreements between DM&E and 51 of the 56 communities on the existing line. Furthermore, FRA's Interim Rule—which went into effect after completion of the EIS and issuance of the 2002 Decision—provides an additional means to reduce potential horn noise as a result of this project. In short, horn noise mitigation does not seem to be appropriate given Board precedent, uncertainty that 37 coal trains per day actually would come through the potentially affected communities, and the other avenues that are already available to reduce, to some extent, the need to sound horns.

¹⁹ The routing and amount of coal traffic will depend on the coal transportation contracts with utilities that DM&E may obtain in the future.

Finally, requiring horn noise mitigation at the noise receptors themselves would be extremely costly, given the broad geographic scope of this project (about 900 miles including both the new and existing line). Potentially, many thousands of noise sensitive receptors could be exposed to adverse noise levels due to horn soundings from DM&E's coal trains. Based on its analysis for the Draft EIS, SEA determined that 8,943 noise sensitive receptors in Minnesota and 3,945 noise sensitive receptors in South Dakota (a total of 12,888) would experience noise levels of 70 dBA L_{dn} due to horn soundings at the full projected 100-million-ton level of rail transport. Of these, 4,352, or 34 percent, would be in the 5 communities without negotiated agreements.

SEA estimated a cost of \$1,000 to \$4,000 per noise sensitive receptor to achieve a 5-10 dBA noise reduction.²⁰ At this cost, to mitigate for all noise sensitive receptors experiencing 70 dBA L_{dn} due to horn noise in communities without negotiated agreements would cost \$4.3 to \$17.4 million. In SEA's view, a strong argument can be made that imposing this additional cost would unreasonably burden the project, given the already high cost of the existing environmental mitigation (estimated to be between \$103 and \$140 million dollars or about 10 percent of this \$1.4 billion project) .

In addition, SEA is concerned that recommending mitigation for horn noise in communities without negotiated agreements could undermine the extensive efforts of DM&E and 51 of the 56 communities along the existing line to develop negotiated agreements, perhaps causing some communities to opt out of their negotiated agreements in order to obtain more noise mitigation. If this occurred, the Board could be asked to impose mitigation for the 8,536 noise sensitive receptors within the communities currently with negotiated agreements that would be exposed to 70 dBA L_{dn} of horn noise. The resulting cost to the railroad would be an

²⁰ Final EIS, Chapter 12, Attachment C.

additional \$8.5 to \$34.1 million. For all these reasons, SEA is not recommending mitigation for horn noise at the noise sensitive receptor locations at this point.

For this Draft SEIS, SEA has also investigated the potential construction of sound walls along portions of the existing line bordered by adjacent residential areas. Rochester, in comments submitted to SEA dated January 6, 1999, had contemplated construction of sound barriers along the existing rail line through Rochester and other neighboring communities. Rochester estimated approximately 12,600 feet of sound wall along both sides of the rail line (25,200 total linear feet), 20 feet tall,²¹ would be required to address potential rail noise issues in Rochester. At an estimated cost of \$230 per linear foot (based on 1999 cost estimates), sound walls in Rochester alone would cost approximately \$5.8 million.

SEA has further estimated that if sound walls were implemented for the other communities on the existing line without negotiated agreements, an additional 21,000 linear feet of sound wall, for an additional cost of approximately \$4.8 million, would be required, including 4,000 feet and 9,000 feet, respectively in Pierre and Brookings, South Dakota, and 8,000 feet in Mankato.²² All totaled, sound barriers in these communities would cost over \$10.6 million.

Outside the cost issue, sound barriers of 20 feet in height for long distances along the existing rail line within these communities would raise additional concerns. Sound barriers do not eliminate noise. Unlike acoustical surfaces capable of absorbing noise, outside sound wall and barriers generally must be hard, impermeable surfaces to withstand weather and have the

²¹ Sound walls of 20 feet or higher would be required due to the locomotive horn being approximately 15 feet above the rail, which is typically located on top of a rail bed raised above the adjacent land to provide suitable drainage.

²² SEA determined no sound barriers in Chester, Minnesota warranted consideration due to the minimal length of residential development along the existing line through this community.

structural stability to extend 20 feet or more into the air. These structures reduce noise levels by deflecting sound waves, which in this case would be deflected back into the corridor between the barriers or potentially over the top of the barriers. However, numerous road crossings in Rochester and the other communities at issue here would create openings in the barriers which would allow sound to escape. In short, the effectiveness of sound barriers to reduce horn or other rail noise in communities like Rochester is uncertain.

Also, in many locations sound barriers would be constructed along the backyards of adjacent residences. These walls would create a significant, permanent visual component in these areas. Maintenance and potential vandalism (particularly graffiti) would create ongoing concerns and cost issues for DM&E, the community, and adjacent residents.

Additionally, sound walls, particularly on both sides of the rail line could create safety hazards. Pedestrians or pets caught between openings for road crossings would have no means to escape from the right-of-way during train passings. Portions of an existing bike/walking trail in Rochester would likely have to be relocated onto property adjacent to the rail right-of-way to avoid location between barrier walls. Sound barriers would also create significant visual obstructions to motorists and locomotive engineers when approaching grade crossings, preventing motorists from seeing approaching trains and engineers from seeing traffic at grade crossings until nearly at the crossing, leaving insufficient time for vehicles or trains to slow or stop to avoid collisions.

Finally, SEA is concerned that implementation of sound barriers could undermine negotiated agreements, as it could for insulation treatment of noise sensitive receptors, discussed previously. These concerns, combined with the significant cost of sound barriers, their questionable effectiveness and potential safety issues, prevent SEA from recommending that they be required as horn noise mitigation in this case.

2.5 CONCLUSIONS

SEA conducted a thorough and extensive evaluation and assessment of the potential noise impacts associated with the proposed increases in rail traffic associated with the proposed Powder River Basin Expansion Project during the EIS process. SEA determined that significant noise impacts would result from the construction and operation of up to 34 additional trains per day along the new rail line and the existing DM&E main line. The court upheld SEA's methodology and most of SEA's noise analysis but indicated that SEA had not adequately explained why mitigation for horn noise impacts had not been recommended.

In the EIS, SEA determined that thousands of noise sensitive receptors could be exposed to adverse levels of noise due to train horn soundings. SEA recommended 11 mitigation measures to address potential noise impacts, including measures that will have the effect of reducing horn soundings (i.e. grade crossing improvements, including grade separated crossings in Rochester, Minnesota and Pierre, South Dakota). All of these mitigation conditions were imposed by the Board. However, consistent with past cases, SEA continues to believe that additional mitigation for horn noise soundings, including mitigation such as insulation treatments, at the noise receptor locations, or sound walls, is neither reasonable nor warranted. This decision is based on:

- train horn soundings are a safety issue regulated by FRA,
- FRA's Interim Rule establishing train horn sounding regulations and procedures to establish quiet zones now provides all of the communities affected by this project the opportunity to eliminate or reduce train horn soundings without compromising safety through community and railroad cooperation,

- numerous agreements negotiated between communities along the existing rail line and DM&E address the concerns of the local communities along the new and existing line, including noise,
- the fact that the Board has never imposed mitigation for horn (as opposed to wayside) noise, and,
- cost—given the broad geographic scope of this 900-mile project (including both the new and existing line) and the number of potential receptors, requiring DM&E to mitigate the thousands of sensitive noise receptors potentially affected by horn noise by means such as insulation or sound barriers, would be very costly. Sound barriers would also create potential safety hazards and might not be effective.

In sum, based on SEA's further review of the issue of horn noise, SEA does not recommend any additional noise mitigation to address adverse impacts from train horn soundings beyond those already recommended and imposed.