STB FD 33388 5-22-98 K 29206V6B 10/12

APPENDIX I
Air Quality Analysis

[THIS PAGE INTENTIONALLY LEFT BLANK]

CONTENTS

TABLES

ATTACHMENTS

APPENDIX I
AIR QUALITY ANALYSIS

This appendix describes the additional air quality analyses that the Section of Environmental Analysis (SEA) of the Surface Transportation Board (the Board) conducted for the Final Environmental Impact Statement (Final EIS) of the proposed Conrail Acquisition. SEA conducted additional air quality analyses in response to public comments on the Draft EIS and for updated railroad operations data that the Applicants[1] provided after preparation of the Draft EIS.

I.1 EMISSIONS ANALYSES

Appendix E, "Air Quality," of the Draft EIS describes the initial emissions analysis that SEA conducted. Chapter 4, "System-wide and Regional Setting, Impacts, and Proposed Mitigation," of the Draft EIS presents the results of SEA's initial system-wide and regional impact analysis. Chapter 5, "State Settings, Impacts, and Proposed Mitigation," of the Draft EIS presents the results of SEA's initial emissions analysis for counties or other local jurisdictions. SEA conducted additional emissions analyses to determine the potential air quality impacts associated with:

- Increased rail activity in three counties (Butler, Hamilton, and Ottawa Counties, Ohio) that SEA did not analyze in the Draft EIS, and revised information provided by the Applicants on rail activity in two counties (Vanderburgh County, Indiana, and Wayne County, Michigan) that SEA had analyzed in the Draft EIS.

- Additional rail segments that would meet or exceed the Board's thresholds for environmental analysis due to Inconsistent and Responsive applications and Settlement Agreements.

SEA conducted its additional emissions analyses using the same process in the Final EIS that it used in the Draft EIS. (See Draft EIS, Appendix E, "Air Quality," Section E.6, "County Emissions Estimation.") SEA developed the following five-step process for its emissions analysis:

---

[1] "The Applicants" refers to CSX Corporation and CSX Transportation, Inc. (CSX); Norfolk Southern Corporation and Norfolk Southern Railway Company (NS); and Conrail, Inc., and Consolidated Rail Corporation (Conrail).

1. Determine which rail line segments, intermodal facilities, and/or rail yards would meet or exceed the Board's thresholds for air quality analysis if the Board approves the proposed Conrail Acquisition.

2. Identify counties or independent jurisdictions that include portions of rail line segments, intermodal facilities, and rail yards that would meet or exceed the Board's thresholds for environmental analysis of air quality impacts.

3. Total the estimated emissions increases on the portions of rail line segments, intermodal facilities, and/or rail yards in the counties/jurisdictions identified.

4. Compare total estimated emissions increases for the affected counties/jurisdictions with the emissions screening levels that SEA developed based on U.S. Environmental Protection Agency (EPA) emissions levels for stationary source permitting. (See Table I-1.)

5. Conduct a detailed emissions analysis for the counties in which the estimated emissions increase would exceed the appropriate emissions screening level. The detailed analysis considers all potential emissions increases and decreases from the proposed Conrail Acquisition and related activities.

TABLE I-1
COUNTY/JURISDICTION EMISSIONS SCREENING LEVELS

Pollutant	Area Designation	Emissions Screening Level[a] (tons per year)
Nitrogen Oxides (NO_x)	NO_2 Attainment/Maintenance Area or Ozone (O_3) Marginal/Moderate Nonattainment Area (NAA) or O_3 Attainment/Maintenance	100
	O_3 Serious NAA	50
	O_3 Severe NAA	25
Volatile Organic Compounds (VOCs)	O_3 Attainment/Maintenance Outside Northeast Ozone Transport Region (OTR)[b] or O_3 Marginal/Moderate NAA Outside OTR	100
	O_3 Attainment/Maintenance Inside OTR or O_3 Marginal/Moderate NAA Inside OTR or O_3 Serious NAA	50
	O_3 Severe NAA	25

TABLE I-1
COUNTY/JURISDICTION EMISSIONS SCREENING LEVELS

Pollutant	Area Designation	Emissions Screening Level[a] (tons per year)
Carbon Monoxide (CO)	CO Attainment/Maintenance or CO Marginal/Moderate NAA	100
	CO Serious NAA	50
Particles < 10 Microns (PM_{10})	PM_{10} Attainment/Maintenance or PM_{10} Moderate NAA	100
	PM_{10} Serious NAA	70
Sulfur Dioxide (SO_2)	SO_2 Attainment or NAA	100
Lead	Lead Attainment or NAA	0.6

[a] The emissions screening levels for NO_x, VOCs, CO, PM_{10}, and SO_2 are based on EPA general conformity emission thresholds and Clean Air Act Amendments Title V emission thresholds. The emissions screening level for lead is based on EPA New Source Review emission threshold for major modification.

[b] The OTR is an area consisting of the northeastern states (from Maine through Pennsylvania and northern Virginia) that was delineated by the 1990 Clean Air Act Amendments as an area of special concern because of substantial transport of ozone and its precursor pollutants (NO_x and VOCs) across state and county boundaries.

I.1.1 Additional and Revised Emissions Analyses

SEA conducted emissions analyses for three additional counties that SEA did not analyze in the Draft EIS. The additional counties for which SEA conducted emissions analyses are Butler, Hamilton, and Ottawa Counties in Ohio. If the Board approves the proposed Conrail Acquisition, the rail line segments, intermodal facilities, and/or rail yards in Butler, Hamilton, and Ottawa Counties, Ohio would meet or exceed the Board's threshold for environmental analysis of air quality impacts. SEA did not include an analysis of these counties in the Draft EIS because it did not have the data to calculate the emissions prior to preparation of the Draft EIS.

SEA revised its emissions analysis of Wayne County, Michigan, using updated information the Applicants provided after issuance of the Draft EIS. SEA's revised emissions analysis of Wayne County reflects NS's revised Operating Plan for the proposed Conrail Acquisition for:

- Rail line segment N-121 (West Detroit, Michigan, to Jackson, Michigan).
- Rail line segment C-214 (Detroit, Michigan, to Plymouth, Michigan).

- Rail line segment C-215 (Plymouth, Michigan, to Grand Rapids, Michigan).

NS's revised plan decreases the estimated amount of freight hauled annually on each of these rail line segments. Therefore, the emissions in Wayne County will be smaller than previously estimated. SEA also revised its analysis of Vanderburgh County, Indiana, to reflect slightly lower train traffic levels as a result of CSX's Settlement Agreement with the Louisville and Indiana Railroad. (See Section I.1.2, "Additional Emissions Analysis Associated With Increased Traffic from Inconsistent and Responsive Applications and Settlement Agreements.")

SEA's estimated emissions increases for activities that would meet or exceed the Board's thresholds for environmental analysis of air quality impacts did not exceed the appropriate screening level for any of the pollutants except nitrogen oxides (NO_x) in these counties. SEA, therefore, did not perform a detailed emissions analysis for any pollutants other than NO_x. The following sections provide the results of NO_x emissions analyses for the five additional counties.

Butler County, Ohio

Butler County is designated by the EPA as a moderate nonattainment area for ozone. The emission screening level for NO_x in Butler County is 100 tons per year. Table I-2 shows the results of SEA's NO_x emissions analysis for Butler County. SEA determined that the proposed Conrail Acquisition would result in a net increase in NO_x emissions in Butler County above the NO_x emissions screening level of 100 tons per year.

TABLE I-2
BUTLER COUNTY, OHIO
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (Railroad)	Identification	NO_x Emissions (tons/year)
Rail Line Segment (NS)	Dayton, OH to Ivorydale, OH	83.63
Rail Line Segment (NS)	Muncie, IN to Ivorydale, OH	65.21
Rail Line Segment (CSX)	Cincinnati, OH to Hamilton, OH	28.76
Rail Line Segment (CSX)	Middletown Jct., OH to Middletown, OH	-7.33
Rail Line Segment (CSX)	Indianapolis, IN to Hamilton, OH	15.51
Rail Yard (CSX)	Hamilton, OH	-10.14
Rail Yard (CSX)	Middletown, OH - Excello, OH	0.28
Truck Diversion (both)	County-wide	-8.81
Highway/Rail At-Grade	Affected Crossings >5,000 Vehicles/Day*	4.78
Total Acquisition-related Net Nitrogen Oxides Emissions Increase		171.89

TABLE I-2
BUTLER COUNTY, OHIO
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (Railroad)	Identification	NO_x Emissions (tons/year)
Nitrogen Oxides Emissions Screening Level		100.00
Existing (1995) County Total Nitrogen Oxides Emissions		17,272.22
Percent Increase in County Nitrogen Oxides Emissions		1.00%

The estimated increase in NO_x emissions in Butler County represents a 1.0 percent increase in the existing (1995) county-wide NO_x emissions (EPA, 1996). SEA does not expect that the estimated 1.0 percent increase in NO_x emissions would have a significant adverse impact on ozone attainment in the county. (See Draft EIS, Chapter 4, "System-wide and Regional Setting, Impacts, and Proposed Mitigation," for a discussion of system-wide and regional air quality.)

Hamilton County, Ohio

Hamilton County is designated by the EPA as a moderate nonattainment area for ozone. The emission screening level for NO_x in Hamilton County is 100 tons per year. Table I-3 shows the results of SEA's analysis of NO_x emissions for Hamilton County. SEA determined that the proposed Conrail Acquisition would result in a net decrease in NO_x emissions in Hamilton County of more than 50 tons per year. Based on these results, SEA did not perform further analysis for this county.

TABLE I-3
HAMILTON COUNTY, OHIO
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (Railroad)	Identification	Nitrogen Oxides Emissions (tons/year)
Rail Line Segment (NS)	Dayton, OH to Ivorydale, OH	40.19
Rail Line Segment (NS)	Ivorydale, OH to Cincinnati, OH	37.23
Rail Line Segment (NS)	Sardenia, OH to Norwood, OH	-23.28
Rail Line Segment (NS)	Norwood, OH to Ivorydale, OH	-7.99
Rail Line Segment (NS)	Cincinnati, OH to SJ Jct, KY	0.51
Rail Line Segment (CSX)	Cincinnati, OH to Hamilton, OH	59.83
Rail Line Segment (CSX)	Cincinnati, OH to Columbus, OH	9.31
Rail Line Segment (CSX)	Cincinnati, OH to Mitchell, OH	-98.99
Rail Line Segment (CSX)	Cincinnati, OH to Covington, OH	2.92

TABLE I-3
HAMILTON COUNTY, OHIO
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (Railroad)	Identification	Nitrogen Oxides Emissions (tons/year)
Rail Yard (NS)	Cincinnati, OH	1.44
Rail Yard (NS)	Sharonville, OH	-0.10
Rail Yard (CSX)	Cincinnati, OH - Decoursey	-5.05
Rail Yard (CSX)	Cincinnati, OH - Ivorydale	-4.66
Rail Yard (CSX)	Cincinnati, OH - Queensgate Yd	-15.55
Rail Yard (CSX)	Cincinnati, OH - Springdale	-2.97
Intermodal Facility (NS)	Cincinnati, OH - Gest Street	5.53
Intermodal Facility (CSX)	Cincinnati, OH	2.06
Truck Diversions (both)	County-wide	-53.03
Highway/Rail At-grade	Affected Crossings >5,000	0.88
Total Acquisition-related Net Nitrogen Oxides Emissions Increase		-51.72
Nitrogen Oxides Emissions Screening Level		100.00

* "Affected Crossings" are those with an increase in rail line segment activity over the Board's thresholds for air quality analysis, and which have vehicle traffic levels over 5,000 vehicles per day.

Ottawa County, Ohio

Ottawa County is designated by EPA as an attainment area for all pollutants, with no maintenance areas for any pollutant. The emission screening level for NO_x in Ottawa County is 100 tons per year. Table I-4 shows the results of SEA's analysis of NO_x emissions for Ottawa County. SEA determined that the proposed Conrail Acquisition would result in a net decrease in NO_x emissions in Ottawa County of more than 7 tons per year. Based on these results, SEA did not perform further analysis for this county.

TABLE I-4
OTTAWA COUNTY, OHIO
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (RR)	Identification	Nitrogen Oxides Emissions (tons/year)
Rail Line Segment (NS)	Oak Harbor, OH to Bellevue, OH	53.28
Rail Line Segment (NS)	Vemilion, OH to Oak Harbor, OH	-124.84
Rail Line Segment (NS)	Homestead, OH to Oak Harbor, OH	-39.09

TABLE I-4
OTTAWA COUNTY, OHIO
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (RR)	Identification	Nitrogen Oxides Emissions (tons/year)
Rail Line Segment (NS)	Oak Harbor, OH to Miami, OH	103.44
Highway/Rail At-grade Crossings (both)	Affected Crossings >5,000 Vehicles/Day[a]	0.04
Total Acquisition-related Net Nitrogen Oxides Emissions Increase		7.17
Nitrogen Oxides Emissions Screening Level		100.00

[a] "Affected Crossings" are those with an increase in rail line segment activity over the Board's thresholds for air quality analysis, and which have vehicle traffic levels over 5,000 vehicles per day.

Wayne County, Michigan

Wayne County is designated by EPA as a maintenance area for ozone. The emissions screening level for NO_x in Wayne County is 100 tons per year. Table I-5 shows the results of SEA's NO_x emissions analysis for Wayne County. SEA determined that the proposed Conrail Acquisition would result in a net increase in NO_x emissions in Wayne County above the emissions screening level of 100 tons per year.

TABLE I-5
WAYNE COUNTY, MICHIGAN
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (RR)	Identification	NO_x Emissions (tons/year)
Rail Segment (CSX)	Detroit, MI to Plymouth, MI	-28.85
Rail Segment (CSX)	Plymouth, MI to Grand Rapids, MI	-12.44
Rail Segment (CSX)	Wixom, MI to Plymouth, MI	4.47
Rail Segment (CSX)	Plymouth, MI to Wayne, MI	6.46
Rail Segment (CSX)	Wayne, MI to Carleton, MI	62.96
Rail Segment (NS)	W Detroit, MI to Jackson, MI	-11.80
Rail Segment (NS)	Airline, OH to River Rouge, MI	12.40
Rail Segment (NS)	Oakwood, MI to Butler, IN	36.04
Rail Segment (NS)	St Thomas, ON to W Detroit, MI	1.02
Rail Segment (SA)	Carleton, MI to Ecorse, MI	88.76
Rail Segment (SA)	W Detroit, MI to North Yard, MI	21.11

TABLE I-5
WAYNE COUNTY, MICHIGAN
ANNUAL NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (RR)	Identification	NO_x Emissions (tons/year)
Rail Segment (SA)	W Detroit, MI to Delray, MI	8.98
Rail Segment (SA)	Delray, MI to Trenton, MI	-16.07
Rail Yard (CSX)	Detroit - Lincoln Park	-0.21
Rail Yard (CSX)	Detroit - Livernois	-4.68
Rail Yard (CSX)	Detroit - Mound Road	0.01
Rail Yard (CSX)	Detroit - North Yard	-5.14
Rail Yard (CSX)	Detroit - River Rogue	-9.22
Rail Yard (CSX)	Detroit - Warren/Sterl	1.21
Rail Yard (CSX)	Detroit - Middlebelt	-2.81
Rail Yard (CSX)	Detroit - Plymouth	1.03
Rail Yard (CSX)	Detroit - Rougemere	14.03
Rail Yard (CSX)	Detroit - Wayne	2.17
Rail Yard (NS)	Detroit - Livernois	-2.76
Rail Yard (NS)	Detroit - North Yard	-2.54
Rail Yard (NS)	Detroit - River Rouge	-6.13
Intermodal Facility (CSX)	Detroit - Livernois	5.10
Intermodal Facility (NS)	Detroit - Livernois	-2.44
Intermodal Facility (NS)	Detroit - Delray	6.55
Intermodal Facility (NS)	Detroit - Oakwood/Melvindale	7.65
Truck Diversions (both)	County-wide	-53.73
At-Grade Crossings (both)	Affected Crossings >5,000 Vehicles/Day[a]	0.27
Total Acquisition-Related Net NO_x Emissions Increase		121.40
NO_x Emissions Screening Level		100.00
Existing (1995) County Total NO_x Emissions		124,884.14
Percent Increase in County NO_x Emissions		0.10%

[a] "Affected Crossings" are those with an increase in rail segment activity over Board air quality analysis thresholds, and which have vehicle traffic levels over 5,000 vehicles/day.

The estimated increase in NO_x emissions in Wayne County represents a 0.1 percent increase in the existing (1995) county-wide NO_x emissions (EPA, 1996). Because this is well below 1.0 percent of the existing NO_x emissions, SEA does not expect a significant impact to local (county)

ozone levels as a result of the proposed Conrail Acquisition. (See Draft EIS, Chapter 4, "System-wide and Regional Setting, Impacts, and Proposed Mitigation," for a discussion of system-wide and regional air quality.) In addition, SEA anticipates that implementation of proposed new EPA emissions standards for locomotives will more than offset the estimated increase within a few years after their implementation. (See Appendix O, "EPA Rules on Locomotive Emissions," of this Final EIS.)

I.1.2 Additional Emissions Analysis Associated With Increased Traffic from Inconsistent and Responsive Applications and Settlement Agreements

Inconsistent and Responsive Applications

Two Inconsistent and Responsive (IR) applicants requested trackage rights over the same rail line segment in Albany, New York (10 miles of rail line segment C-726, between rail line segment C-187 and Selkirk in Albany and Rensselaer Counties). Each IR applicant proposed an additional 2 trains per day on this rail line segment. Although this rail line segment would have no projected increase in traffic as a result of the proposed Conrail Acquisition, the Board's approval of these two IR applications would result in an increase in train traffic of 4 trains per day, which would exceed the Board's threshold for air quality analysis. Therefore, SEA conducted emissions analyses for Albany and Rensselaer Counties, where the rail line segment is located.

Because neither IR applicant provided information on the amount of freight that would be transported over the rail line segment as a result of their proposals, SEA estimated the annual amount of freight (in million gross tons) in order to calculate emissions resulting from the proposed additional traffic. SEA's estimate is based on the annual amount of freight per train on all rail line segments included in the detailed emissions analysis presented in the Draft EIS. SEA calculated the pollutant emissions resulting from the additional 4 trains per day on the subject rail line segment using its estimated freight-per-train value and the pollutant specific emission factors presented in the Draft EIS. (See Draft EIS, Appendix E, "Air Quality," Section E.7, "Emissions Factors," for emission factors and calculation methodology.)

The following sections provide the results of SEA's emissions analyses of Albany and Rensselaer Counties. SEA's estimated emissions increases for the proposed additional train traffic on rail line segment C-726 do not exceed the appropriate screening level for any of the criteria pollutants. Therefore, SEA did not perform a detailed emissions analysis for the two counties affected by the IR applications.

<u>Albany County, New York</u>. Albany County is designated by EPA as a marginal nonattainment area for ozone. SEA estimated increases in emissions for each of the rail facilities in Albany County that would experience an increase in traffic or activity and meet or exceed the Board's thresholds for environmental analysis as a result of the proposed Conrail Acquisition and IR applications. (See Table I-6.) Although the increased traffic would result in an increase in

emissions, the estimated increase is below the screening level for each of the pollutants. (See Table I-1.)

Rensselaer County, New York. Rensselaer County is designated by EPA as a marginal nonattainment area for ozone. SEA estimated increases in emissions for the rail facilities in Rensselaer County that would experience an increase in traffic or activity and meet or exceed the Board's thresholds for environmental analysis as a result of the proposed Conrail Acquisition and IR applications. (See Table I-7.) Although the increased traffic would result in an increase in emissions, the estimated increase is below the screening level for each of the pollutants. (See Table I-1.)

TABLE I-6
ESTIMATED INCREASES IN EMISSIONS IN ALBANY COUNTY

Rail Line Segment	Length of Segment within County (miles)	Change in Trains Per Day	Change in MGT[a]	Estimated Increases in Emissions (tons/year)					
				NO_x[b]	VOCs[c]	CO[d]	PM_{10}[e]	SO_2[f]	Lead
C-054	13	6.5	9.90	50.00	1.90	5.50	1.30	3.20	$1.1x10^{-4}$
C-726	4.7	4.0	8.24	15.09	0.56	1.68	0.38	0.98	$3.2x10^{-5}$
Total for Albany County				65.09	2.46	7.18	1.68	4.18	$1.4x10^{-4}$

[a] Million gross tons.
[b] Nitrogen oxides.
[c] Volatile Organic Compounds.
[d] Carbon monoxide.
[e] Particles less than 10 microns in diameter.
[f] Sulfur dioxide.

TABLE I-7
ESTIMATED INCREASES IN EMISSIONS IN RENSSELAER COUNTY

Rail Line Segment	Length of Segment within County (miles)	Change in Trains per Day	Change in MGT[a]	Estimated Increases in Emissions (tons/year)					
				NO_x[b]	VOCs[c]	CO[d]	PM_{10}[e]	SO_2[f]	Lead
C-726	4.7	4.0	8.24	15.09	0.56	1.68	0.38	0.98	$3.2x10^{-5}$

[a] Million gross tons.
[b] Nitrogen oxides.
[c] Volatile Organic Compounds.
[d] Carbon monoxide.
[e] Particles less than 10 microns in diameter.
[f] Sulfur dioxide.

CSX/Louisville and Indiana Settlement Agreement

After preparation of the Draft EIS, SEA was informed of a Settlement Agreement between CSX and the Louisville and Indiana Railroad. This agreement altered CSX's proposed Operating Plan for several rail line segments in Indiana, Kentucky, Tennessee, and Ohio. SEA evaluated these changes and determined that several counties previously analyzed would no longer meet the Board's air quality analysis thresholds, some counties not previously analyzed would meet Board thresholds, and some counties previously analyzed would have changes in emissions.

SEA found that of the counties analyzed previously, only Vanderburgh County would have a non-negligible change in NO_x emissions due to the agreement. Therefore, SEA has revised its detailed NO_x emissions netting analysis for Vanderburgh County. (See Table I-8.)

TABLE I-8
VANDERBURGH COUNTY ANNUAL
NITROGEN OXIDES EMISSIONS SUMMARY

Activity Type (RR)	Identification	NO_x Emissions (tons/year)
Rail Segment (CSX)	Vincennes, IN to Evansville, IN	171.62
Rail Segment (CSX)	Evansville, IN to Amqui, TN	90.01
Rail Yard (CSX)	Evansville - Howell	2.51
Intermodal Facility (CSX)	Evansville	0.16
Truck Diversions (both)	County-wide	-0.92
At-Grade Crossings (both)	Affected Crossings > 5,000 Vehicles/Day [a]	0.18
Total Acquisition-Related Net NO_x Emissions Increase		263.56
NO_x Emissions Screening Level		100.00
Existing (1995) County Total NO_x Emissions		12,094.44
Percent Increase in County NO_x Emissions		2.18%

[a] "Affected Crossings" are those with an increase in rail segment activity over the Board's air quality analysis thresholds, and which have vehicle traffic levels over 5000 vehicles/day.

The revised analysis for Vanderburgh County changes the estimated NO_x increase from 311 tons per year, or a 2.58 percent increase in county-total nitrogen oxides emissions as presented in the Draft EIS, to a revised increase of 264 tons per year, or 2.18 percent of county-total NO_x emissions. This minor increase would be temporary (see Section I.2.1), and in any case, is not expected to significantly affect local ozone concentrations, which can be affected by NO_x emissions. EPA recently changed Vanderburgh County's designation to an ozone maintenance area from a nonattainment area for ozone. Recent studies by the Ozone Transport Assessment

Group (OTAG) have found, however, that the primary cause of high ozone is NO_x emissions over large-scale areas, rather than local NO_x emissions. Because the proposed Conrail Acquisition would result in a system-wide decrease in NO_x emissions, SEA has concluded that the small increase in NO_x in Vanderburgh County would not adversely affect local ozone levels.

In addition to revising its analysis for Vanderburgh County, SEA estimated emissions for several other counties in Indiana and Kentucky that were not analyzed in the Draft EIS because they were not expected to have activities exceeding the Board's air quality analysis thresholds. Because of the Settlement Agreement, which grants CSX trackage rights over two rail line segments owned by the Louisville and Indiana Railroad, the Indianapolis-to-Seymour, Indiana and Seymour-to-Louisville, Kentucky, rail line segments would exceed Board analysis thresholds. Table I-9 presents SEA's estimated air pollutant emissions for each of the counties affected by these rail line segments.

TABLE I-9
ESTIMATED INCREASES IN EMISSIONS IN COUNTIES AFFECTED BY LOUISVILLE AND INDIANA RAILROAD SETTLEMENT

Rail Line Segment	Length of Segment within County (miles)	Change in Trains Per Day	Change in MGT[a]	Estimated Increases in Emissions (tons/year)					
				NO_x[b]	VOCs[c]	CO[d]	PM_{10}[e]	SO_2[f]	Lead
LIRC-1	9.0	2.1	4.05	14.20	0.53	1.58	0.36	0.92	$3.0x10^{-5}$
Total for Marion County				14.20	0.53	1.58	0.36	0.92	$3.0x10^{-5}$
LIRC-1	21.8	2.1	4.05	34.40	1.28	3.82	0.87	2.23	$7.3x10^{-5}$
Total for Johnson County				34.40	1.28	3.82	0.87	2.23	$7.3x10^{-5}$
LIRC-1	22.2	2.1	4.05	35.03	1.30	3.89	0.88	2.27	$7.4x10^{-5}$
Total for Bartholomew County				35.03	1.30	3.89	0.88	2.27	$7.4x10^{-5}$
LIRC-1	5.8	2.1	4.05	9.15	0.34	1.02	0.23	0.59	$1.9x10^{-5}$
LIRC-2	13.7	4.2	8.05	42.97	1.59	4.77	1.08	2.78	$9.1x10^{-5}$
Total for Jackson County				52.12	1.93	5.79	1.31	3.37	$1.1x10^{-4}$
LIRC-2	12.2	4.2	8.05	38.27	1.42	4.25	0.97	2.48	$8.1x10^{-5}$
Total for Scott County				38.27	1.42	4.25	0.97	2.48	$8.1x10^{-5}$
LIRC-2	23.6	4.2	8.05	74.03	2.74	8.22	1.87	4.80	$1.6x10^{-4}$
Total for Clark County				74.03	2.74	8.22	1.87	4.80	$1.6x10^{-4}$
LIRC-2	3.0	4.2	8.05	9.41	0.35	1.05	0.24	0.61	$2.0x10^{-5}$
Total for Jefferson County				9.41	0.35	1.05	0.24	0.61	$2.0x10^{-5}$

[a] Million gross tons.

[b] Nitrogen oxides.

[c] Volatile Organic Compounds.

[d] Carbon monoxide.

[e] Particles less than 10 microns in diameter.

[f] Sulfur dioxide.

The counties listed in Table I-9 are designated by EPA as attainment, maintenance, or marginal nonattainment areas for ozone, and are designated as attainment areas for other pollutants. The data in Table I-9 show that increased emissions in each county affected are below SEA's emissions screening levels. Therefore, SEA did not perform a detailed emissions netting analysis for any of these counties and concludes that these small increases will not have a significant impact on air quality.

I.2 ADDITIONAL ANALYSES IN RESPONSE TO COMMENTS

I.2.1 Projected Cumulative Changes in Nitrogen Oxides Emissions

In response to several commentors who expressed concern about projected localized NO_x emissions increases, SEA performed additional analysis to evaluate the cumulative effects of the proposed Conrail Acquisition and EPA's proposed emissions standards for new and rebuilt locomotive engines. The commentors generally expressed concern that any increase in local (county-wide) NO_x emissions would impede efforts to reduce such emissions to help maintain compliance or bring areas into compliance with the National Ambient Air Quality Standards (NAAQS) for ozone.

Local NO_x emissions control efforts do not have a significant impact on reducing local ozone concentrations. In studies that included large-scale modeling of ozone transport, OTAG concluded that the transport of ozone is a larger-scale problem and requires NO_x reductions on a larger, regional scale, rather than only on a local level. (See Draft EIS, Chapter 4, "System-wide and Regional Setting, Impacts, and Proposed Mitigation.") The proposed Conrail Acquisition is expected to reduce NO_x emissions slightly on a system-wide basis. Therefore, SEA does not believe the relatively minor NO_x increases projected for some local areas would have a significant adverse impact on ozone levels.

Although recent OTAG findings suggest that NO_x controls should have a multistate, rather than a county-by-county focus, SEA recognizes that many counties are still attempting to maintain or reduce NO_x emissions budgets in accordance with state implementation plan (SIP) agreements with EPA. Therefore, SEA analyzed the combined effects of the proposed Conrail Acquisition together with the new locomotive emissions standards to identify the projected effects on local NO_x emissions over time.

Attachment I-1 shows the projected trend in locomotive NO_x emissions due to the cumulative effects of the proposed Conrail Acquisition and the locomotive emissions standards. The counties listed are those classified as ozone nonattainment and maintenance areas, with estimated NO_x emissions above SEA's emissions screening levels for NO_x. (See Table I-1.) The projections in Attachment I-1 are based on the following assumptions and procedures:

- The proposed Conrail Acquisition would take three years to implement, starting in late 1998, and the associated local NO_x emissions increases would occur evenly over time,

with one-third occurring by the end of 1999, two-thirds by the end of 2000, and all of the proposed Conrail Acquisition-related emissions increases by the end of 2001.

- EPA locomotive emissions standards will be effective starting January 1, 2000, and the rate of locomotive emissions reduction will be as projected by EPA. (See Appendix O, "EPA Rules on Locomotive Emissions," of this Final EIS.)

- SEA estimated the locomotive rule-related emissions reductions only for rail line segments operated by CSX, NS, and Conrail, or as shared operations in the counties analyzed by SEA. Because these reductions were not estimated for other rail carriers, or for locomotive activity in rail yards or intermodal facilities, SEA expects that the rate of NO_x emissions reduction would be faster than estimated in Attachment I-1.

The first column of data in Attachment I-1 shows the estimated NO_x increase calculated for each county, without accounting for the effects of the EPA locomotive emissions standards. This column represents the net NO_x emissions calculated from all sources analyzed in relation to the proposed Conrail Acquisition (rail line segments, rail yards, intermodal facilities, truck-to-rail diversions, and highway/rail at-grade crossings). The second column of data in Attachment I-1 shows the estimated total (existing plus projected future) NO_x emissions for all CSX, NS, Conrail, and shared-area rail line segments in each county, if activities related to the proposed Conrail Acquisition are fully implemented, without the effects of the EPA locomotive emissions standards.

The remaining columns of Attachment I-1 show the projected net or cumulative NO_x emissions changes for each year from 1999 through 2009, relating to the combined effect of the proposed Conrail Acquisition and locomotive emissions/standards. Attachment I-2 presents charts for selected counties based on the data presented in Attachment I-1.

The results of the cumulative assessment of projected rail line segment locomotive NO_x emissions show that nearly all counties listed would have a negative net change in cumulative NO_x emissions by 2005, and every county shown would have a decrease in cumulative NO_x emissions by 2007. Thus, the proposed Conrail Acquisition would increase rail-related NO_x emissions in these counties for a few years at most, and these increases would be less than the conservative values estimated in the Draft EIS.

Finally, SEA emphasizes that system-wide NO_x emissions would decrease due to the proposed Conrail Acquisition alone. Factoring in the effects of EPA's rule establishing locomotive emissions standards, NO_x emissions from rail-related operations would decrease much more significantly over the areas affected by the proposed Conrail Acquisition.

I.2.2 Potential Ambient Carbon Monoxide Concentrations Due to Motor Vehicle Delays at Highway/Rail At-grade Crossings

A number of comments on the Draft EIS concerned potential ambient air quality effects due to emissions from motor vehicles delayed at highway/rail at-grade crossings. SEA performed a conservative screening analysis, using dispersion modeling, of ambient concentrations from these emissions. The purpose of the analysis was to determine whether potential increases in vehicle delay due to increased train traffic as a result of the proposed Conrail Acquisition might cause or significantly contribute to exceedances of the NAAQS at locations accessible to the general public. SEA estimated concentrations only for carbon monoxide, because EPA guidelines specify carbon monoxide as the indicator pollutant for air quality effects of roadway traffic. Motor vehicles emit larger amounts of carbon monoxide relative to emissions of other pollutants. In the event of adverse air quality conditions due to vehicles, concentrations would approach the NAAQS for carbon monoxide before approaching the standards for other pollutants. The NAAQS for carbon monoxide are 35 parts per million (ppm) for one-hour and 9 ppm for eight-hour average concentrations. SEA performed the study in a conservative manner (tending to overestimate potential effects).

SEA did not analyze carbon monoxide concentrations at locations where commentors indicated that highway/rail at-grade crossings are currently blocked by stopped trains for extended periods (e.g., one hour or more), because these are existing conditions that are unrelated to the proposed Conrail Acquisition. Although the proposed Conrail Acquisition would increase vehicle delays at some crossings, these increases would be incremental and would not be associated with the causes of any existing instances of blocked crossings.

Analysis Procedure

Dispersion modeling estimates the pollutant concentrations at specific locations of interest (receptors) as a result of source activity. Receptors include locations where the public could have legitimate access for the time periods specified in the NAAQS. For example, a residence, school, or sidewalk is a receptor, but a point within the crossing right-of-way is not. SEA conducted the analysis in accordance with EPA guidelines and used EPA's CAL3QHC model and emissions data as calculated in the Draft EIS, Appendix E, "Air Quality," for vehicles idling in queues. SEA selected the emission factors corresponding to "Northern Tier - Winter" from the Draft EIS, Appendix E in order to simulate maximum carbon monoxide emission rates for idling vehicles. SEA calculated emission factors for moving vehicles with EPA's MOBILE5A model consistent with the Draft EIS, assuming a conservative (slow) speed of 20 mph for moving traffic in order to maximize emission rates.

SEA selected for analysis the highway/rail at-grade crossings with the highest traffic volumes, and the highway/rail at-grade crossings with the largest projected amounts of vehicle delay, from all the highway/rail at-grade crossings evaluated for delay in the EIS. (See Appendix G, "Transportation: Highway/Rail At-grade Crossing Traffic Delay Analysis," of this Final EIS for the list of all highway/rail at-grade crossings evaluated.) Total volume (vehicles per day or

ADT) and total delay time (vehicle-minutes per day) are effective indicators of the degree of congestion and the need for air quality analysis. The total delay time accounts for both the vehicle volume and the effect of highway/rail at-grade crossing closures due to trains. The highest traffic volume analyzed was 41,700 ADT, and the largest vehicle delay was 2,972 vehicle-minutes per day. In response to comments on the Draft EIS that concerned air quality impacts of the proposed Conrail Acquisition at specifically identified highway/rail at-grade crossings, SEA also analyzed emissions impacts from delayed vehicles at these highway/rail at-grade crossings. For each highway/rail at-grade crossing, SEA calculated the peak hour traffic volumes, the amount of vehicle delay in the peak hour, and the size of the queues using the same method as for the highway/rail at-grade crossing traffic analysis. (See Draft EIS, Chapter 3, Section 3.7, "Transportation: Highway/Rail At-grade Crossing Delay.") Because SEA could access only limited geometric information on each highway/rail at-grade crossing, SEA analyzed each location as consisting of a straight roadway and a straight railroad track intersecting at right angles.

For each crossing, SEA calculated concentrations at receptors at conservative locations adjacent to the queues in accordance with EPA guidelines. Also in accordance with these guidelines, SEA considered all wind directions at 10-degree increments, and used a wind speed of 1 meter per second and an atmospheric stability class of D (neutral), corresponding to urban land use. From all combinations of receptor location and meteorology, SEA selected the combination that resulted in the highest one-hour carbon monoxide concentration. SEA multiplied the maximum hourly concentrations by EPA's screening adjustment factor of 0.7 to derive the eight-hour concentration for comparison to the NAAQS.

The total ambient pollutant concentration is the sum of the contribution from motor vehicles and a background concentration. To estimate the total ambient concentration, SEA conservatively assumed background concentrations of 5 ppm for one hour and 3 ppm for eight hours. These values are representative of high carbon monoxide levels for urban areas.

Table I-10 lists the model input values used to conservatively analyze the potential ambient air quality effects due to emissions from motor vehicles delayed at highway/rail at-grade crossings.

TABLE I-10
CARBON MONOXIDE MODELING INPUT VALUES AND RESULTS FOR HIGHWAY/RAIL AT-GRADE CROSSINGS

MOBILE5A emission factors	
Idle emission factor	567.0 g/veh-hr
20 mph emission factor	40.1 g/veh-mile
CAL3QHC, version 2 assumptions	
Surface roughness coefficient	Z_0 = 108 cm (single family residential)
Design saturation flow rate	SFR = 1400 veh/hr (urban)

TABLE I-10
CARBON MONOXIDE MODELING INPUT VALUES AND RESULTS FOR HIGHWAY/RAIL AT-GRADE CROSSINGS

Arrival rate	AT = 3 (random arrivals)
Signal type	ST = 1 (pre-timed)
Meteorological parameters	
Wind speed	1 m/sec
Stability class	D
Mixing height	1000 m
Wind directions	10° - 360° scanned at 10° increments
Adjustment factor (1 to 8 hr)	0.7
Background concentrations	
One-hour	5 ppm
Eight-hour	3 ppm
Maximum values for vehicle traffic	
Highest traffic volume	41,700 ADT
Largest vehicle delay	2,972 veh-min/day
Maximum estimated CO concentrations from all cases, including background	
One-hour	12.4 ppm (NAAQS = 35 ppm)
Eight-hour	8.2 ppm (NAAQS = 9 ppm)

Results

Table I-10 lists the maximum estimated carbon monoxide concentrations caused by vehicle delays near highway/rail at-grade crossings. The conservative carbon monoxide concentration estimates, including potential effects of the proposed Conrail Acquisition, were less than the NAAQS. Therefore, SEA does not expect ambient air pollutant concentrations at highway/rail at-grade crossings, due to the proposed Conrail Acquisition, to result in adverse air quality effects.

I.2.3 Potential Ambient Air Pollutant Concentrations Due to Diesel Locomotive Exhaust Emissions from Stopped Trains

A number of comments on the Draft EIS concerned ambient air pollutant concentrations that may result from stopped trains with locomotives idling, especially near highway/rail at-grade crossings. SEA performed a conservative screening analysis, using dispersion modeling to evaluate potential effects of emissions from idling diesel locomotives on nearby localized areas. The purpose of the analysis was to determine whether potential increases in occurrences of idling, stopped trains associated with the proposed Conrail Acquisition might cause or

significantly contribute to exceedances of the NAAQS at locations accessible to the general public. SEA estimated concentrations for all criteria pollutants except lead. Based on the emission inventories, SEA concluded that lead emissions from locomotives would not cause exceedances of the NAAQS.

SEA conducted the study conservatively (tending to overestimate potential effects) since it did not account for the significant overall reduction in diesel locomotive exhaust emissions that will result from EPA's new locomotive emission standards issued in December 1997. This appendix provides details of the modeling analysis for stopped, idling locomotives.

Analysis Procedure

Dispersion modeling estimates the pollutant concentrations at specific locations of interest (receptors) as a result of source activity. Receptors include locations where the public could have legitimate access for the time periods specified in the NAAQS. For example, a residence or a school is a receptor, but a point within the railroad right-of-way is not. The dispersion modeling analysis estimates the potential air quality effects of stopped, idling locomotives at receptors. Although the Applicants operate some freight trains with more than two locomotives to provide additional power in rural, mountainous terrain, they normally use a maximum of two locomotives in urban areas that tend to have flatter terrain. Urban areas are of greatest concern to this study because they have numerous sensitive land uses (receptors) close to the rail lines. SEA evaluated a case consisting of one stopped train with two locomotives, corresponding to conditions such as a train waiting on a siding to be unloaded or for another train to pass. SEA did not evaluate larger groups of stopped, idling locomotives because such groupings are possible only in yards where larger numbers of both locomotives and parallel tracks could exist, and this type of location is unlikely to have receptors in close proximity. Based on typical railroad operating practices, SEA assumed that the locomotives could idle continuously for up to four hours. SEA also assumed conservatively that the idling could occur for up to four hours in any 24-hour period, every day of the year.

SEA used EPA's ISC3 model and data on exhaust characteristics for typical freight locomotives to estimate maximum one-hour average concentrations. SEA selected this program to model stopped locomotives appropriately as stationary sources. SEA calculated concentrations at a range of receptor distances in all directions from the locomotive exhaust stacks for an EPA-approved screening range of meteorological conditions. From all combinations of receptor distance and meteorology, SEA selected the combination that resulted in the highest concentrations of each pollutant. SEA multiplied the maximum hourly concentrations by EPA's screening adjustment factors to derive the concentrations for longer averaging periods. SEA adjusted the concentrations for the proportion of time (corresponding to the NAAQS averaging periods) that locomotives typically may be idling near the receptors. Table I-11 provides a summary of the model input data used in this screening analysis.

TABLE I-11
MODELING INPUT VALUES FOR ANALYSIS OF STOPPED, IDLING LOCOMOTIVES

Source Data	
Throttle notch	Idle
Emission rates	
CO	0.0617 g/sec
NO_x	0.521 g/sec
PM/PM_{10}	0.0122 g/sec
SO_2	0.0298 g/sec
Exhaust height	4.18 m
Exhaust temperature	366 K
Exhaust gas velocity	1.46 m/sec
Exhaust equivalent diameter	1.07 m
Meteorology	
Wind speeds by stability class:	
A	1, 3 m/sec
B	1, 3, 5 m/sec
C	1, 3, 5, 7.5, 10 m/sec
D (day)	1, 3, 5, 7.5, 10, 15, 20 m/sec
D (night)	1, 3, 5, 7.5, 10, 15, 20 m/sec
E	1, 3, 5 m/sec
F	1, 3, 5 m/sec
Mixing height	1,000 m
Wind directions	Scanned at 10° increments
Ambient temperature	293 K
Receptors	
Distance from exhaust port	15, 30, 45, 60, 100 m, +100 m increments to 2,000 m
Height above ground	1.8 m (breathing height)

Emissions of NO_x from locomotives consist mostly of nitric oxide, while the NAAQS applies only to nitrogen dioxide. Some of the emitted nitric oxide converts to nitrogen dioxide in the atmosphere through chemical reactions with ambient ozone. In estimating concentrations of nitrogen dioxide, SEA applied an EPA-approved ozone-limiting method to account for this conversion. SEA used 18 percent as the initial fraction of nitrogen dioxide in the exhaust, and 25 percent as the fraction of nitric oxide converted to nitrogen dioxide. SEA assumed conservatively that the ambient ozone concentration was equal to the NAAQS, or 0.12 parts per million (ppm).

The total ambient pollutant concentration is the sum of the contribution from locomotives and a background concentration. To estimate the total ambient concentration, SEA assumed that the background concentrations were equal to typical urban values of one-third of the NAAQS for each pollutant and averaging time.

Results

Table I-12 provides the estimated worst-case incremental, background, and total concentrations of criteria pollutants due to stopped, idling locomotives, along with a comparison to the NAAQS. All the values in Table I-12 are less than the respective NAAQS. Therefore, SEA does not expect ambient air pollutant concentrations from idling diesel locomotives on rail line segments, due to the proposed Conrail Acquisition, to result in adverse air quality effects.

TABLE I-12
MAXIMUM CONCENTRATIONS OF CRITERIA POLLUTANTS DUE TO STOPPED, IDLING DIESEL LOCOMOTIVES

Pollutant (units)	Averaging Period	Maximum Estimated Concentration			NAAQS (40 CFR 50)
		Modeled	Background	Total	
CO (ppm)	1 hour	0.50	11.7	12.2	35
CO (ppm)	8 hour	0.35	3.0	3.3	9
NO_2 ($\mu g/m^3$)	Annual	20	33	53	100
PM_{10} ($\mu g/m^3$)	24 hour	7.5	50	58	150
PM_{10} ($\mu g/m^3$)	Annual	1.9	16.7	19	50
SO_2 ($\mu g/m^3$)	3 hour	248	433	681	1300
SO_2 ($\mu g/m^3$)	24 hour	18	122	140	365
SO_2 ($\mu g/m^3$)	Annual	4.6	26.7	31	80

I.2.4 Potential Ambient Air Pollutant Concentrations Due to Emissions from Diesel Locomotives on Rail Line Segments

In response to comments on the Draft EIS concerning ambient air pollutant concentrations that may result from locomotives traveling on rail line segments, SEA performed a conservative screening analysis, using dispersion modeling, to evaluate effects on localized areas due to projected increases in diesel locomotive exhaust emissions. The purpose of the analysis was to determine whether projected emission increases associated with the proposed Conrail Acquisition might cause or significantly contribute to exceedances of the NAAQS or air toxic health effects thresholds at locations accessible to the general public. To compare to the NAAQS, SEA estimated concentrations for all criteria pollutants except lead. Based on the

emission inventories, SEA concluded that lead emissions from locomotives would not cause exceedances of the NAAQS.

SEA performed the study in a conservative manner (tending to overestimate potential effects) in that it used worst-case assumptions, and did not account for the significant overall reduction in diesel locomotive exhaust emissions that will result from EPA's new locomotive emission standards issued in December 1997. This section describes the modeling analysis and results. The potential air toxic health effects of diesel exhaust and the air toxics threshold concentrations that SEA used in this analysis are discussed in Section I.2.5 of this appendix.

Analysis Procedure

Dispersion modeling estimates the pollutant concentrations at specific locations of interest (receptors) as a result of source activity. This dispersion modeling analysis estimates the impacts of locomotive passbys at receptors along rail line segments. Receptors include locations where the public could have legitimate access for the time periods specified in the NAAQS. For example, a residence or a school is a receptor but a point within the railroad right-of-way is not. SEA evaluated a range of train operating characteristics including number of locomotives per train, throttle notch settings and train speeds. SEA calculated concentrations at a range of receptor distances from the track, for an EPA-approved screening range of meteorological conditions. From all combinations of operating conditions, receptor distance, and meteorology, SEA selected the combination that resulted in the highest concentrations of each pollutant due to a train passing the receptor location.

SEA used EPA's INPUFF 2.3 model and data on exhaust characteristics for typical freight locomotives. SEA selected this program to model locomotives appropriately, given the relatively short source-receptor distances found along rail line segments. Although several other models can simulate railroads, only INPUFF 2.3 can model locomotives explicitly as moving points with plume rise. INPUFF 2.3 is a Gaussian integrated puff model. Source emissions are treated as a series of puffs emitted into the atmosphere. Each puff trajectory is tracked individually, and the diffusion parameters are functions of travel time. The model includes Briggs plume rise methods and stack (locomotive exhaust port) downwash. Table I-13 lists the input values that SEA used in the modeling.

TABLE I-13
MODELING INPUT VALUES FOR ANALYSIS
OF LOCOMOTIVES ON RAIL LINE SEGMENTS

Source Options	
Use stack downwash	Yes
Use buoyancy-induced dispersion	No
Use deposition and settling	No

TABLE I-13
MODELING INPUT VALUES FOR ANALYSIS OF LOCOMOTIVES ON RAIL LINE SEGMENTS

User calculates plume rise	No	
Perform puff combinations	Yes	
Source Data	**Criteria Pollutants Analysis**	**Air Toxics Analysis**
Train speed (for worst case)	10 mph (4.47 m/sec)	10 mph (4.47 m/sec)
Throttle notch (for worst case)	8 (i.e., full power) for all pollutants	1 for HC/VOC/organics 8 for PM/PM10
Emission rates		
CO	0.439 g/sec	N/A
HC/VOC	N/A	0.0333 g/sec
NO_x	11.86 g/sec	N/A
PM/PM10	0.23 g/sec	0.23 g/sec
SO_2	0.73 g/sec	N/A
Exhaust height	4.18 m	4.18 m
Exhaust temperature	623 K	388 K (notch 1 for HC/organics) 623 K (notch 8 for PM)
Exhaust gas velocity	9.71 m/sec	1.78 m/sec (notch 1 for HC/organics) 9.71 m/sec (notch 8 for PM)
Exhaust equivalent diameter	1.07 m	1.07 m
Initial sigma Y	103.3 m	103.3 m
Initial sigma Z	1.94 m	1.94 m
Meteorology		
Wind speeds by stability class		
A	1, 3 m/sec	
B	1, 3, 5 m/sec	
C	1, 3, 5, 7.5, 10 m/sec	
D (day)	1, 3, 5, 7.5, 10, 15, 20 m/sec	
D (night)	1, 3, 5, 7.5, 10, 15, 20 m/sec	
E	1, 3, 5 m/sec	

TABLE I-13
MODELING INPUT VALUES FOR ANALYSIS
OF LOCOMOTIVES ON RAIL LINE SEGMENTS

F	1, 3, 5 m/sec
Mixing height	3000 m
Wind directions	Scanned at 10° increments
Ambient temperature	290 K
Simulation time per passby	420 sec/passby (corresponding to locomotive travel distance of 2 Km to encompass all exhaust plume effects at each receptor)
Puff release rate	Calculated by program
Sigma theta	0.0
Sigma phi	0.0
Puff combination criterion	Calculated by program
Anemometer height	10 m
Receptors	
Distance from track centerline	15, 30, 45, 60, 75, 90, 105, 120 m
Height above ground	1.8 m (breathing height)

N/A = Not Applicable

The concentration resulting from one train passby represents a peak, transitory pollution level only. SEA averaged these estimated peak levels over one hour to allow comparison to the NAAQS that are based on averaging periods of one hour to one year of exposure. SEA multiplied the maximum hourly concentration due to one locomotive passby by the number of locomotives per train, and the number of trains projected to operate on a rail line segment, to give the worst-case total concentration due to diesel locomotives.

For purposes of selecting a conservative condition, SEA evaluated all rail line segments that would have any change in activity due to the proposed Conrail Acquisition and calculated the total number of locomotive passbys. The number of locomotives included passenger trains, but did not include electric locomotives (such as those used in Amtrak service between Washington, D.C. and New Haven, Connecticut). SEA derived the number of locomotive passbys by assuming that each passenger train has one diesel locomotive and each freight train has two. Although the Applicants operate some freight trains with more than two locomotives in order to provide additional power in rural, mountainous terrain, they normally use a maximum of two locomotives in urban areas, which tend to have flatter terrain. Urban areas are of greatest concern to this study because they have numerous sensitive land uses (receptors) close to the rail line segments. On this basis, SEA selected the rail line segment with the highest projected

number of diesel locomotive passbys. The selected rail line segment is number N-308 with a projected activity of 83.5 trains per day (14 passenger and 69.5 freight) after the proposed Conrail Acquisition. The resulting number of locomotive passbys on rail line segment N-308 is 153 per day, or an average of 6.375 locomotives per hour. SEA used this number of locomotives to estimate the conservative pollutant concentrations. SEA multiplied the maximum hourly concentrations by EPA's screening adjustment factors to derive the concentrations for longer averaging periods.

Results

Table I-14 presents the conservative incremental concentrations of criteria pollutants due to the maximum 153 locomotives per day. Attachment I-3 gives the conservative total concentrations of diesel particulates and organic substances air pollutants. All the values in Table I-14 and Attachment I-3 are far below the respective NAAQS and health effects thresholds. Also, all of the criteria pollutant concentrations in Table I-14, except for the nitrogen dioxide concentration, are below EPA Significance Levels (40 CFR 51.165). These levels are not a measure of "significance" in the context of NEPA, but are levels below which EPA considers the impacts so insignificant that they do not hold stationary emissions sources responsible.

TABLE I-14
MAXIMUM CONCENTRATIONS OF CRITERIA POLLUTANTS DUE TO 153 LOCOMOTIVE PASSBYS/DAY COMPARED TO EPA SIGNIFICANCE LEVELS AND NAAQS

Pollutant (units)	Averaging Period	Modeled Concentration	Signif. Level (40 CFR 51.165)	NAAQS (40 CFR 50)
CO (ppm)	1 hour	0.0005	1.75	35
CO (ppm)	8 hour	0.0004	0.45	9
HC/VOC ($\mu g/m^3$)	1 hour	0.33 [a]	N/A	N/A
HC/VOC ($\mu g/m^3$)	Annual	0.033 [a]	N/A	N/A
NO_2 ($\mu g/m^3$)	Annual	1.7	1.0	100
PM_{10} ($\mu g/m^3$)	1 hour	0.33 [a]	N/A	N/A
PM_{10} ($\mu g/m^3$)	24 hour	0.13	5.0	150
PM_{10} ($\mu g/m^3$)	Annual	0.033	1.0	50
SO_2 ($\mu g/m^3$)	3 hour	0.94	25.0	1300
SO_2 ($\mu g/m^3$)	24 hour	0.42	5.0	365
SO_2 ($\mu g/m^3$)	Annual	0.10	1.0	80

N/A = Not applicable; U.S. EPA has not established a NAAQS for this pollutant and time period.

[a] Used for toxics analysis only (Section I.2.5 of this appendix). U.S. EPA has not established a NAAQS for this pollutant and time period.

Based on the above results, SEA does not expect ambient air pollutant concentrations from diesel locomotives on rail line segments due to the proposed Conrail Acquisition to result in adverse air quality effects.

I.2.5 Potential Health Effects of Toxic Air Pollutants in Diesel Locomotive Exhaust Emissions

In response to comments on the Draft EIS concerning potential effects of toxic air pollutants including carcinogens, SEA used dispersion modeling in performing a conservative screening analysis of projected increases in diesel locomotive exhaust emissions that could affect the University Circle area of Cleveland, Ohio, and other localized areas. The purpose of the analysis was to determine whether projected emission increases associated with the proposed Conrail Acquisition might cause or significantly contribute to adverse air toxic health impacts to the general public. SEA's study was performed in a conservative manner (tending to overestimate potential effects) in that it did not account for the significant overall reduction in diesel locomotive exhaust emissions projected to result from EPA's new locomotive emission standards issued in December 1997. Section I.2.4 of this appendix provides details of the modeling analysis.

SEA reviewed diesel exhaust health effects data from the Health Effects Institute (HEI) and the EPA. These health effects data provide recommendations for acceptable ambient concentration levels of diesel exhaust particulate matter and gaseous air toxics. SEA used these recommendations to establish ambient concentration thresholds, and compared the screening dispersion modeling results with these thresholds. Levels below these thresholds should not pose any adverse health effects to the public. This section discusses the basis for SEA's use of health effects thresholds.

SEA also used air toxics screening procedures developed by the Ohio Environmental Protection Agency (Ohio EPA) for permitting and regulating new stationary sources. Ohio EPA uses its air toxics screening procedures to determine whether to grant a construction permit to a new source that could emit toxic air pollutants. Ohio EPA's air toxic screening procedure compares the maximum predicted 1-hour ambient concentration from the source to a calculated 1-hour average Maximum Acceptable Ground-Level Concentration (MAGLC) for each pollutant. The Ohio EPA derives the pollutant-specific MAGLC by dividing the American Conference of Governmental and Industrial Hygienists' threshold limit value (ACGIH-TLV) by a factor of 42. (The ACGIH-TLV is expressed as a time-weighted average of the concentration of a substance to which most workers can be exposed without adverse effects). The Ohio EPA's value of 42 is a safety factor to relate the ACGIH-TLV concentration values to non-occupational public exposure levels.

Diesel Exhaust Emissions Characteristics

Diesel emissions are highly complex mixtures consisting of a wide range of organic and inorganic compounds distributed among the gaseous and particulate phases. The composition

of diesel exhaust varies considerably depending on engine type and operating conditions, fuel, lubricating oil, and presence of any emission control systems. The particulate matter is mainly attributable to the incomplete combustion of fuel hydrocarbons, though some may be due to engine oil or other fuel components. Diesel exhaust particulate matter consists of a solid core composed mainly of carbon, a soluble organic fraction, sulfates, and trace elements. The particles are very small (mainly less than 1 micron in diameter), making them readily respirable. Their small size and relatively large surface area makes the particles ideal for serving as adsorption and condensation sites for organic compounds (products of incomplete combustion) and trace metal elements that were contained in the fuel. These particles have hundreds of chemicals adsorbed onto their surfaces, including many known or suspected mutagens and carcinogens. The gaseous phase also contains oxides of nitrogen, carbon monoxide, and hydrocarbons.

At temperatures below 500° C, the particles become coated with adsorbed and condensed high molecular weight organic compounds. These organic compounds include open-chain hydrocarbons of 14-35 carbon atoms, alkyl-substituted benzenes, and derivatives of polycyclic aromatic hydrocarbons (PAH) such as ketones, nitrates, carboxyaldehydes, carboxylic acids, acid anhydrides, hydroxy compounds, and quinones. Diesel exhaust polycyclic organic matter can exist in both the gas and particulate phases in the atmosphere. The distribution between the two phases is determined by the vapor pressure of the species the ambient temperature, and the amount of airborne particulate matter present. Colder temperatures and higher aerosol concentrations lead to greater association of polycyclic organic matter with particles. Because of this particulate affinity of organics, and the fact that diesel particulate matter is generally defined as any material that is collected, at a temperature of 52° C or less, on a filtering medium after dilution of the raw exhaust gases, health effect researchers typically have focused on carcinogenic and noncarcinogenic health effects of diesel exhaust particulate matter in occupational and ambient environments.

Because maximum diesel locomotive exhaust temperatures tend to range under 350°C at the highest throttle notch setting, SEA assumed that the majority of diesel exhaust air toxics are associated with the particulate phase. However, SEA's air toxics screening modeling evaluation also considered individual gaseous air toxic emissions for those substances for which representative emission factors were available or could be readily derived from the literature.

Exposure Levels

Because diesel engines are only one of the many sources of ambient pollutants, it is difficult to measure the exposures from various sources, and to distinguish the potential health risks attributable to exposure to diesel exhaust from those attributable to other air pollutants. For example, combustion of other fossil fuels and tobacco produces many of the same chemicals that are present in diesel emissions, and both natural and man-made sources of respirable particles are common. Although no single constituent of diesel exhaust serves as a unique marker of exposure, scientists have used the levels of fine particulate or elemental carbon as surrogate indices of diesel exhaust particulate matter in health effects studies.

Exposure to diesel exhaust particulate matter has been assessed in occupational settings and some ambient environments. Although the existing data are limited, some estimates of the range of human exposure to diesel emissions can be made:

- In some occupations, diesel emissions contribute a high proportion of the particulate and gaseous air pollutants. The estimates for workplace exposures (eight-hour averages) to diesel exhaust particulate matter range widely, from approximately 1 to 100 micrograms per cubic meter ($\mu g/m^3$) in some occupations such as trucking or transportation, to 100 to 1,700 $\mu g/m^3$ for occupations such as underground mining where equipment powered by diesel engines is often used in enclosed spaces.

- Although ambient exposure data are sparse, studies conducted in the Los Angeles Basin in the early 1980s showed that diesel emissions accounted for approximately 3 percent of the mass of total particulate matter, and 7 percent of the mass of fine particles emitted into the atmosphere. Average monthly values for ambient levels of diesel exhaust particulate matter ranged from 1 to 3 $\mu g/m^3$ in areas with low levels of air pollution. The highest monthly average level of diesel particulate matter was approximately 10 $\mu g/m^3$ during the winter months. Short-term or peak exposures to diesel particulate matter, especially in urban settings such as street canyons, are usually higher than monthly or annual average concentrations.

Human and Animal Response Health Effects

HEI's Diesel Working Group developed the following conclusions after reviewing more than 30 epidemiological studies of workers exposed to diesel emissions in occupational settings for the period 1950 through the early 1980s, and animal response studies:

- The epidemiological data are consistent in showing weak associations between exposure to diesel exhaust and lung cancer. Available evidence suggests that long-term exposure to diesel exhaust in a variety of occupational circumstances is associated with a 1.2- to 1.5-fold increase in the relative risk of lung cancer compared with workers classified as unexposed. However, the lack or definitive exposure data for occupationally exposed study populations precludes using available epidemiologic data to develop quantitative estimates of cancer risk. When appropriate human information is not available, some policymakers have relied on the results of animal bioassays to estimate human risk.

- The carcinogenic activity of diesel emissions has been convincingly demonstrated in rats. Nearly lifetime exposure for 35 hours or more per week to high concentrations of diesel exhaust particulate matter (2,000 to 10,000 $\mu g/m^3$) causes an exposure-dependent increase in the incidence of benign and malignant lung tumors in rats. No consistent evidence suggests that diesel emissions induce cancer in rats at sites other than the lung. Prolonged diesel emission exposures to other rodent species does not produce lung tumors, which suggests that species-specific factors play a critical role in inducing formation of lung tumors. Recent studies also support the idea that the particle-associated organic chemicals

play little or no role in the development of lung tumors in rats exposed to high concentrations of diesel exhaust.

HEI's Diesel Working Group recommended caution in extrapolating the rat bioassay data (obtained at high-dose exposure levels) to humans, which could overestimate potential carcinogenic risks. The reason for this uncertainty is that the mechanism of lung tumor induction that appears to operate in rats continuously exposed to high concentrations of diesel exhaust may not be relevant to most humans, who are exposed intermittently to levels of diesel exhaust particulate matter that are two or three orders of magnitude lower than those used in the rat bioassays. Moreover, carcinogenic risk extrapolations from animals to humans need to account for several influences on carcinogenicity that scientists do not fully understand. These include particle overload and associated inflammatory and proliferative processes; the apparent existence of a threshold for particle-induced biologic responses such as impairment of lung clearance mechanisms, inflammation, cell proliferation, and tumor development; and the mechanistic relation of the nongenotoxic injuries to the development of lung tumors in laboratory rats.

Health Effects Institute's Diesel Working Group Health Effects Recommendations

HEI's Diesel Working Group concluded that it is not currently possible to base a risk characterization of diesel exhaust solely on either the human or the animal data. Instead, the Group evaluated and integrated the available information from diverse data sets to make the most informed judgements about the potential carcinogenicity of exposure to diesel exhaust. A key issue concerning human health risk is whether particle overloading occurs in humans under environmental exposure conditions, and if so, whether it triggers processes that lead to lung cancer. One mathematical extrapolation model suggests that human lung clearance mechanisms would not be impaired even if the humans were exposed continuously (24 hours per day) to the current national estimate of average ambient atmospheric concentration levels of diesel exhaust particulate matter (1 to 10 $\mu g/m^3$). The levels of respirable diesel particles needed to depress lung clearance mechanisms in humans under continuous exposure conditions are greater than 100 to 200 $\mu g/m^3$. This, however, is an unlikely exposure scenario even for most workers.

Therefore, SEA believes that the toxicity and health effects data support the Diesel Working Group's finding that human exposure to diesel exhaust particulate matter alone at the levels found in most ambient settings (1 to 10 $\mu g/m^3$) are not sufficiently high to overwhelm lung clearance processes and thus induce lung tumors by a mechanism driven by inflammation and cell proliferation. This long-term (chronic) exposure concentration level range for diesel particulate matter was used in SEA's dispersion modeling study.

Non-Carcinogenic Health Effects of Diesel Particulate Matter

Most of the acute (arising from short-term exposure) and subchronic effects consist of respiratory tract irritation and diminished resistance to infection. Increased cough and phlegm, and slight impairments in lung function have also been documented. Animal data indicate that chronic respiratory diseases can result from long-term exposure to diesel exhaust. Although it appears

that normal, healthy adults are not at high risk to serious noncancer effects from diesel exhaust at levels found in the ambient air, the data are inadequate to form conclusions about sensitive subpopulations. EPA cited a reference concentration (RfC) for diesel exhaust particulate matter of 5 $\mu g/m^3$ over a lifetime. An RfC is an estimate of the day-to-day exposure to the human population that is likely to be without deleterious effects during a lifetime. As such, it can be viewed as a long-term (chronic) exposure concentration level. This non-carcinogenic RfC is within the range cited above for ambient concentration levels assumed not to induce carcinogenic effects in humans. SEA compared this RfC to the annual average concentrations estimated in the dispersion modeling analysis. SEA also compared the modeled concentrations of criteria air pollutants (particulates, carbon monoxide, and oxides of nitrogen, and sulfur dioxide; see Section I.2.4 of this appendix) to the NAAQS, based on the dispersion modeling results.

Health Effects of Organic Substances in Diesel Exhaust

Although SEA believes that the majority of the air toxic substances contained in diesel exhaust are associated with particulate matter, SEA also considered individual air toxic substances that have been found in diesel exhaust from large uncontrolled stationary diesel engines and nonroad mobile sources, and for which representative emission factors were available. These substances were benzene, toluene, xylene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene.

Results

Attachment I-4 summarizes the health effects criteria and thresholds from the HEI, EPA, and Ohio EPA. Attachment I-4 also lists the emission factors used in the dispersion modeling and the analysis results. The results reflect assumptions of 36.6 trains per day and 2 locomotives per train, corresponding to the rail line segment with the most train activity that potentially could affect the University Circle area of Cleveland, Ohio. SEA also selected emission factors corresponding to the conservative condition of low train speed and maximum emission rates by engine throttle notch. Attachment I-4 demonstrates that all conservative modeled concentrations due to diesel exhaust are less than the corresponding health effects thresholds.

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT I-1

Cumulative Nitrogen Oxides Emissions Changes Due to Proposed Conrail Acquisition and EPA Locomotive Rules

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT I-1

CUMULATIVE NITROGEN OXIDES EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES

NonAttainment/ Maintenance Area		Acq.-Related NOx Increase	Post-Acq. Rail Seg CSX/NS/CR/SA NOx Total (TPY)	Future Year Cumulative NOx Change (TPY) *										
State	County/City	(TPY)		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
DE	New Castle	184.85	917.98	61.62	113.59	146.29	92.13	40.73	-9.76	-70.35	-117.17	-145.62	-161.23	-175.00
GA	Fulton	70.79	1373.70	23.60	32.77	13.09	-67.95	-144.88	-220.43	-311.10	-381.16	-423.74	-447.09	-467.70
GA	Henry	62.39	644.06	20.80	34.83	35.34	-2.66	-38.73	-74.15	-116.66	-149.51	-169.47	-180.42	-190.08
IN	Lake	83.76	1767.94	27.92	37.28	9.51	-94.80	-193.81	-2[illegible]1.04	-407.73	-497.89	-552.70	-582.75	-609.27
IN	Porter	176.06	1524.72	58.69	101.36	112.02	22.06	-63.32	-147.18	-247.81	-325.57	-372.84	-398.76	-421.63
IN	Vanderburgh	263.56	751.05	87.85	167.82	232.02	187.70	145.65	104.34	54.77	16.46	-6.82	-19.59	-30.85
MD	Anne Arundel	124.05	406.90	41.35	78.43	106.96	82.95	60.17	37.79	10.93	-9.82	-22.43	-29.35	-35.45
MD	Cecil	92.96	888.15	30.99	52.65	55.66	3.26	-46.48	-95.33	-153.95	-199.24	-226.77	-241.87	-255.19
MD	Frederick	113.08	614.15	37.69	68.94	87.29	51.05	16.66	-17.12	-57.65	-88.98	-108.01	-118.45	-127.67
MD	Montgomery	173.50	663.35	57.83	108.70	145.64	106.50	69.35	32.87	-10.91	-44.74	-65.31	-76.58	-86.53
MD	Prince George's	176.82	653.26	58.94	111.02	149.38	110.84	74.26	38.33	-4.79	-38.10	-58.35	-69.46	-79.26
MI	Monroe	176.13	992.15	58.71	107.00	134.46	75.92	20.36	-34.21	-99.69	-150.29	-181.04	-197.91	-212.79
MI	Wayne	121.40	1383.12	40.47	66.41	63.31	-18.30	-95.75	-171.82	-263.11	-333.65	-376.52	-400.04	-420.78
NJ	Bergen	208.64	610.02	69.55	132.62	183.02	147.03	112.87	79.32	39.05	7.94	-10.97	-21.34	-30.49
NJ	Mercer	61.09	529.79	20.36	35.16	38.84	7.58	-22.09	-51.23	-86.19	-113.21	-129.63	-138.64	-146.59
NJ	Middlesex	149.12	1383.67	49.71	84.88	91.01	9.37	-68.12	-144.22	-235.54	-306.11	-349.00	-372.52	-393.28
NY	Erie	347.61	2855.65	115.87	201.76	227.67	59.19	-100.73	-257.79	-446.26	-591.90	-680.42	-728.97	-771.80
NY	Montgomery	195.07	1390.97	65.02	115.44	136.65	54.58	-23.31	-99.82	-191.62	-262.56	-305.68	-329.33	-350.19
OH	Ashtabula	601.89	2356.75	200.63	376.51	502.91	363.86	231.88	102.26	-53.29	-173.48	-246.54	-286.60	-321.96
OH	Butler	171.89	966.90	57.30	104.44	131.28	74.23	20.09	-33.09	-96.91	-146.22	-176.19	-192.63	-207.13
OH	Cuyahoga	787.45	2937.23	262.48	494.13	664.09	490.79	326.30	164.76	-29.10	-178.90	-269.95	-319.89	-363.94
OH	Lake	556.53	1920.56	185.51	350.85	475.87	362.55	255.00	149.37	22.61	-75.33	-134.87	-167.52	-196.33
OH	Lorain	648.01	2121.51	216.00	409.73	558.91	433.74	314.93	198.25	58.23	-49.97	-115.73	-151.80	-183.62
OH	Trumbull	213.31	1019.56	71.10	131.50	170.49	110.33	53.24	-2.84	-70.13	-122.13	-153.73	-171.06	-186.36
OH	Wood	565.63	2306.88	188.54	352.86	468.74	332.64	203.45	76.57	-75.68	-193.33	-264.85	-304.06	-338.67
PA	Allegheny	228.31	2682.08	76.10	124.04	115.66	-42.58	-192.78	[illegible]0.29	-517.31	-654.09	-737.24	-782.83	-823.07
PA	Delaware	104.54	473.57	34.85	64.72	84.65	56.71	30.19	4.14	-27.11	-51.26	-65.95	-74.00	-81.10
PA	Erie	309.71	2422.06	103.24	181.04	207.98	65.08	-70.55	-203.77	-363.62	-487.15	-562.23	-603.41	-639.74
PA	Fayette	306.89	991.77	102.30	194.18	265.24	206.72	151.18	96.63	31.18	-19.40	-50.15	-67.01	-81.88
PA	Lawrence	166.02	886.68	55.34	101.37	128.78	76.47	26.81	-21.96	-80.48	-125.70	-153.18	-168.26	-181.56
PA	Philadelphia	87.49	705.81	29.16	50.92	57.85	16.20	-23.32	-62.14	-108.73	-144.72	-166.60	-178.60	-189.19
PA	Somerset	181.47	1055.28	60.49	109.90	137.15	74.89	15.79	-42.25	-111.90	-165.72	-198.43	-216.37	-232.20
TN	Davidson	244.20	1343.69	81.40	148.69	187.77	108.49	33.24	-40.66	-129.35	-197.87	-239.53	-262.37	-282.53
VA	Stafford	68.58	363.31	22.86	41.91	53.32	31.89	11.54	-8.44	-32.42	-50.95	-62.21	-68.39	-73.84
DC	DC	84.47	329.33	28.16	52.86	70.64	51.21	32.77	14.65	-7.08	-23.88	-34.09	-39.69	-44.63

* Changes are in comparison to 1998 baseline NOx, and are approximations based only on cumulative effects of the proposed Conrail Acquisition (assumed to be implemented over 3 years) and the EPA Locomotive Rule effects on just rail segment emissions by CSX, NS, Conrail, and Shared Assets Areas.

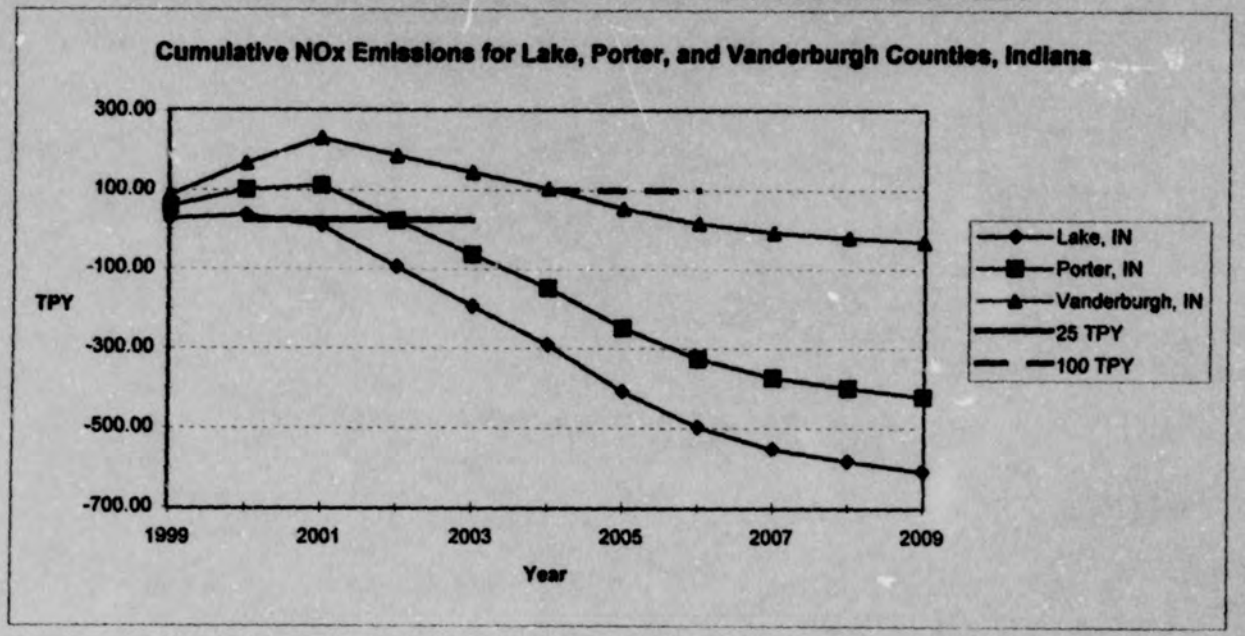
[THIS PAGE INTENTIONALLY LEFT BLANK]

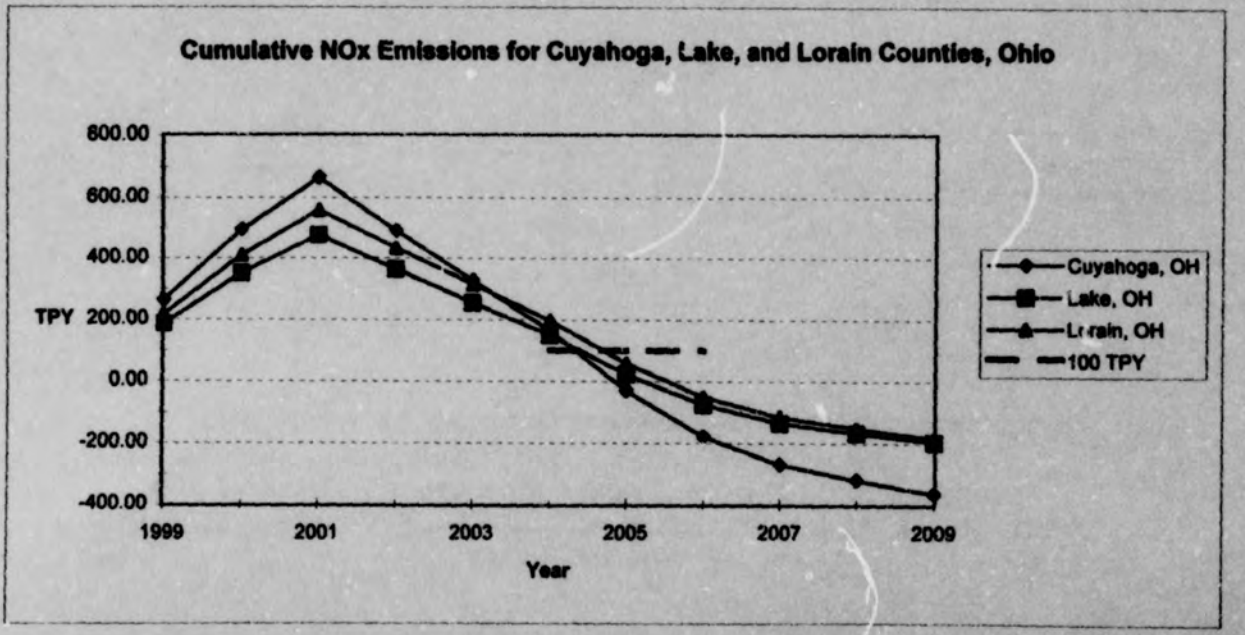
ATTACHMENT I-2

Charts Showing Cumulative Nitrogen Oxides (NO_x) Emissions Changes Due to Proposed Conrail Acquisition and EPA Locomotive Rules

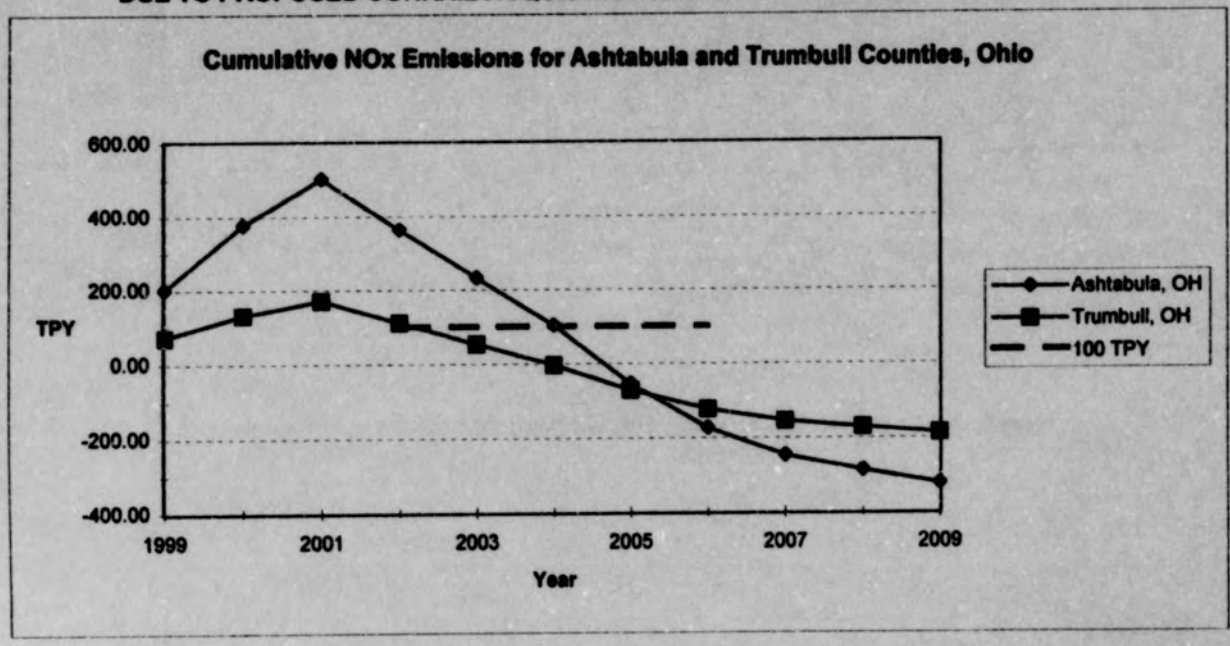
[THIS PAGE INTENTIONALLY LEFT BLANK]

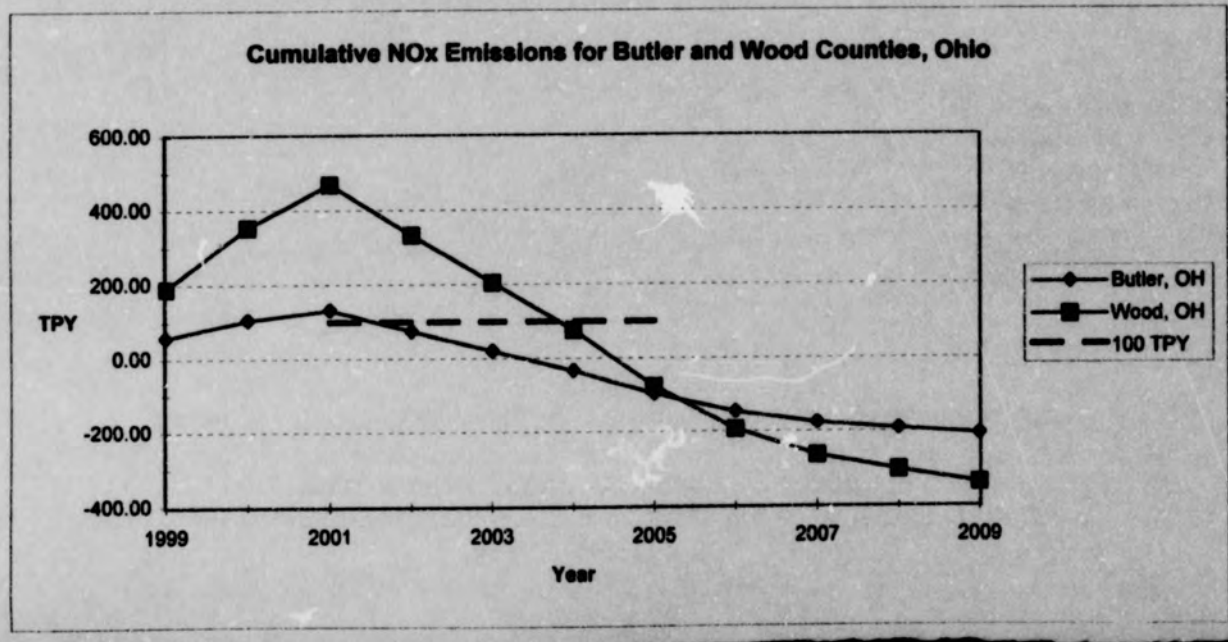
ATTACHMENT I-2
CHARTS SHOWING CUMULATIVE NITROGEN OXIDES (NOx) EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES



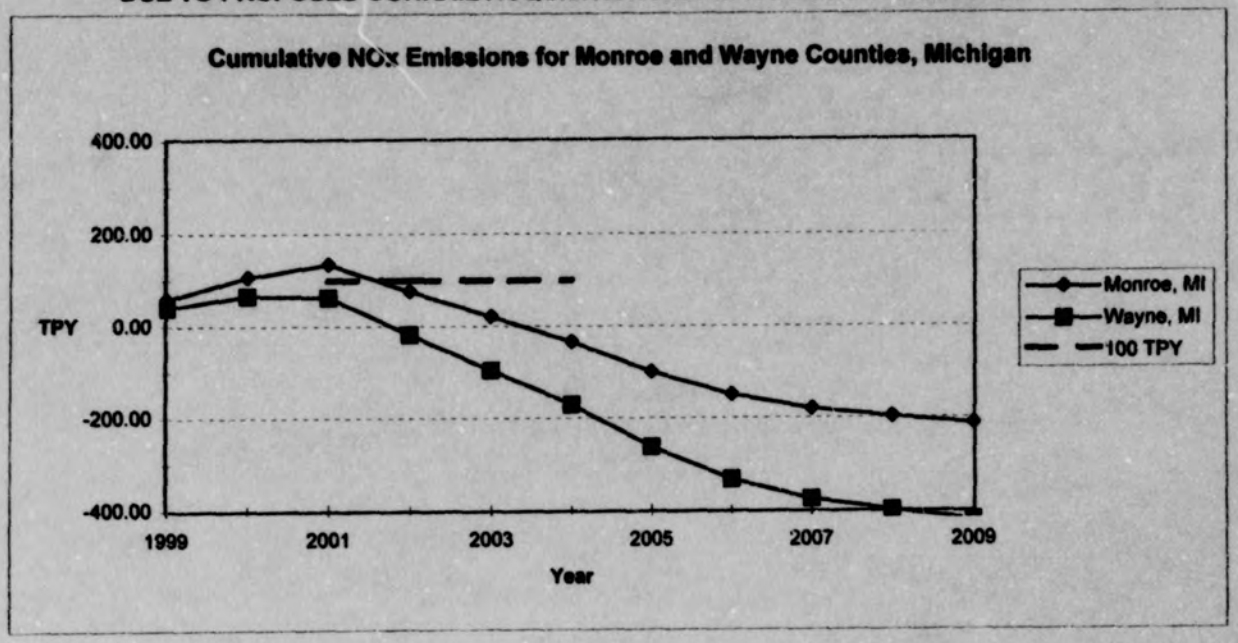


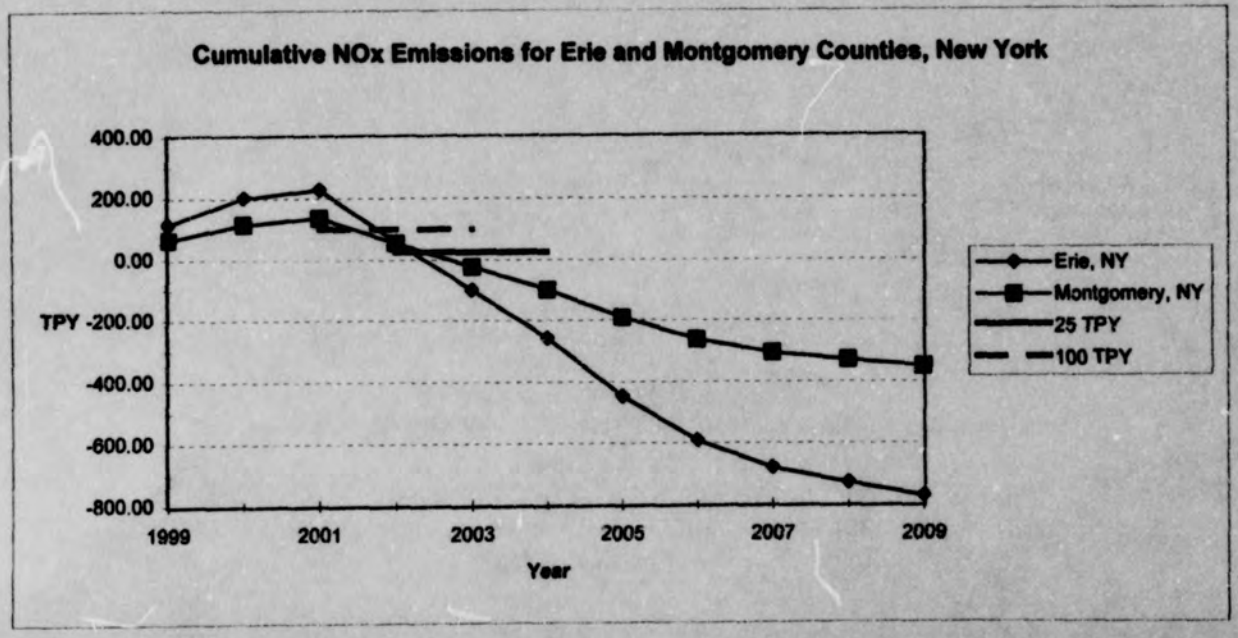
ATTACHMENT I-2
CHARTS SHOWING CUMULATIVE NITROGEN OXIDES (NOx) EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES



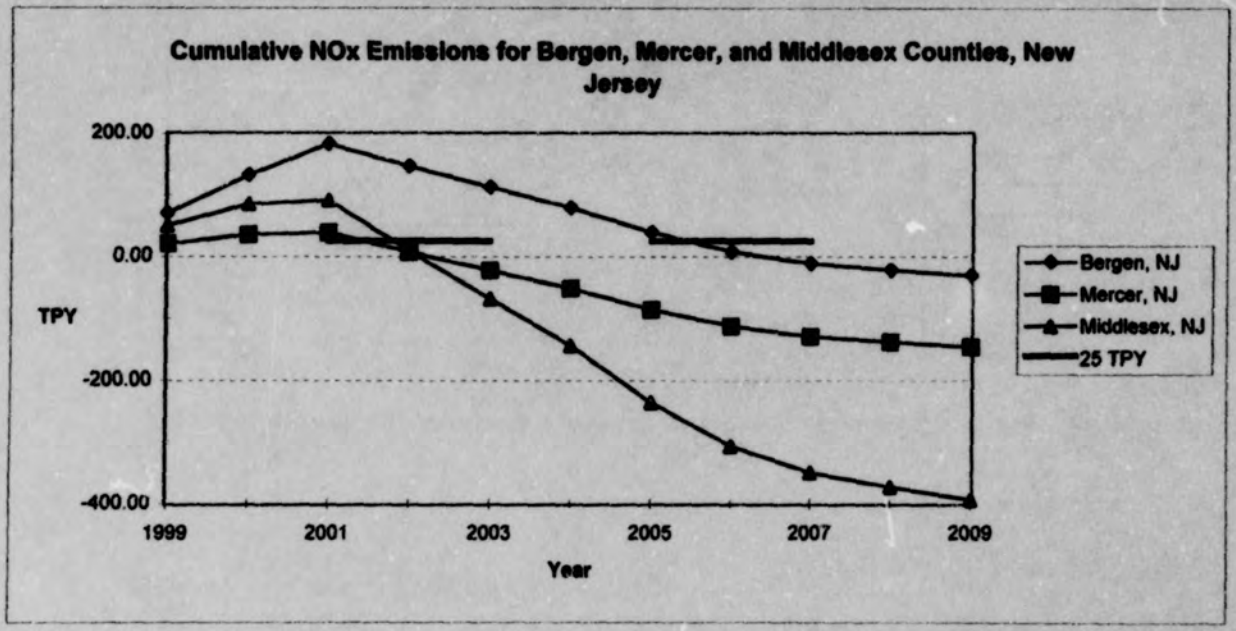


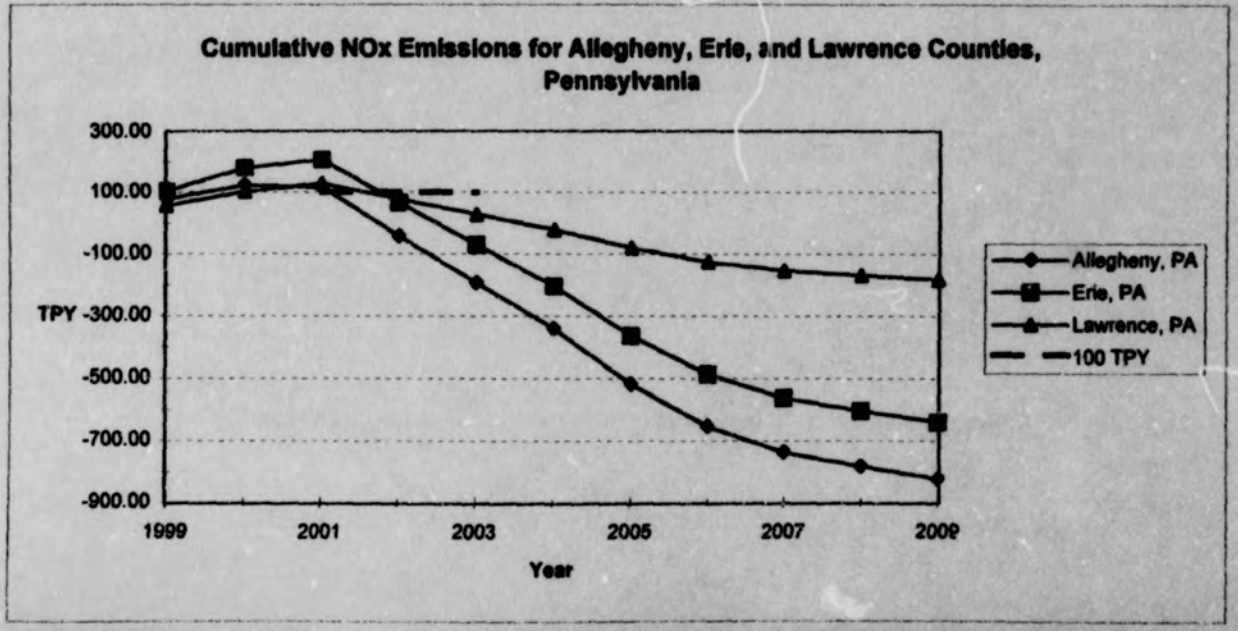
ATTACHMENT I-2
CHARTS SHOWING CUMULATIVE NITROGEN OXIDES (NOx) EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES



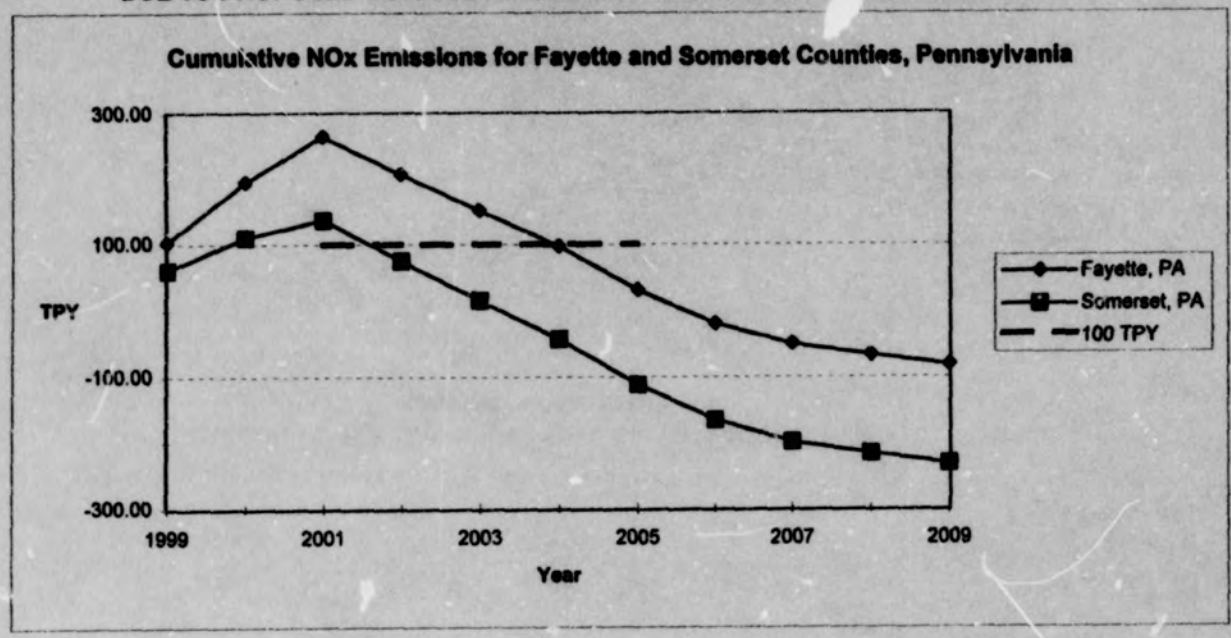


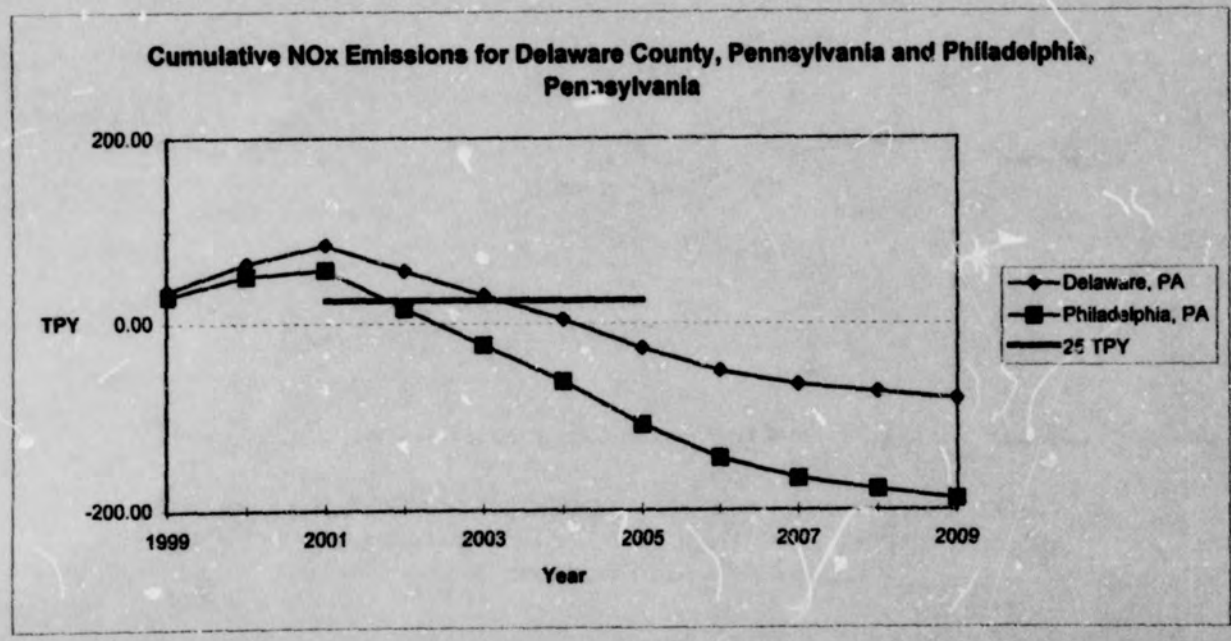
ATTACHMENT I-2
CHARTS SHOWING CUMULATIVE NITROGEN OXIDES (NOx) EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES



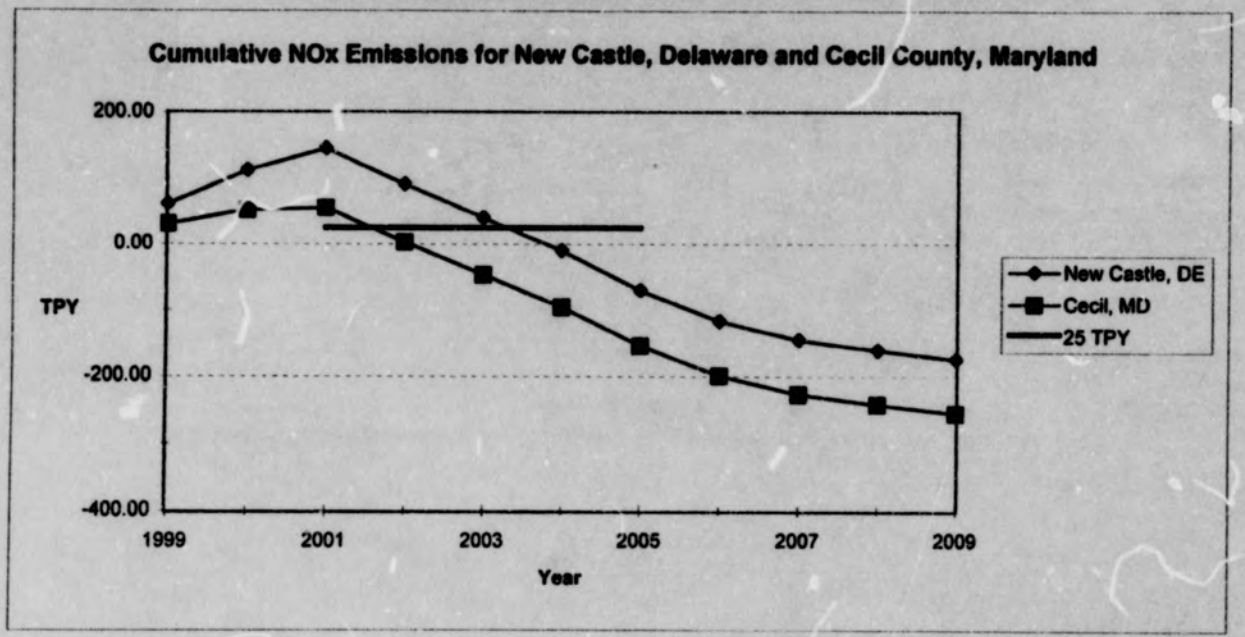


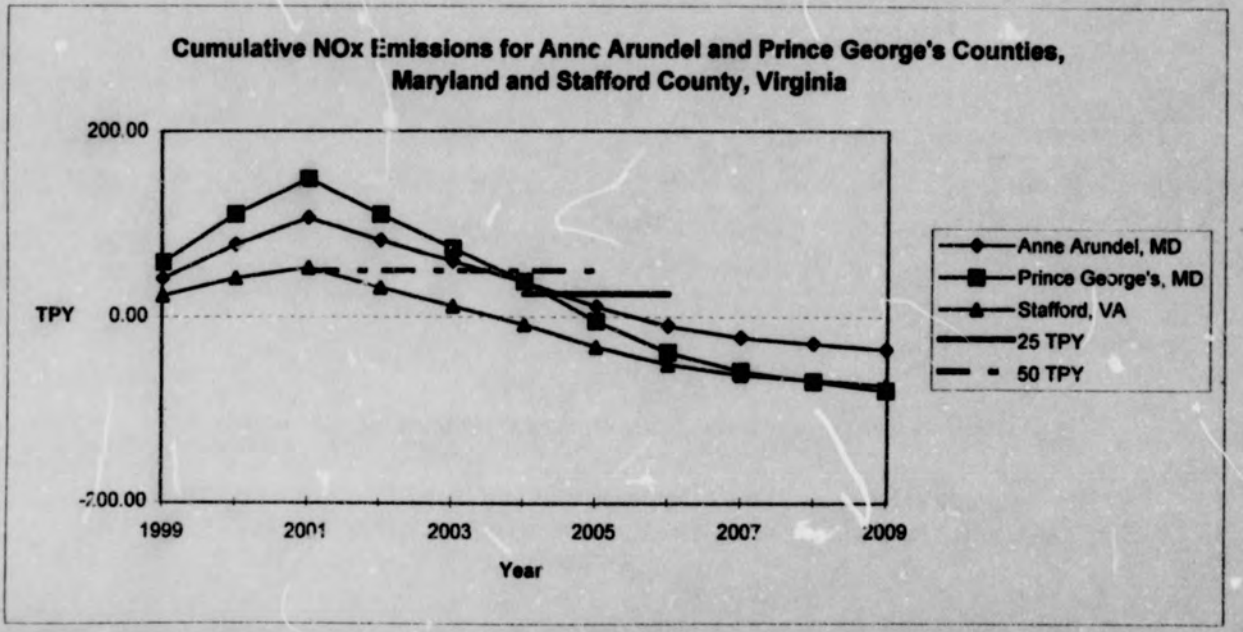
ATTACHMENT I-2
CHARTS SHOWING CUMULATIVE NITROGEN OXIDES (NOx) EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES



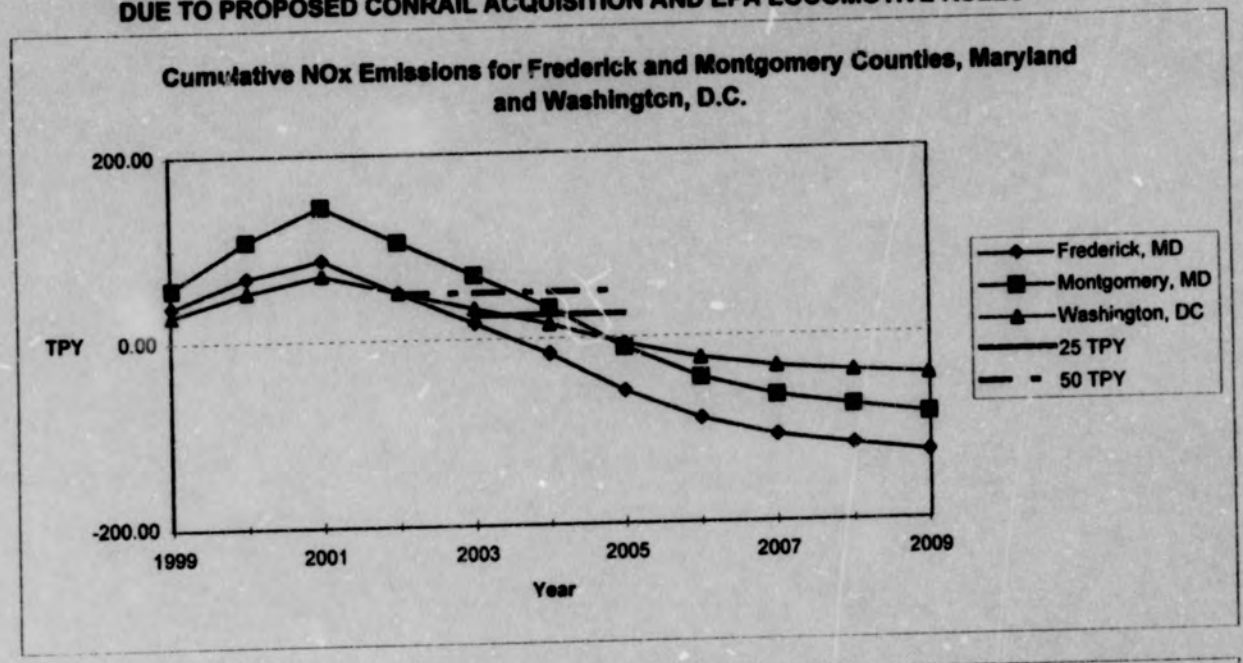


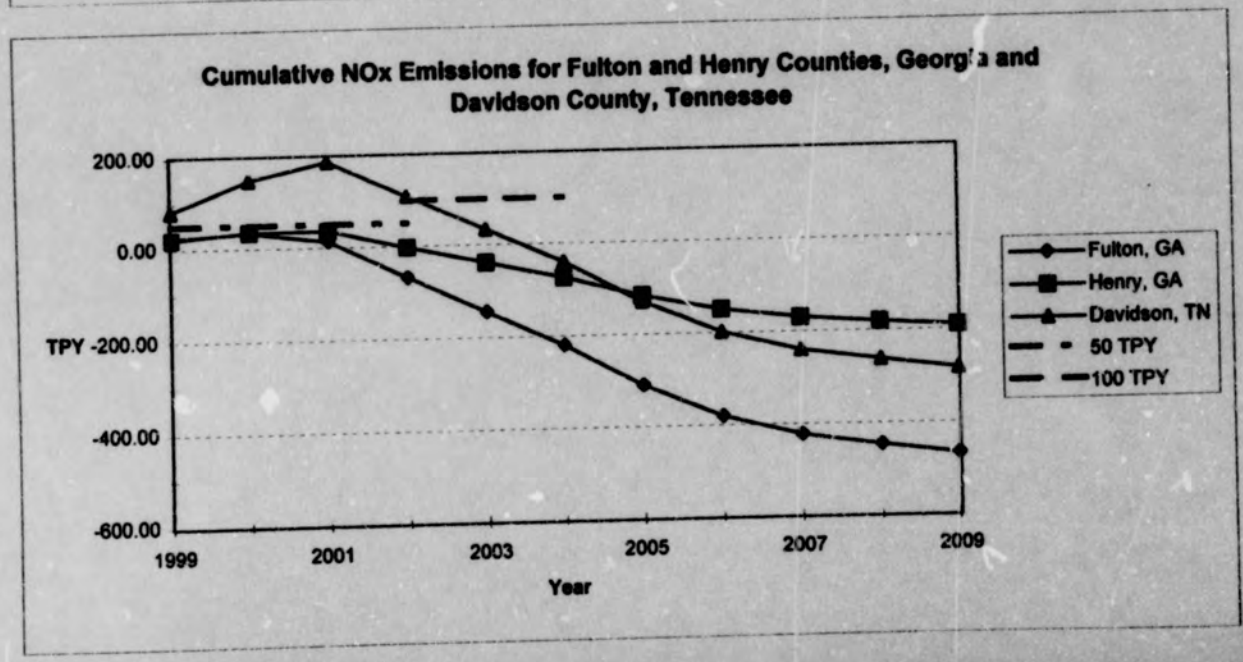
ATTACHMENT I-2
CHARTS SHOWING CUMULATIVE NITROGEN OXIDES (NOx) EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES





ATTACHMENT I-2
CHARTS SHOWING CUMULATIVE NITROGEN OXIDES (NOx) EMISSIONS CHANGES DUE TO PROPOSED CONRAIL ACQUISITION AND EPA LOCOMOTIVE RULES





[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT I-3

Maximum Concentrations of Diesel Particulates and Organic Substances and Comparison to Health Criteria for 153 Diesel Locomotive Passbys Per Day

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT I-3
MAXIMUM CONCENTRATIONS OF DIESEL PARTICULATES AND ORGANIC SUBSTANCES AND COMPARISON TO HEALTH CRITERIA FOR 153 DIESEL LOCOMOTIVE PASSBYS PER DAY

Pollutant	Emission Factor	Max. 1-Hour Concentration ($\mu g/m^3$)	Ohio EPA 1-Hour MAGLC[a] ($\mu g/m^3$)	Max. Annual Concentration ($\mu g/m^3$)	U.S. EPA RfC[b] ($\mu g/m^3$)	HEI Chronic Effects Threshold[c] ($\mu g/m^3$)
Diesel Particulate Matter	0.26 g/hp-hr[d]	0.33	N/A	0.033	5	1-10
Acetaldehyde	2.52×10^{-5} lb/MMBtu[e]	3.84×10^{-5}	4,286	3.48×10^{-6}	9	N/A
Acrolein	7.88×10^{-6} lb/MMBtu[e]	1.09×10^{-5}	6.0	1.09×10^{-6}	0.02	N/A
Benzene	0.0387 g/hp-hr[f,g,h]	1.00×10^{-2}	762	1.00×10^{-3}	N/A	N/A
Formaldehyde	0.0142 g/hp-hr[f,g,h]	3.68×10^{-3}	35.7	3.68×10^{-4}	N/A	N/A
Toluene	2.81×10^{-4} lb/MMBtu[e]	3.88×10^{-4}	1,786	3.88×10^{-5}	400	N/A
Xylenes	1.93×10^{-4} lb/MMBtu[e]	2.67×10^{-4}	10,357	2.67×10^{-5}	N/A	N/A
1,3-Butadiene	0.0167 g/hp-hr[f,g,h]	4.35×10^{-3}	524	4.35×10^{-4}	N/A	N/A

N/A Not applicable or no value established.

a Source: Ohio EPA, 1998.

b Source: EPA Office of Mobile Sources, 1993.

c Source: Health Effects Institute, 1997.

d Source: EPA Office of Mobile Sources, 1997.

e Source: EPA Office of Air Quality Planning and Standards, 1996.

f Source: EPA Region 5, 1993.

g Source: General Motors Corporation, 1986.

h Emission factor calculated as percentage (f) of total hydrocarbon emissions (g).

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT I-4

Maximum Calculated Concentrations of Diesel Particulates and Organic Substances Due to Locomotives and Comparison to Health Criteria for 73 Locomotive Passbys Per Day

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT I-4
MAXIMUM CALCULATED CONCENTRATIONS OF DIESEL PARTICULATES AND ORGANIC SUBSTANCES DUE TO LOCOMOTIVES AND COMPARISON TO HEALTH CRITERIA FOR 73 LOCOMOTIVE PASSBYS PER DAY

Pollutant	Emission Factor	Max. 1-Hour Concentration ($\mu g/m^3$)	Ohio EPA 1-Hour MAGLC[a] ($\mu g/m^3$)	Max. Annual Concentration ($\mu g/m^3$)	U.S. EPA RfC[b] ($\mu g/m^3$)	HEI Chronic Effects Threshold[c] ($\mu g/m^3$)
Diesel Particulate Matter	0.26 g/hp-hr[d]	0.158	NA	0.0158	5	1-10
Acetaldehyde	2.52×10^{-5} lb/MMBtu[e]	1.67×10^{-5}	4,286	1.67×10^{-6}	9	N/A
Acrolein	7.88×10^{-6} lb/MMBtu[e]	5.21×10^{-6}	6.0	5.21×10^{-7}	0.02	N/A
Benzene	0.0387 g/hp-hr[f,g,h]	4.80×10^{-3}	762	4.80×10^{-4}	N/A	N/A
Formaldehyde	0.0142 g/hp-hr[f,g,h]	1.76×10^{-3}	35.7	1.76×10^{-4}	N/A	N/A
Toluene	2.81×10^{-4} lb/MMBtu[e]	1.86×10^{-4}	1,786	1.86×10^{-5}	400	N/A
Xylenes	1.93×10^{-4} lb/MMBtu[e]	1.28×10^{-4}	10,357	1.28×10^{-5}	N/A	N/A
1,3-Butadiene	0.0167 g/hp-hr[f,g,h]	2.08×10^{-3}	524	2.08×10^{-4}	N/A	N/A

N/A Not applicable or no value established.

a Source: Ohio EPA, 1998.

b Source: EPA Office of Mobile Sources, 1993.

c Source: Health Effects Institute, 1997.

d Source: EPA Office of Mobile Sources, 1997.

e Source: EPA Office of Air Quality Planning and Standards, 1996.

f Source: EPA Region 5, 1993.

g Source: General Motors Corporation, 1986.

h Emission factor calculated as percentage (f) of total hydrocarbon emissions (g).

[THIS PAGE INTENTIONALLY LEFT BLANK]

SURFACE TRANSPORTATION BOARD
Finance Docket No. 33388

CSX Corporation and CSX Transportation, Inc.
Norfolk Southern Corporation and Norfolk Southern Railway Company
Control and Operating Leases/Agreements
Conrail Inc. and Consolidated Rail Corporation

GUIDE TO THE FINAL ENVIRONMENTAL IMPACT STATEMENT

This Final Environmental Impact Statement (Final EIS) evaluates the potential environmental impacts that could result from the proposed Acquisition of Conrail Inc. and Consolidated Rail Corporation (Conrail) by CSX Corporation and CSX Transportation, Inc. (CSX) and Norfolk Southern Corporation and Norfolk Southern Railway Company (NS). The Surface Transportation Board's (Board) Section of Environmental Analysis (SEA) has prepared this document in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. 4321); the Council on Environmental Quality (CEQ) regulations implementing NEPA; the Board's environmental rules (49 CFR Part 1105); and other applicable environmental statutes and regulations.

SEA issued the Draft EIS on December 19, 1997. Subsequently, SEA issued an Errata (January 12, 1998) and a Supplemental Errata (January 21, 1998) to clarify statements and analyses in the Draft EIS. The 45-day public comment period closed February 2, 1998. This Final EIS provides responses to comments, questions, and issues that the public, agencies, and other document reviewers raised. It describes SEA's additional environmental analysis and includes SEA's final environmental mitigation recommendations to the Board.

To assist the reader in the review of this document, each volume contains a Guide to that volume and a Table of Contents for each chapter in that volume. In addition, each individual volume also contains a Guide to the Final EIS, a Glossary of Terms, a List of Acronyms and Abbreviations, and the Table of Contents of the Final EIS. Specifically, the Final EIS document includes the following volumes:

Executive Summary Volume

The **Executive Summary** provides an overview of the proposed Conrail Acquisition, including the potential environmental impacts and the mitigation measures that SEA recommends to address those impacts. In addition, the Executive Summary Volume contains the **Letter to Interested Parties** that SEA attached to copies of this Final EIS, the **Information Sources** that SEA used for preparing both the Draft EIS and the Final EIS documents, and the **Index** of keywords and phrases that appear in this Final EIS.

Volume 1: Chapters 1, 2, and 3

- Chapter 1, "Introduction and Background," describes the purpose and need for the project, the proposed action, and the alternatives to the proposed action. It also sets forth the jurisdiction of the Board and outlines SEA's environmental review process. In addition, this chapter presents an overview of SEA's agency coordination and the public comment process.

- Chapter 2, "Scope of the Environmental Analysis," identifies the proposed Conrail Acquisition-related activities that SEA analyzed. This chapter includes a table presenting the thresholds SEA used to identify activities for environmental analysis and explains project activities that differ from those set forth in the Draft EIS.

- Chapter 3, "Agency Coordination and Public Outreach," describes SEA's public outreach activities to notify interested parties and environmental justice populations of the potential environmental impacts of the proposed Conrail Acquisition and of the availability of the Draft EIS and the Final EIS. Additionally, the chapter explains SEA's distribution of the Draft EIS and the Final EIS, explains the methods that SEA used to facilitate the public comment process, and describes the agency coordination that SEA performed as part of the environmental review process. Chapter 3 also reviews the historic properties outreach activities that SEA conducted in Ohio.

Volume 2: Chapter 4

- Chapter 4, "Summary of Environmental Review," outlines the additional environmental analysis that SEA conducted for each environmental issue area since preparation of the Draft EIS. Specifically, it explains the methods of analysis, presents the public comments and additional evaluations, identifies the results of the analysis, and reviews SEA's assessment of environmental impacts. In addition, this chapter describes SEA's refinement of the mitigation measures recommended in the Draft EIS, SEA's final recommended mitigation measures, anticipated environmental benefits, and the adverse environmental impacts of the proposed Conrail Acquisition.

Volume 3: Chapter 5

- Chapter 5, "Summary of Comments and Responses," contains summaries of the comments that SEA received on the Draft EIS and SEA's responses to the comments. The chapter provides the following: (a) an overview of the comments, including those

from Federal agencies, the Applicants, and national and regional groups as well as groups and individuals within specific states; (b) general comments on the Draft EIS, including the Application review process, the environmental review process, and the system-wide technical analysis; and (c) comments on state and community issues, organized by state and environmental issue category.

Volume 4: Chapter 6

- Chapter 6, "Safety Integration Planning," sets forth the purpose and topics of the Safety Integration Plans and presents summaries of comments that reviewing agencies and the public submitted about the Safety Integration Plans. The chapter also includes SEA's analysis and response to those comments and provides SEA's conclusion and recommended conditions regarding the Safety Integration Plans.

Volume 5: Chapter 7

- Chapter 7, "Recommended Environmental Conditions," describes the final environmental mitigation conditions that SEA recommends to address significant adverse environmental impacts that could result from the proposed Conrail Acquisition.

Volume 6: Appendices

- These four volumes (6A through 6D) include appendices containing the comments on the Draft EIS and the analysis by the technical disciplines as well as appendices containing public outreach and agency consultation information and documents.

Volume 6A contains the following appendix:

A. Comments Received on the Draft Environmental Impact Statement.

Volume 6B contains the following appendices:

B. Draft Environmental Impact Statement Correction Letter, Errata, Supplemental Errata and Additional Environmental Information, and Board Notices to Parties of Record.
C. Settlement Agreements and Negotiated Agreements.
D. Agency Consultation.
E. Safety: Highway/Rail At-Grade Crossing Safety Analysis.
F. Safety: Hazardous Materials Transport Analysis.
G. Transportation: Highway/Rail At-grade Crossing Traffic Delay Analysis.
H. Transportation: Roadway Systems Analysis.
I. Air Quality Analysis.

Volume 6C contains the following appendices:

J. Noise Analysis.
K. Cultural Resources Analysis.
L. Natural Resources Analysis.
M. Environmental Justice Analysis.

N. Community Evaluations.

Volume 6D contains the following appendices:

O. EPA Rules on Locomotive Emissions.
P. SEA's Best Management Practices for Construction and Abandonment Activities.
Q. Example Public Outreach Materials.
R. All Relevant Board Decisions.
S. Index for the Draft Environmental Impact Statement.
T. Final Environmental Impact Statement Rail Line Segments.
U. List of Preparers.

Addendum Volume

The **Addendum** contains information SEA did not include in the other portions of the Final EIS because of production timing constraints. The Addendum contains SEA's evaluation and additional analyses SEA conducted for train traffic rerouting proposed as mitigation for the Greater Cleveland Area. The Addendum also contains additional analysis of the proposed connection in Alexandria, Indiana (one of the Seven Separate Connections) as well as comments received during an additional comment period and summaries of, and responses to, those comments.

GLOSSARY OF TERMS

abandonment: The discontinuance of service on a rail line segment and the salvaging and/or the removal of railroad-related facilities for reuse, sale, and/or disposal.

Acquisition: The proposal by CSX, NS, and Conrail to acquire control of Conrail's assets and its basic railroad operations.

active warning devices: Traffic control devices that give positive notice to highway users of the approach or presence of a train. These devices may include a flashing red light signal (a device which, when activated, displays red lights flashing alternately), a bell (a device which, when activated, provides an audible warning, usually used with a flashing red light signal), automatic gates (a mechanism added to flashing red light signals to provide an arm that can lower across the lanes of the roadway), and a cantilever (a structure equipped with flashing red light signals and extending over one or more lanes of traffic).

Advanced Civil Speed Enforcement System (ACSES): A supplement to the Automatic Cab Signal (ACS) and Automatic Train Control (ATC) systems currently in place within the Northeast Corridor (NEC), ACSES uses a series of transponders to communicate location and other factors to passing trains whose on-board computers utilize the information to achieve system function. These functions include: (1) civil speed enforcement; (2) temporary speed enforcement, including protection of roadway workers; and (3) enforcement of positive stop at interlocking home signals and Control Points (CPs).

adverse environmental impact: A negative effect, resulting from the implementation of a proposed action, that serves to degrade or diminish an aspect of human or natural resources.

Advisory Council on Historic Preservation (ACHP): An independent Federal agency charged with advising the President and Congress on historic preservation matters and administering the provisions of Section 106 of the National Historic Preservation Act.

air-brake test: A test made prior to train departure, required by Federal Railroad Administration regulations and by railroad rules to ensure that a train's air-brake system is functioning as intended and that certain devices are within prescribed tolerances and physical parameters.

Allied Rail Unions (ARU): A group of unions representing railroad employees, including the Brotherhood of Locomotive Engineers, the Brotherhood of Railroad Signalmen, and the Brotherhood of Maintenance-of-Way Employees.

Applicants: CSX Corporation and CSX Transportation, Inc. (CSX), Norfolk Southern Railway Company and Norfolk Southern Corporation (NS), and Conrail Inc. and Consolidated Rail Corporation (Conrail).

Application: A formal filing with the Surface Transportation Board related to railroad mergers, acquisitions, constructions, or abandonments. Applications may be either Primary Applications or Inconsistent and Responsive (IR) Applications. See *Primary Application* and *Inconsistent and Responsive (IR) Application*.

Area of Potential Effect(s) (AoPE): The geographic area surrounding a rail activity where an individual (or resource) or group of individuals (or resources) could likely experience adverse environmental effects. For this Final EIS, where applicable, the different technical disciplines determined their own specific definitions of this term for their individual technical disciplines.

attainment area: An area that EPA has classified as complying with the National Ambient Air Quality Standards specified under the Clean Air Act.

authorized speed: Maximum permitted speed for a specific train at a specific location, taking into account the prevailing weather conditions (for example, restrictions due to heavy rain, extreme heat or cold).

Automatic Block System (ABS): A series of railroad signals that indicate track occupancy in the block (length of track of defined limits) ahead and govern the use of a consecutive set of blocks by a train. These signals include wayside track signals and cab signals (signals displayed in the locomotive cab instead of, or in addition to, wayside track signal displays), or both. This system combines automatic detection of train position with control of signals.

Automatic Train Control (ATC): A system that has components installed on both trains and tracks that, when working together, will cause the train brakes to apply automatically if the engineer fails to respond to a condition requiring train speed to be reduced.

Best Management Practice (BMP): Technique that various parties (for example, the construction industry) use to provide protection from adverse impacts to the environment. The Board may designate these techniques as mitigation measures.

block group: A small population area that the U.S. Census Bureau uses to measure and record demographic characteristics. The population of a block group typically ranges from 600 to 3,000 people and is designed to reflect homogeneous living conditions, economic status, and population characteristics. Block group boundaries follow visible and identifiable features, such as roads, canals, railroads, and above-ground high-tension power lines.

block swapping: The process of moving groups of cars with a common destination (called "blocks") from one train to another.

Board: The Surface Transportation Board, the licensing agency for the proposed Conrail Acquisition.

bulletins: Documents addressed to train crews and other operating employees specifying temporary or local operating rules and restrictions.

cab signaling: System that provides signal indications in the locomotive cab instead of, or in addition to, wayside signal displays.

carload: A unit of measure used to describe commodities transported on a railroad typically in a boxcar, tank car, flat car, hopper car, or gondola.

centralized traffic control system: A signal system that allows for the movement of trains in either direction on designated tracks at the maximum authorized speed, in accordance with the wayside or cab signals or both.

census tract: Small, relatively permanent statistical subdivisions of a county containing between 2,500 and 8,000 persons. The U.S. Bureau of Census designs census tracts to reflect homogeneous living conditions, economic status, and population characteristics.

Clean Air Act (Clean Air Act Amendments): The Clean Air Act of 1970 and the subsequent amendments, including the Clean Air Act Amendments of 1990 (42 U.S.C. 7401-7671g); the primary Federal law that protects the nation's air resources. This act establishes a comprehensive set of standards, planning processes, and requirements to address air pollution problems and reduce emissions from major sources of pollutants.

Clean Water Act: The Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 *et seq.*;) is the primary Federal law that protects the nation's waters, including lakes, rivers, aquifers, and coastal areas. This act provides a comprehensive framework of standards, technical tools, and financial assistance to address the many causes of pollution and poor water quality, including municipal and industrial wastewater discharges, polluted runoff from urban and rural areas, and habitat destruction. Specifically, the Clean Water Act provides for the following:

- Requires major industries to meet performance standards to ensure pollution control.
- Charges states and tribes with setting specific water quality standards appropriate for their waters and developing pollution control programs to meet them.
- Provides funding to states and communities to help them meet their clean water infrastructure needs.
- Protects valuable wetlands and other aquatic habitats through a permitting process that conducts land development activities and other activities in an environmentally sound manner.

coastal zone: According to the Coastal Zone Management Act of 1972, lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology the sea affects.

Coastal Zone Management Act (CZMA): The Coastal Zone Management Act of 1972, as amended ((16 U.S.C. 1451-1464; P.L. 92-583), is also known as "Federal Consistency With Approved State Coastal Management Programs" (15 CFR 930). This Federal act preserves, protects, develops, and, where possible, restores or enhances the resources of the nation's coastal zone for the present and for future generations. The provisions of 15 CFR 930.30 ensure that all Federally conducted or supported activities, including development projects directly affecting the coastal zone, are consistent with approved state coastal management programs as much as possible.

collective bargaining agreement: An agreement between a union and an employer that defines the scope of work, rates of pay, rules, and working conditions for the union's members.

common corridor: For the purposes of this Final EIS, a railroad line segment that accommodates both public mass transportation service and passenger and freight train operations by using separate tracks adjacent to each other in the same right-of-way or area.

compensation wetlands (compensatory wetlands): Wetlands that an agency or entity creates, enhances, or preserves to mitigate for unavoidable impacts on existing wetlands that occur as a result of implementation of the agency's or entities' proposed action. These compensation (or compensatory) wetlands replace, "in kind", wetlands that an agency or entity partially or totally fills or drains during its construction or earth-moving activities.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9601-9675; P.L. 96-510); the Federal act that provides EPA with the authority to clean up inactive hazardous waste sites and distribute the cleanup costs among the parties who generated and/or handled the hazardous substances at these sites.

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS): Federal database containing information on potential hazardous waste sites that states, municipalities, private companies, and private persons have reported to the EPA, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act. This database contains sites that are either proposed for inclusion on, or are currently on, the National Priorities List (NPL) and sites that are in the screening and assessment phase for possible inclusion on the NPL.

condition: A provision that the Board imposes as part of any decision approving the proposed Conrail Acquisition and that requires action by one or more of the Applicants.

conductor: The operating employee on a train responsible for safe and efficient train movement in accordance with all railroad operating rules and special instructions.

Conrail Shared Assets Operations: See *Shared Assets Areas*.

consist: The number and type of locomotives and cars included in a train, considering special factors such as the tonnage and the placement of hazardous materials cars and "high-wides" (oversize dimension cars).

constant warning time: A motion-sensing system with the capability of measuring train speed and providing a relatively uniform warning time by warning signal devices to highway traffic at highway/rail at-grade crossings.

Control Date: The date on which the merger can become effective, following formal approval of the Board.

Council on Environmental Quality (CEQ): Federal agency responsible for developing regulations and guidance for agencies implementing the National Environmental Policy Act.

craft employee: Term applied to a railroad employee qualified in a specific railroad operating or maintenance activity (for example, locomotive engineer, train dispatcher, signal maintainer, or car inspector).

crew caller: Term applied to a railroad employee who is responsible for notifying train crews when and where to report for duty.

crew calling: Process of notifying train crew members when and where their next tour-of-duty will start. Labor agreements commonly specify that railroads call train crews a minimum of 2 hours before crew members are required to begin their tour-of-duty.

critical habitat: The specific sites within the geographical area occupied by a threatened or endangered species that include the physical or biological features essential to the conservation of the species. These areas may require special management considerations or protection. These areas include specific sites outside the geographical areas occupied by the species at the time of the listing that are essential for the conservation of the species.

criteria of significance: The criteria SEA developed specifically for the proposed Conrail Acquisition to determine whether a potential adverse environmental effect is significant and may warrant mitigation.

cross-tie: Transverse wooden, concrete, or steel beam supporting the rails of a railroad track.

cultural resource: Any prehistoric or historic district, site, building, structure, or object that warrants consideration for inclusion in the National Register of Historic Places. A cultural resource that is listed in or is eligible for listing in the National Register of Historic Places is considered a historic property (or a significant cultural resource). For the purposes of this Final EIS, the term applies to any resource more than 50 years old for which SEA gathered information to evaluate its significance. In addition, this Final EIS addresses potential environmental impacts of the proposed rail line construction and abandonment activities on Native American reservations and sacred sites.

cumulative effects: Effects resulting from the incremental impacts of the proposed Conrail Acquisition when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (Federal or non-Federal) or person undertakes such actions, as described in 40 CFR 1508.7. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Day 1: In the event that the Board approves the proposed Conrail Acquisition, the date (as the Applicants determine through mutual agreement) when operating responsibility for the acquired railroad is transferred to the Applicants' organizations.

decibel (dB): A unit of noise measured on a logarithmic scale that compresses the range of sound pressures audible to the human ear over a range from 0 to 140, where 0 decibels represents sound pressure corresponding to the threshold of human hearing, and 140 decibels corresponds to a sound pressure at which pain occurs. Noise analysts measure sound pressure levels that people hear in decibels, much like other analysts measure linear distances in yards or meters. A-weighted decibel (dBA) refers to a weighting that accounts for the various frequency components in a way that corresponds to human hearing.

degradation: To change a habitat, either terrestrial or aquatic, so that it no longer meets the survival needs of a particular species of plant or wildlife. Such change could include reducing the feeding area, modifying the vegetation type, and limiting the available shelter.

detector car: One of two types of rail equipment designed to detect imperfections in railroad track structure. Rail detector cars detect internal imperfections within the rail, using ultrasonic techniques. See also *track geometry inspection car*.

dimensional traffic: A freight shipment requiring special authorization for movement because of height, width, length, or gross weight.

dispatcher (train): The railroad operating employee responsible for issuing on-track movement and/or occupancy authority through the use of remotely controlled switches, signals, visual displays, voice control written mandatory directives, and/or all of the above.

dispatcher desk: The workstation from which a train dispatcher controls a specific portion of a railroad's network.

dispatching: The process of real-time planning, supervising, and controlling of train movements.

disproportionality (test for): A comparison test to assess whether potentially high and adverse impacts of an action are predominantly borne or more severe or greater in magnitude in an Environmental Justice (EJ) population than a non-EJ population within the current analysis scale (that is, at the system, state, county, segment, or block group level).

double-stack freight service: The transport of two intermodal containers stacked on top of each other on one platform of an intermodal rail flat car.

double tracking: Construction of a second railroad track immediately adjacent to an existing track, to perform railroad activities similar to those occurring on the existing track.

emergent species: Any type of aquatic plant whose vegetative growth is mostly above the water.

emissions: Air pollutants that enter the atmosphere.

endangered species: A species that is in danger of extinction throughout all or a significant portion of its range. Federal and state laws protect these species.

Endangered Species Act (ESA): The Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*; P.L. 93-205), as amended in 1978, is the primary Federal law protecting endangered and threatened wildlife and plant species. The purpose of the law is to provide for the conservation of habitat for such species.

engineer (railroad): Employee responsible for operating a railroad locomotive in accordance with train-handling practices, signal indications, operating rules, speed limits, and the technical requirements of the particular locomotive.

Environmental Impact Statement (EIS): A document that the National Environmental Policy Act requires Federal agencies to prepare for major projects or legislative proposals having the potential to significantly affect the environment. A tool for decision-making, it describes the positive and negative environmental effects of the undertaking, and alternative actions and measures to reduce or eliminate potentially significant environmental impacts.

Environmental Justice (EJ): For purposes of this document, SEA defines environmental justice as the mission discussed in Executive Order (EO) 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (59 FR 7629, February 11, 1994). This EO directs Federal agencies to identify and address "disproportionately high and adverse human health or environmental effects" of their programs, policies, and activities on minority and low-income populations in the United States. EO 12898 also calls for public notification for environmental justice populations, as well as meaningful public participation of environmental justice populations. In this document, SEA used the guidance provided in the Department of Transportation Order on Environmental Justice, the Council of Environmental Quality, Environmental Justice Guidance under the National Environmental Policy Act, and the Interim Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA analysis to analyze potential disproportionately high and adverse impacts on environmental justice populations for rail segments, intermodal facilities, rail yards, and new construction.

Environmental Justice (EJ) population: A population within an Area of Potential Effect whose minority and low-income composition meets at least one of the following criteria: (1) The percentage of minority and low-income population in the Area of Potential Effect is greater than 50 percent of the total population in the Area of Potential Effect; or (2) The percentage of minority and low-income population in the Area of Potential Effect is at least ten percentage points greater than the percentage of minority or low-income population in the county of which the Area of Potential Effect is a part.

Environmental Resource Category: Any of the environmental issues that serve as the major topics of impact analysis for this EIS. Examples include land use, natural resources, noise, hazardous materials, cultural resources, water quality, or air quality.

Environmental Resource Score (ERS): The impact score determined for an environmental resource category within a (block group) Area of Potential Effect. A typical ERS ranges from 0 to 6, reflecting the relative impact on the Area of Potential Effect compared with impacts on other Areas of Potential Effect. For the Environmental Justice analysis, SEA calculated an ERS for noise, hazardous materials transport, and traffic safety and delay.

equipment: For a railroad, a term used to refer to the mobile assets of the railroad, such as locomotives, freight cars, and on-track maintenance machines. Also used more narrowly as a collective term for freight cars operated by the railroad.

equipment restrictions: Operating instructions that restrict certain types of locomotives or freight cars from operating over selected line segments.

Errata: A list of corrections to the Draft EIS, prepared to facilitate public review of the Draft EIS and to clarify some of the information contained therein.

Executive Order (EO) 12898: Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," issued in February of 1994; directs Federal agencies to identify and address as appropriate "disproportionately high and adverse human health or environmental effects," including interrelated social and economic effects, of their programs, policies, and activities on minority populations and low-income populations in the United States.

extra board crew caller position: Railroad employee who does not have a regularly assigned position but who works on an on-call basis.

floodplain: The lowlands adjoining inland and coastal waters and relatively flat areas and flood-prone areas of offshore islands, including, at a minimum, those areas that have a 1 percent or greater chance of flood in any given year (also known as a 100-year or a Zone A floodplain).

Four City Consortium: An alliance of the cities of East Chicago, Hammond, Gary, and Whiting, Indiana.

freight car inspections: Pre-departure tests required for railroad freight cars pursuant to Federal Railroad Administration regulations.

fugitive dust: According to EPA regulations, those particulate matter emissions that could not "reasonably pass" through a stack, chimney, vent, or other functionally equivalent opening. Examples of fugitive dust include wind-borne particulate matter from earth-moving and material handling during construction activities.

Geographic Information System (GIS): A computer system for storing, retrieving, manipulating, analyzing, and displaying geographic data. GIS combines mapping and databases.

grade crossing: See *highway/rail at-grade crossing*.

grade separation: See *separated grade crossing*.

gross ton-mile: A measure of railroad production that represents the weight of cars and freight movement in terms of total tons per mile transported system-wide or over a specific rail line segment. Specifically, 1 ton of railroad car and loading carried 1 mile.

haulage right(s): The limited right (or combination of limited rights) of one railroad to have their freight traffic moved by another railroad over the designated lines of the other railroad.

hazardous materials: Substances or materials that the Secretary of Transportation has determined are capable of posing an unreasonable risk to human health, safety, and property when transported in commerce, as designated under 49 CFR Parts 172 and 173.

hazardous wastes: Waste materials that, by their nature, are inherently dangerous to handle or dispose of (for example, old explosives, radioactive materials, some chemicals, some biological wastes). Usually, industrial operations produce these waste materials.

high-and-wide load: Load on a freight car that exceeds the normal height and/or width limits for general operation over a railroad. Such loads may move only with special operating precautions to prevent damage to wayside structures and trains on adjacent tracks.

high-profile crossings: A condition at a highway/rail at-grade crossing where the elevation of the tracks is above the elevation of the approaching roadway. This condition, generally the result of the periodic raising of the tracks for maintenance of the track bed, can affect sight distance for highway users and can become a hazard for trucks and trailers with low ground-clearance. This is also referred to as "hump crossings".

highway/rail at-grade crossing: The general area of an intersection of a public or private road and a railroad where the intersecting rail and highway traffic are at the same level.

historic property: Any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). The term "eligible for inclusion in the NRHP" pertains to both properties that the Secretary of the Interior has formally determined to be eligible and to all other properties that meet NRHP listing criteria.

horn noise (train): Noise that occurs when locomotives sound warning horns in the vicinity of highway/rail at-grade crossings.

hours-of-service regulations: Federal Hours of Service Law, which Federal Railroad Administration enforces, governing maximum shift lengths and minimum rest periods for railroad operating employees. These employees include train crew, train dispatchers, and signal maintainers, as well as mechanical employees such as hostlers who move equipment for the purpose of test and inspection.

Implementing Agreement: An agreement between a railroad company and an employee union regarding working conditions on a combined system, and specifying the corresponding seniority districts, work locations, and other terms and conditions of employment.

Inconsistent and Responsive (IR) application: Proposal to the Surface Transportation Board that Parties of Record submitted prior to October 21, 1997, requesting modifications of, or alternatives to, the proposed Conrail Acquisition.

Indian tribe: According to Indian Self-Determination and Education Assistance Act (25 U.S.C. 450-458; P.L. 93-638), any Indian tribe, band, nation, or other organized group or community recognized as eligible for the special programs and services that the United States provides to Indians because of their status as Indians.

interchange point: Point at which two or more railroads join to exchange freight traffic.

interlocking: An arrangement of switch, lock, and signal devices that is located where rail tracks cross, join, or separate. The devices are interconnected in such a way that their movements must succeed each other in a predetermined order, thereby preventing opposing or conflicting movements.

intermodal facility: A site consisting of tracks, lifting equipment, paved and/or unpaved areas, and a control point for the transfer (receiving, loading, unloading, and dispatching) of trailers and containers between rail and highway, or between rail and marine modes of transportation.

jurisdictional wetland: Wetlands that the U.S. Army Corps of Engineers regulates under Section 404 of the Clean Water Act (33 U.S.C. 1344).

key route: For the purposes of this Final EIS, a rail line segment that carries an annual volume of 10,000 or more carloads of hazardous material.

key train: Any train with five or more tank carloads of chemicals classified as a Poison Inhalation Hazard (PIH), or with a total of 20 rail cars with any combination of PIHs, flammable gases, explosives, or environmentally sensitive chemicals.

L_{dn}: The day-night average noise sound level, which is the receptor's cumulative noise exposure from all noise events over a full 24 hours. This is adjusted to account for the perception that noise at night is more bothersome than the same noise during the day.

$L_{eq(h)}$: The hourly energy-averaged noise level.

labor relations culture: Philosophy by which an employer and/or parties to a collective bargaining agreement conduct labor-management relations.

land use consistency: Determination of whether the proposed Conrail Acquisition represents a change that is consistent with local land use plans in effect, based on consultation with local and/or regional planning agencies and/or a review of the official planning documents that such agencies have prepared.

Level of Service (LOS): A measure of the operational efficiency of a roadway vehicle traffic stream using procedures that consider factors such as vehicle delay, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Traffic analysts express LOS as letter grades, ranging from Level of Service A (free flowing) to Level of Service F (severely congested); they measure LOS by the average delay for all vehicles. Specifically, Level of Service A describes operations with very low delay (less than 5.0 seconds per vehicle); Level of Service B describes operations with delay in the range of 5.1 to 15.0 seconds per vehicle; Level of Service C describes operations with delay in the range of 15.1 to 25.0 seconds per vehicle; Level of Service D describes operations with delay in the range of 25.1 to 40.0 seconds per vehicle; Level of Service E describes operations with delay in the range of 40.1 to 60.0 seconds per vehicle; and Level of Service F describes operations with delay in excess of 60.0 seconds per vehicle.

low-income population: A population composed of persons whose median household income is below the Department of Health and Human Services poverty guidelines.

maintenance area: An area classified by EPA as meeting National Ambient Air Quality Standards (NAAQS) and which previously (within the last 10 years before reclassification) did not meet NAAQS.

maintenance-of-way: The activity of maintaining the track and structures of a railroad.

major key route: For the purposes of this Final EIS, a rail line segment where the annual volume of hazardous material it carries is projected to double and also exceed 20,000 carloads as a result of the proposed Conrail Acquisition.

Mechanical Department: Department of the railroad primarily responsible for the maintenance and inspection of locomotives, freight cars, and other moving equipment.

Memorandum of Agreement (MOA): With regard to cultural resources for the Final EIS, a legally binding document executed under 35 CFR 800.5(e)(4) that either specifies the process a Federal agency will undertake in order to avoid, reduce, or mitigate adverse effects on historic properties by the implementation of a proposed action, or documents the acceptance of such effects in the public interest. The parties who sign a MOA generally include the lead agency, the State Historic Preservation Office, the Advisory Council on Historic Preservation, and sometimes other interested parties.

Memorandum of Understanding (MOU): An agreement that two or more parties execute that sets forth the specific duties and responsibilities of each party. For the purposes of this Final EIS, MOU is an agreement that the Applicants may negotiate with communities.

minority population: A population composed of persons who are Black (non-Hispanic), Hispanic, Asian American, American Indian, or Alaskan Native.

mitigation: An action taken to prevent, reduce, or eliminate adverse environmental effects.

motive power: Locomotives operated by the railroad.

multi-level rail car: A two- or three-level freight car, designed for transporting automotive vehicles.

Multiple Resource Score (MRS): For the Environmental Justice analysis, a measure of aggregate impacts used to identify the geographic areas of greatest concern. This score sums the environmental resource scores for hazardous materials transport, noise, and traffic safety and delay and forms the basis for the tests for disproportionality.

National Ambient Air Quality Standards (NAAQS): Air pollutant concentration limits established by the EPA for the protection of human health, structures, and the natural environment.

National Environmental Policy Act (NEPA): The National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321-4347; P.L. 91-190) is the basic national charter for the protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. Its purpose is to provide for the establishment of a Council on Environmental Quality and to instruct Federal agencies on what they must do to comply with the procedures and achieve the goals of NEPA.

National Historic Preservation Act (NHPA): The National Historic Preservation Act of 1966, as amended (16 U.S.C. 470-470t *et seq.*; P.L. 89-665), is the basic legislation of the Nation's historic preservation program that established the Advisory Council on Historic Preservation and the Section 106 review process. Section 106 of the NHPA requires every Federal agency to "take into account" the effects of its undertakings on historic properties.

National Priorities List (NPL): A subset of CERCLIS; EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund Program.

National Register of Historic Places (NRHP): Administered by the National Park Service, the Nation's master inventory of known historic properties, including buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the Federal, state, and local levels.

Native American: According to the Native American Graves Protection and Repatriation Act of 1990, as amended (25 U.S.C. 3001 *et seq.*; P.L. 101-601), of, or relating to, a tribe, people, or culture that is indigenous to the United States.

Native American lands: According to the regulations of the Advisory Council on Historic Preservation in 36 CFR 800.2, as modified by the scope of this EIS, all lands under the jurisdiction or control of an Indian tribe, including all lands within the exterior boundaries of any American Indian reservation.

Negotiated Agreement: An agreement between CSX, NS, or both, and one or more communities or other governmental units that addresses potential environmental impacts or other issues.

No-Action Alternative: The proposed acquisition of Conrail by CSX and NS does not take place under this alternative; also the present setting for the pre-Acquisition conditions.

noise: A disturbance or annoyance of an intruding or unwanted sound. Noise impacts essentially depend on the amount and nature of the intruding sound, the amount of background sound already present before the intruding or unwanted sound occurred, and the nature of working or living activity of the people occupying the area where the sound occurs.

noise contour: Lines plotted on maps or drawings connecting points of equal sound levels.

noise-sensitive receptor: Location where noise can interrupt ongoing activities and can result in community annoyance, especially in residential areas. The Board's environmental regulations include schools, libraries, hospitals, residences, retirement communities, and nursing homes as examples of noise-sensitive receptors.

nonattainment area: An area that EPA has classified as not complying with the National Ambient Air Quality Standards promulgated under the Clean Air Act.

Northeast Corridor (NEC): Railroad right-of-way between Boston, Massachusetts and Washington, D.C. on which Amtrak and others operate; Amtrak is responsible for operation and maintenance on all of the route, except the route segment between New Haven, Connecticut and New Rochelle, New York.

Northeast Operating Rules: Rules that govern railroad operations, adapted by members of the Northeast Operating Rules Advisory Committee (NORAC). These operating rules apply to all railroads when working on any NORAC member's territory. The NORAC members are Bay Colony Railroad, Conrail Inc. and Consolidated Rail Corporation (Conrail), Delaware & Hudson Railway company, Guildford Transportation Industries, National Railroad Passenger Corporation (Amtrak), New Jersey Transit (NJT), New York Susquehanna & Western Railway Corporation, Providence & Worcester Railroad Company, and Southeastern Pennsylvania Transportation Authority (SEPTA).

notices: Documents addressed to engineers and other operating employees detailing temporary or local operating rules and restrictions.

on-track (maintenance) equipment: Track and other maintenance equipment provided with flanged wheels and able to move along railroad track.

operating employee: Railroad employee engaged in the operation of trains, including a member of the train crew; a train dispatcher; and a track, a signal, and an equipment maintenance employee.

Operating Plans: Documents that CSX and NS provided as part of the Application, detailing their planned railroad operations following the proposed Conrail Acquisition.

operating practices: Safety and operating rules, practices, and procedures contained in operating rulebook, timetable, special instructions, or any other company-issued instructions and the management decisions implementing those rules and instructions that govern the movement of trains and work on or around active tracks.

operating rules: Written rules of a railroad governing the operation of trains and the conduct of employees responsible for train operations when working on or around active tracks.

Operation Lifesaver: A non-profit public information and safety education program dedicated to eliminating collisions, deaths, and injuries at highway/rail at-grade crossings and on railroad rights-of-way. It is composed of a broad-based coalition of Federal, state, and local government agencies, private safety groups, and transportation industry representatives.

particulate matter (PM): Airborne dust or aerosols.

Party of Record (POR): Party that notified the Board of their active participation in the proceeding about the proposed Conrail Acquisition. When submitting a filing to the Board, the POR must also notify the entire POR service list.

passive warning devices: Traffic control devices that do not give positive notice to highway users of the approach or presence of a train. These devices may include signs and pavement markings, located at, or in advance of, railroad crossings to indicate the presence of a crossing and the presence of a train. These signs are either regulatory or non-regulatory and may include parallel track signs, crossbucks, stop signs, yield signs, and constantly flashing lights.

positive train separation: Mechanism included in positive train control, an experimental, automated safety system, using Global Positioning System (GPS) technology, onboard computers and wayside information inputs to control train movement. In the event of failure on the primary safety system, positive train control reduces the risk of single-point failure (that is, human error).

posted speed: Maximum speed permitted at a specific location on the railroad network irrespective of train type.

Prevention of Significant Deterioration (PSD) Class I Areas: National parks and wilderness areas designated under the Clean Air Act as areas for which users are to maintain air quality at pristine levels, with very small increases in air pollution levels allowed.

Primary Application: The formal filing of documents with the Surface Transportation Board by applicants for railroad mergers, acquisitions, constructions, or abandonments. The Primary Application contains Operating Plans and information describing related construction projects. It also includes an Environmental Report, describing the physical and operational changes associated with the proposed action and the potential environmental effects of that action.

prime farmland: According to Natural Resources Conservation Service, land having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops.

proposed Conrail Acquisition: The proposed acquisition of Conrail's physical assets and operating systems by CSX and NS, for which the Applicants are seeking approval from the Board.

public uses: According to 49 U.S.C. 10905 and STB Regulations "Surface Transportation Manual," Section 1105.7(3)iv, those identified alternative public purposes for the use of rail properties proposed for abandonment or discontinuance, including highways, other forms of mass transportation, conservation, energy production or transmission, or recreation.

queue: A line of vehicles waiting at a highway/rail at-grade crossing for an obstruction to clear.

rail line segment: For the purposes of this Final EIS, portions of rail lines that extend between two terminals or junction points.

rail route: Line of railroad track between two points on a rail system.

rail spur: A railroad track that typically connects to the main line at only one end and provides rail service to one or more railroad freight customers. A rail spur could also parallel the main line.

rail yard: A location or facility with multiple tracks where rail operators switch and store rail cars.

receptor: See *noise-sensitive receptor*.

regional and system gang: A group of railroad maintenance-of-way employees that work a particular region or an entire railroad system.

remediation (remedial actions): Actions taken to mitigate the adverse effects, or potential adverse effects, to the environmental or to the public health and welfare resulting from the release or spill of hazardous substances.

Request for Conditions: A document filed with the Board by a party to this proceeding on or before October 21, 1997, that requests the Board to impose one or more specified requirements on the Applicants as a condition to the Board's approval of the proposed Conrail Acquisition.

Resource Conservation and Recovery Act (RCRA): The Resource Conservation and Recovery Act of 1976 (42 U.S.C. 6901 *et seq.*; P.L. 94-580) is a Federal act governing the generating, storing, transporting, treating, and disposing of hazardous waste.

Resource Conservation and Recovery Information System (RCRIS): Federal database containing information on facilities that generate, transport, store, treat, and/or dispose of hazardous waste.

Responsive Environmental Report (RER): A report, submitted by an Inconsistent and Responsive applicant, that contains detailed environmental information regarding the activities proposed in its IR Application and complies with the requirements for environmental reports in the Board's rules at 49 CFR 1105.7(e).

restricted speed: A speed that will permit a train to stop within one-half the range of vision of the railroad employee controlling the movement of the train; the train must stop before passing improperly aligned switches, a defect in the track structure, deliberately placed objects, or striking other railroad equipment. According to Federal Railroad Administration regulations, this speed is not to exceed 20 miles per hour.

retarder: In railroad yards, a braking device, usually power-operated, built into a railroad track to reduce the speed of cars by means of brake-shoes which, when set in braking position, press against the sides of the lower portions of the wheels.

right-of-way: The strip of land for which an entity (for example, a railroad) has a property right to build, operate, and maintain a linear structure (for example, a rail line).

roadmaster: Railroad supervisor responsible for track inspection and maintenance over a specified portion of the railroad network.

Safety Assurance and Compliance Program (SACP): Federal Railroad Administration program to audit railroad safety practices and to ensure compliance with Federal regulations.

safety culture: The manner in which management and employees in an organization view and approach the issue of safety, including both formalized rules and informal practices in the organization.

Safety Implementation Plan Guidelines (SIPG): A series of acquisition-related guidelines that the Federal Railroad Administration developed for CSX and NS, detailing a list of safety concerns that CSX and NS must address in their Safety Integration Plans.

Safety Integration Plans: Plans that the Applicants prepared and submitted to the Board to explain how they propose to provide for the safe integration of their separate corporate cultures and operating systems, if the Board approves the proposed Conrail Acquisition.

Section 106 review process: The review process set forth in Section 106 of the NHPA (16 U.S.C. 470) that requires every Federal agency to "take into account" the effects of its undertakings on historic properties and affords the ACHP the opportunity to comment on those undertakings and their effects.

seniority district: A geographic area within which a group of employees in a specific labor union (for example, engineers, dispatchers) are authorized and expected to work.

seniority rights: The priority one employee has over another employee in bidding for available positions, choice of work assignments, and similar matters, based on length of employment in a specified category. Agreements between railroad companies and labor unions specify such rights.

sensitive receptor: See *noise-sensitive receptor*.

separated grade crossing: The site where a local street or highway crosses railroad tracks at a different level or elevation, either as an overpass or as an underpass.

service: The official notification and delivery of Board decisions and notices (including EAs and EISs) by the Secretary of the Board to persons involved in a particular proceeding.

Settlement Agreement: An agreement negotiated between CSX or NS or both and one or more parties, including other railroads, that addresses concerns or requests of the party (or parties). Generally, such an agreement addresses competitive customer service or labor issues.

Seven Separate Connections: Seven new rail line connection construction projects in Illinois, Indiana, and Ohio. These projects total approximately 4 miles of new track. CSX and NS requested that the Board give early consideration and approval to the physical construction of these particular connections.

Shared Assets Areas: Areas comprising Conrail facilities in southeastern Michigan, northern New Jersey, and southern New Jersey/Philadelphia that CSX and NS would share and Conrail Shared Assets Operations would operate for the benefit of both CSX and NS, if the Board approves the proposed Conrail Acquisition.

shifted load: An improperly secured freight car load that has moved and may protrude beyond the allowed dimensional limits.

shipment: A unit of freight given to the railroad for movement to its destination by an individual customer.

siding: A track parallel to a main track that is connected to the main track at each end. A siding is used for the passing and/or storage of trains.

signal maintainer: Railroad employee who maintains signal and communications systems.

socioeconomic: For this Final EIS, job loss directly attributable to changes in the physical environment as a result of construction and abandonment activities and other activities related to the proposed Conrail Acquisition project.

Sound Exposure Level (SEL): For a transient noise event such as a passing train, equivalent to the maximum A-weighted sound level that would occur if all of the noise energy associated with the event were restricted to a time period of 1 second. The SEL accounts for both the magnitude and the duration of the noise event; noise analysts use SEL to calculate the day-night average noise level.

Spill Prevention, Control, and Countermeasures Plan (SPCCP): A site-specific document written to detail measures to prevent discharges of oil into waters of the United States (as defined in the Clean Water Act). Facilities with aboveground storage capacities in a single container greater than 660 gallons, or the aggregate aboveground storage capacity greater than 1,320 gallons, or total underground storage capacity greater than 42,000 gallons are required to prepare SPCCPs.

superior train: For purposes of this Final EIS, a passenger train operating on the same track network with freight trains. Superior trains must have track clear of all trains not less than 15 minutes prior to their arrival. See *temporal train separation.*

Supplemental Environmental Report: A report that analyzes the environmental impacts of operating changes related to a Settlement Agreement between an Applicant and another railroad that exceed the Board's thresholds when added to changes proposed in the Applicants' Operating Plans.

switch: The portion of the track structure used to direct cars and locomotives from one track to another.

switching: The activity of moving cars from one track to another in a yard or where tracks go into a railroad customer's facility.

temporal train separation: The time separation of passenger trains that share rail lines with freight trains, in order to reduce the possibility of train collisions. See *superior train.*

territory: The portion of a railroad's track network under the management of a particular supervisor.

threatened species: A species that is likely to become endangered within the foreseeable future throughout all or part of its range. Federal and state laws protect these species.

threshold for environmental analysis: A level of proposed change in railroad activities that determines the need for SEA's environmental review. For the proposed Conrail Acquisition, SEA used the Board's environmental rules at 49 CFR Part 1105 to determine the activities that it would examine for air and noise impacts ("Board thresholds"). For other issue areas, SEA developed appropriate thresholds to guide its environmental review ("SEA thresholds"). The term "Board thresholds", as used in this EIS, may refer to either Board or SEA thresholds.

timetable: A document that identifies key railroad line features over a defined portion of the network. The features usually include distances, speed limits, track layout, type of signaling, location and length of passing sidings, and the local applicability of specific operating rules. Operating rules are often published with the timetable.

track geometry: Dimensional description of railroad track and individual rails compared to optimal design criteria.

track geometry inspection car: Rail vehicle equipped with instruments to make continuous, in-motion measurements of variations in the track gauge, alignment, and cross level.

trackage right(s): The right (or combination of rights) of one railroad to operate over the designated trackage of another railroad including, in some cases, the right to operate trains over the designated trackage; the right to interchange with all carriers at all junctions, the right to build connections or additional tracks to access other shipper or carriers. See also *haulage right(s)*.

trackage rights agreement: An agreement between two parties that defines the trackage rights granted to one party over the tracks of a second party.

traffic volume (highway): The number of highway vehicles that pass over a given point during a given period of time, often expressed on an annual, daily, hourly, and sub-hourly basis. For the purposes of this Final EIS, SEA expressed highway traffic volumes on a daily basis.

traffic volume (rail): The total volume of rail traffic that passes over a given rail line segment, typically expressed in either trains per day or annual million gross tons per year.

train (freight): A conveyance transported by one or more locomotives typically with 40 to 150 freight cars, measuring approximately 5,000 to 8,000 feet in length. For the purposes of this Final EIS, does not apply to locals, work trains, switch-engine movements, or engine-only movements.

train (passenger): Equipment composed of one or more rail cars designed to carry passengers, propelled by a locomotive or self-propelled, moving from one place to another.

train crew: Employees assigned to operate a train, usually an engineer, a conductor, and one or more trainmen.

train defect detector: An electronic device located alongside a rail track that monitors passing trains to determine the presence of certain potentially dangerous conditions, such as an overheated wheel bearing ("hot box") or a shifted load that protrudes from the rail car.

trainman: Member of a train crew responsible for assisting the engineer and conductor in operating the train, especially with switching cars.

trainmaster: Railroad operations supervisor responsible for managing train and yard operations and operating employees on a defined portion of the railroad network.

transient noise event: An intermittent occurrence of noise, such as the passing of a train that generates such noise.

Transportation Department: Department of the railroad responsible for day-to-day train operations and dispatching.

Triple Crown Service (TCS): An expedited intermodal service offered by both Conrail and NS. TCS trains do not require the use of flat cars, but rather use specially designed dual-mode highway trailers that are coupled together with two-axle rail wheel sets that support the ends of the trailers for the rail portion of the rail-highway movement. The equipment used is similar to "RoadRailer" equipment.

turnout: The portion of railroad track structure where a single track divides into two tracks.

Verified Statement: A party's sworn statement that provides information to the Board.

vibration velocity: The rate of change of displacement of a vibration. Noise analysts often express measurements of vibration in terms of velocity because velocity correlates well with human response to vibration.

waybill: Document or computer record containing details of a rail shipment: origin, destination, route, commodity, freight rate, car or cars used, and similar information.

wayside: Adjacent to the railroad track, as in "wayside signals" or "wayside defect detectors."

wayside noise: Train noise adjacent to the right-of-way that comes from sources other than the horn, such as engine noise, exhaust noise, and noise from steel train wheels rolling on steel rails.

wetlands: According to 40 CFR Part 230.41, those "areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions," generally including swamps, marshes, bogs, and similar areas.

yardmaster: Railroad operations supervisor responsible for railroad operations and employees in a railyard.

[THIS PAGE INTENTIONALLY LEFT BLANK]

LIST OF ACRONYMS AND ABBREVIATIONS

AAR	Association of American Railroads
ABS	Automatic Block System
ACHP	Advisory Council on Historic Preservation
ACS	Automatic Cab Signals
ACSES	Advanced Civil Speed Enforcement System
ADT	Average Daily Traffic
Amtrak	The National Railroad Passenger Corporation
ANSI	American National Standards Institute
AoPE	Area of Potential Effect(s)
APL	American Presidents Line
APTA	American Public Transit Association
ARU	Allied Rail Unions
ASTM	American Society for Testing and Materials
ATC	Automatic Train Control
B&O	Baltimore & Ohio Railroad Company
B&OCT	Baltimore & Ohio Chicago Terminal Railroad Company
BIA	Bureau of Indian Affairs
BMP	Best Management Practice
Board	Surface Transportation Board
BOCT	Baltimore & Ohio Chicago Terminal Railroad Company
BRL	The Cities of Bay Village, Rocky River, and Lakewood, Ohio
CAA	Clean Air Act of 1970
CAAA	Clean Air Act Amendments of 1990
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CO	carbon monoxide
Conrail	Conrail, Inc. and Consolidated Rail Corporation
CP	Control Point
CPR	Canadian Pacific Railway
CRC	Comments and Requests for Conditions
CSX	CSX Corporation and CSX Transportation, Inc.

CTC	Centralized Traffic Control
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act of 1972
dB	decibel
dBA	A-weighted decibels
DES	Division of Endangered Species
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
EA	Environmental Assessment
EDR	Environmental Data Resources, Inc.
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERS	Environmental Resource Score
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMEA	Failure Mode and Effects Analysis
FRA	Federal Railroad Administration
FRA ID	Federal Railroad Administration Identification Number
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Global Positioning System
HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HCM	The Transportation Research Board's *Highway Capacity Manual*
HMERP	Hazardous Materials Emergency Response Plan
HMIS	Hazardous Materials Information System
HUD	Department of Housing and Urban Development
ICC	Interstate Commerce Commission
ID	Identification
IHB	Indiana Harbor Belt Railroad Company
IR	Inconsistent and Responsive [application]
ISTEA	Intermodal Surface Transportation Efficiency Act
IT	Information Technology
LAL	Livonia, Avon, and Lakeville Railroad Corporation
L_{dn}	day-night equivalent sound level
$L_{eq(h)}$	hourly energy-averaged sound level
LOS	Level of Service
LUST	Leaking Underground Storage Tank

MARC	Maryland Rail Commuter (Maryland's Mass Transit Administration's Commuter Rail Service)
MBTA	Massachusetts Bay Transportation Authority
Metra	Northeast Illinois Regional Commuter Railroad Corporation
min./veh	minutes per vehicle
MNR	Metro-North Railroad (Metro-North Commuter Railroad Company)
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
mph	miles per hour
MRS	Multiple Resource Score
MRTA	Metro Regional Transit Authority of Akron, Ohio
MUTC	Manual of Uniform Traffic Control Devices
N/A	Not Applicable
NAAQS	National Ambient Air Quality Standards
NEC	Northeast Corridor
NEPA	National Environmental Policy Act of 1969
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act of 1966
NHTSA	National Highway Traffic Safety Administration
NJT	New Jersey Transit
NORAC	Northeast Operating Rules Advisory Committee
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NPS	National Park Service
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NS	Norfolk Southern Railway Company and Norfolk Southern Corporation
NWI	National Wetlands Inventory
NYCH	New York Cross Harbor
O_3	ozone
OAR	Office of Air and Radiation (within Environmental Protection Agency)
OHPO	Ohio Historic Preservation Office
OMS	Office of Mobile Sources (within Environmental Protection Agency)
OTR	Ozone Transport Region
PCB	polychlorinated biphenyl
PDEA	Preliminary Draft Environmental Assessment
PIH	Poison Inhalation Hazard
P.L.	Public Law
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
POR	Party of Record

PSD	Prevention of Significant Deterioration
P&W	Providence & Worcester
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act of 1976
RCRIS	Resource Conservation and Recovery Information System
RER	Responsive Environmental Report
RQ	Reportable Quantity
SACP	Safety Assurance and Compliance Program
SARA	Superfund Amendments and Reauthorization Act of 1986
SCS	Soil Conservation Service
SEA	Section of Environmental Analysis
sec/veh	seconds per vehicle
SEL	Sound Exposure Level
SEPTA	Southeastern Pennsylvania Transportation Authority
SHPO	State Historic Preservation Office
SIPG	Safety Implementation Plan Guidelines
SPCCP	Spill Prevention, Control, and Countermeasures Plan
Stat.	Statute
STB	Surface Transportation Board
SO_2	sulfur dioxide
TCS	Triple Crown Service
TLCPA	Toledo-Lucas County Port Authority
TMACOG	Toledo Metropolitan Area Council of Governments
Tri-Rail	Florida Tri-County Commuter Rail Authority
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRE	Virginia Railway Express
WMATA	Washington Metropolitan Area Transit Authority

CONTENTS OF THE FINAL ENVIRONMENTAL IMPACT STATEMENT

Executive Summary Volume Continued

FIGURES

Volume 1 Continued

TABLES

TABLES

Volume 1 Continued

TABLES

VOLUME 2
GUIDE TO VOLUME 2

Volume 2 Continued

Volume 2 Continued

Volume 2 Continued

FIGURES

TABLES

Volume 2 Continued

Volume 3 Continued

Volume 3 Continued

VOLUME 4
GUIDE TO VOLUME 4

Volume 4 Continued

Volume 5 Continued

VOLUME 6A
GUIDE TO VOLUME 6A

VOLUME 6B
GUIDE TO VOLUME 6B

Volume 6B Continued

TABLES

ATTACHMENTS

TABLES

Volume 6B Continued

Volume 6B Continued

Volume 6B Continued

FIGURES

TABLES

STB FD 33388 5-22-98 K 29206V6B 12/12

Volume 6B Continued

TABLES

ATTACHMENTS

Volume 6C Continued

Volume 6C Continued

TABLES

ATTACHMENTS

TABLES

Volume 6C Continued

ATTACHMENTS

Volume 6C Continued

Volume 6C Continued

FIGURES

Volume 6C Continued

TABLES

Volume 6C Continued

Volume 6C Continued

ATTACHMENTS

Volume 6D Continued

Volume 6D Continued

FINAL ENVIRONMENTAL IMPACT STATEMENT

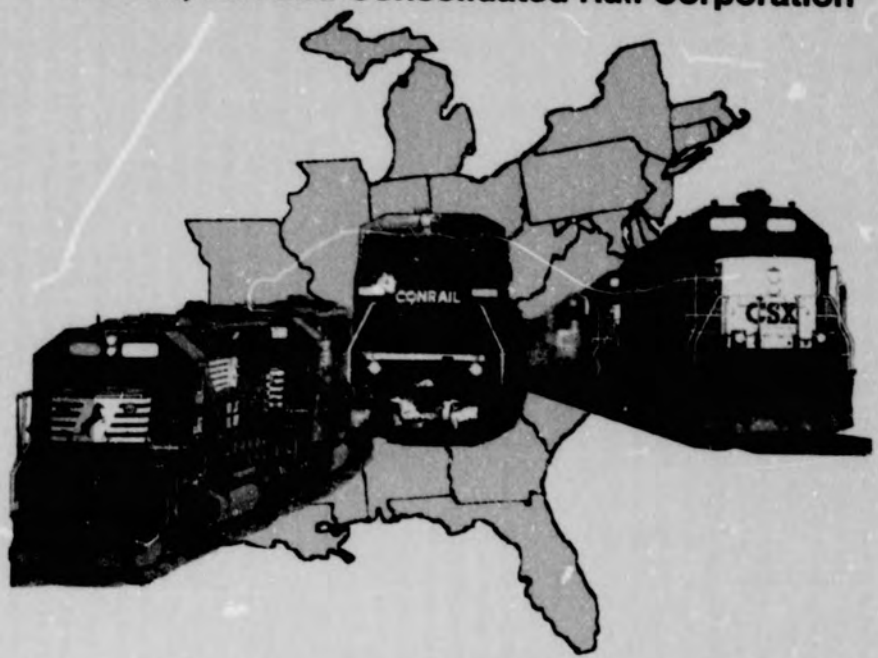
Finance Docket No. 33388

"PROPOSED CONRAIL ACQUISITION"

CSX Corporation and CSX Transportation, Inc.
Norfolk Southern Corporation and
Norfolk Southern Railway Company

Control and Operating Leases/Agreements

Conrail, Inc. and Consolidated Rail Corporation



VOLUME 6C

Appendices J through N

prepared by:

Surface Transportation Board
Section of Environmental Analysis
1925 K Street, NW • Washington, DC 20423-0001

Information Contacts:

Elaine K. Kaiser
Environmental Project Director
888-869-1997

Michael J. Dalton
Environmental Project Manager
888-869-1997

GUIDE TO VOLUME 6C

Volume 6C of the Proposed Conrail Acquisition Final EIS contains the following items:

- List of Appendices.
- Appendix J, "Noise Analysis."
- Appendix K, "Cultural Resources Analysis."
- Appendix L, "Natural Resources Analysis."
- Appendix M, "Environmental Justice Analysis."
- Appendix N, "Community Evaluations."
- Guide to the Final EIS.
- Glossary of Terms.
- List of Acronyms and Abbreviations.
- Contents of the Final EIS.

[THIS PAGE INTENTIONALLY LEFT BLANK]

LIST OF APPENDICES

APPENDIX J
Noise Analysis

[THIS PAGE INTENTIONALLY LEFT BLANK]

CONTENTS

TABLES

ATTACHMENTS

[THIS PAGE INTENTIONALLY LEFT BLANK]

APPENDIX J
NOISE ANALYSIS

This appendix presents the methods that the Section of Environmental Analysis (SEA) of the Surface Transportation Board (the Board) used to refine the noise analysis for the Final Environmental Impact Statement (Final EIS) of the proposed Conrail Acquisition. The following sections discuss the process by which SEA evaluated potential noise effects and identified areas requiring mitigation.

J.1 DEFINITION OF RAILROAD NOISE

The principal sources of noise SEA considered in evaluating of rail line segments are wayside noise and horn noise. Wayside train noise refers collectively to all train-related operational noise adjacent to the right-of-way, excluding warning horn noise. Wayside noise results from steel train wheels contacting steel rails and from locomotive exhaust and engine noise. The amount of noise created by the wheels on the rails is dependent on the train speed, and the amount of noise created by the locomotive is dependent on the throttle setting. Horn noise occurs in the vicinity of highway/rail at-grade crossings. Safety regulations require that engineers use locomotive horns at highway/rail at-grade crossings to warn motorists and pedestrians of approaching trains.

Potential sources of noise associated with rail yards and intermodal facilities include locomotives, freight handling equipment, rail cars, trucks, and retarders.

J.2 SCREENING PROCESS

SEA used the same screening process in the Final EIS that it used in the Draft Environmental Impact Statement (Draft EIS) to identify sites that would require impact analysis. SEA's approach was to analyze those areas that would meet or exceed the Board's thresholds for environmental analysis as a result of the proposed Conrail Acquisition. SEA also analyzed areas where the projected increase in train volume or change in train mix would cause an incremental increase of at least 2 dBA in the day-night equivalent sound level (L_{dn}). (See Draft EIS Appendix F, "Noise," Section F.3, "Screening Process.")

J.3 MODELING

The noise models that SEA used in the Draft EIS to determine potential noise impacts incorporated a combination of the models that the Applicants[1] used in their Environmental Report and the model SEA used to verify the Applicants' analysis. (See Draft EIS Appendix F, "Noise," Section F.5, "Assumptions, Evaluation Criteria, and Analysis.") CSX and NS used two separate noise models in their evaluation of potential noise effects for their Environmental Report. Although similar in approach, the two models operated on different assumptions for input data. SEA performed independent Geographic Information System (GIS)-based modeling during preparation of the Draft EIS to verify the Applicants' models. After finding some disparities between SEA's modeling results and the Applicants' modeling results, SEA consulted with the Applicants to determine the cause of the disparities and updated the noise analysis results with its GIS-based model. For the Draft EIS, SEA updated the modeling for approximately 30 percent of the combined rail systems and facilities.

Through extensive coordination between the Applicants' and SEA's technical personnel, SEA developed for the Final EIS a refined approach to the noise analysis that addresses data and method consistency issues. SEA applied this refined approach to 100 percent of the combined rail systems and facilities.

SEA's refined approach to the noise analysis involves:

- A GIS-based noise model.
- Revised reference Sound Exposure Level (SEL) values to include greater consistency between SEL values for CSX and NS operations, and proper assignment of each Applicant's and associated SEL values to rail line segments for existing conditions and conditions that would exist if the Board approves the proposed Conrail Acquisition.
- Inclusion of the noise effects of parallel rail line segments that are close to each other.
- Inclusion of wheel/rail contribution (wayside noise) to noise levels at highway/rail at-grade crossings.

J.3.1 Geographic Information System-based Noise Model

For 100 percent of the combined rail systems and facilities in the Final EIS and 30 percent of the combined rail systems and facilities in the Draft EIS, SEA used a GIS-based noise model to identify noise-sensitive receptors potentially affected by the proposed Conrail Acquisition that

---

1 "The Applicants" refers to CSX Corporation and CSX Transportation, Inc. (CSX); Norfolk Southern Corporation and Norfolk Southern Railway Company (NS); and Conrail, Inc., and Consolidated Rail Corporation (Conrail).

would meet the Board's thresholds for noise analysis. The GIS-based model uses current digitized aerial photographs and U.S. Geological Survey topographic maps for base mapping. The SEA noise analysis team superimposed the 65 dBA L_{dn} contour on the GIS base map and counted sensitive receptors within the contour. SEA conducted site visits where receptor identification from base mapping was uncertain. Where a row of buildings separated the rail facility from sensitive receptors and blocked the line of sight from the receptors to the rail facility by 65 percent, SEA applied a shielding factor of 5 dBA to all subsequent rows of dwelling units.

J.3.2 Reference Sound Exposure Level Values

SEL values for transient noise events are equivalent to the maximum A-weighted sound level that would occur if all of the noise energy associated with the event were restricted to a time period of one second. CSX and NS conducted separate noise measurement programs for the Environmental Report and obtained slightly different reference SEL values. SEA attributed the differences in SEL values to real-world variations in noise measurements and the fact that NS trains are shorter and slower than Conrail and CSX trains, resulting in lower SEL values for NS trains. For the Final EIS, SEA revised the SEL values used in the Applicants' noise models to provide a more consistent characterization of noise associated with Conrail, CSX, and NS trains. (See Table J-1.)

TABLE J-1
REFERENCE SOUND EXPOSURE LEVEL VALUES (dBA)

Railroad	Environmental Report/Draft EIS Sound Exposure Level Values		Final EIS Sound Exposure Level Values	
	Wayside Noise [a]	Horn Noise	Wayside Noise [a]	Horn Noise
Conrail	102	111	102	108
CSX	102	111	102	112
NS	98.4	108	100	108

[a] Wayside noise refers to wheel/rail and locomotive noise. SEL values are referenced at 100 feet from the tracks and are adjusted to compensate for train speed and length. NS train speed is 35 miles per hour; train length is 5,000 feet. Conrail and CSX train speed is 40 miles per hour; train length is 6,200 feet.

In their Environmental Report noise analysis, the Applicants did not differentiate between existing conditions and conditions under the proposed Conrail Acquisition regarding equipment type or operations. For example, the noise model in the Environmental Report assumed only NS train speed and length for both existing conditions and conditions under the proposed Conrail Acquisition on Conrail-owned rail line segments, when it should have assumed Conrail train speed and length for existing conditions. In addition, the model used average horn SEL values for Conrail and CSX, when it should have used the individual SEL values to reflect existing

conditions and conditions under the proposed Conrail Acquisition. SEA refined the noise analysis for the Final EIS to account for actual activities by the individual Applicants for both existing conditions and conditions under the proposed Conrail Acquisition. (See Table J-1.)

J.3.3 Parallel Rail Line Segments

In areas where parallel rail line segments are close to each other, SEA analyzed the combined noise levels of the parallel rail line segments. SEA determined that the combined noise levels of certain parallel rail line segments would be higher than the noise levels for the individual segments, resulting in expanded noise contours. Those rail line segments are Ashtabula-to-Cleveland (N-075), Ashtabula-to-Quaker(C-060), Quaker-to-Mayfield (C-073), and Mayfield-to-Marcy (C-072).

J.3.4 Wayside Noise at Highway/Rail At-grade Crossings

In its refined approach to noise analysis, SEA included the wayside noise contribution to the train noise event at highway/rail at-grade crossings. Although the horn-sounding contribution at highway/rail at-grade crossings is much higher than the wayside noise contribution, the wayside noise contribution adds 20 to 100 feet to noise contours near the crossings. SEA notes that, given the margin of error inherent in noise modeling, its primary purpose for including this refinement is to ensure consistency for the noise analysis.

J.4 QUALITY ASSURANCE/QUALITY CONTROL

Members of the noise analysis team performed a quality assurance/quality control (QA/QC) review of the refined noise analysis for every rail line segment, intermodal facility, and rail yard affected by the proposed Conrail Acquisition. A noise analyst other than the one who originally entered the data conducted the QA/QC review. The noise analyst performing the QA/QC review used a checklist to verify that the original noise analyst properly entered the data in the database and correctly performed the original analysis. Attachment J-1 presents the checklist used to perform the QA/QC review.

J.5 RESULTS

SEA's refined analysis for the Final EIS resulted in new 65 dBA L_{dn} contours and noise-sensitive receptor counts. Attachment J-2 presents the results of the refined noise analysis for rail line segments that meet or exceed the Board's thresholds for noise analysis. Attachment J-3 presents the results of the refined noise analysis for intermodal facilities and rail yards that meet or exceed the Board's thresholds for noise analysis.

J.6 NOISE MITIGATION

SEA considered mitigation for increased rail activity that results in potential exposure of noise-sensitive receptors to noise levels that would increase by at least 5 dBA L_{dn} and would be at least 70 dBA L_{dn} as a result of the proposed Conrail Acquisition. SEA examined areas adjacent to rail lines and at intermodal facilities and rail yards to determine whether the potential increase in wayside noise (that is, wheel/rail and diesel locomotive noise) would meet the mitigation criteria.

SEA identified mitigation strategies for horn noise in the Draft EIS; however, SEA does not consider it feasible to implement these measures due to pending Federal Railroad Administration (FRA) rules addressing use of locomotive horns near highway/rail at-grade crossings. However, after the FRA issues these rules, communities may be able to apply to FRA for quiet zones at specific highway/rail at-grade crossings that meet certain safety requirements. (See Draft EIS Appendix F, "Noise," Section F.6.1, "Highway/Rail At-grade Crossing Noise.")

J.6.1 Noise Mitigation Criteria

SEA determined that noise-sensitive receptors exposed to wayside noise levels by at least 5 dBA L_{dn} and would be at least 70 dBA L_{dn} as a result of the proposed Conrail Acquisition could warrant noise mitigation. SEA identified these noise levels as mitigation criteria based on reasonableness of cost, geographic extent of the project, other agencies' mitigation criteria, and past railroad merger projects.

Using the GIS-based noise model, SEA identified locations adjacent to rail line segments and at intermodal facilities and rail yards where the potential increase in wayside noise meets the mitigation criteria. SEA identified 15 rail line segments and no intermodal facilities or rail yards that meet the mitigation criteria as a result of increased wayside noise associated with the proposed Conrail Acquisition. These 15 rail line segments are:

- C-026 Warsaw to Tolleston, Indiana.
- C-061 Berea to Greenwich, Ohio.
- C-065 Deshler to Toledo, Ohio.
- C-072 Mayfield to Marcy, Ohio.
- C-073 Quaker to Mayfield, Ohio.
- C-074 Short to Berea, Ohio.
- C-085 Sinns to Brownsville, Pennsylvania.
- N-040 Alexandria to Muncie, Indiana.
- N-060 Corning to Geneva, New York.
- N-079 Oak Harbor to Bellevue, Ohio.
- N-085 Bellevue to Sandusky Dock, Ohio.
- N-100 Riverton Junction to Roanoke, Virginia.
- N-110 Elmore to Deepwater, West Virginia.

- N-111 Fola Mine to Deepwater, West Virginia.
- S-020 Carleton to Ecorse, Michigan.

J.6.2 Noise Mitigation Analysis

Measures for reducing wayside noise impacts include: constructing noise barriers, installing sound insulation in buildings, replacing jointed rail with continuous welded rail (however, SEA assumed quieter continuous welded rail in the noise modeling), improving wheel/rail maintenance, and improving locomotive noise control. (See Draft EIS Appendix F, "Noise," Section F.6.2, "Wheel/Rail and Locomotive Noise.") Noise barriers are the most common and practical method of outdoor noise control. SEA considers noise barriers to be the most appropriate mitigation measure when a large number of affected dwellings are close together along segments of the rail lines where wheel/rail noise is predominant. SEA considered noise barriers as the primary noise mitigation method in this analysis because the Applicants could construct the noise barriers on railroad property and provide noise reduction both indoors and outdoors. SEA considered the installation of sound insulation in buildings as a secondary mitigation option.

J.6.3 Mitigation Analysis Results

Affected Receptors

Using the GIS-based noise model, SEA identified receptors adjacent to the 15 rail line segments where the potential increase in wayside noise meets the mitigation criteria. Table J-2 lists, by rail line segment, sensitive receptors meeting the mitigation criteria of at least 70 dBA L_{dn} and an increase of 5 dBA or more. Table J-2 also shows the distance from the tracks to the wayside noise contour for the 15 rail line segments.

SEA determined that mitigation of wayside train noise (locomotive engine and wheel/rail noise) is warranted for noise sensitive receptors identified in Attachment J-4. SEA determined that noise barriers or building sound insulation treatments are appropriate in reducing noise impacts at these locations. In addition, SEA determined a design goal of a 10 dBA noise reduction and a minimum of a 5 dBA noise reduction for noise barriers and sound insulation treatments for buildings.

SEA recommends that the Applicants use American National Standards Institute (ANSI) "Methods for Determination of Insertion Loss of Outdoor Noise Barriers" to determine the performance of noise barriers and American Society for Testing and Materials 966-90, "Standard Guide for Field Measurements of Airborne Sound Insulation of Building Facades and Facade Elements," to evaluate sound insulation treatments.

TABLE J-2
RECEPTORS THAT MEFT WAYSIDE NOISE MITIGATION CRITERIA[a]

Rail Line Segment	Rail Line Segment Description	Distance to 70 dBA L_{dn} Noise Contour (in feet)	Affected by Horn Sounding		Total Number of Receptors
			No	Yes	
C-026	Warsaw to Tolleston, Indiana	56	0	3	3
C-061	Berea to Greenwich, Ohio	246	15	246	261
C-065	Deshler to Toledo, Ohio	108	6	71	77
C-072	Mayfield to Marcy, Ohio	218	95	0	95
C-073	Quaker to Mayfield, Ohio	218	206	0	206
C-074	Short to Berea, Ohio	229	32	40	72
C-085	Sinns to Brownsville, Pennsylvania	91	58	91	149
N-040	Alexandria to Muncie, Indiana	72	0	6	6
N-060	Corning to Geneva, New York	21	0	0	0
N-079	Oak Harbor to Bellevue, Ohio	122	13	57	70
N-085	Bellevue to Sandusky Dock, Ohio	76	0	2	2
N-100	Riverton Junction to Roanoke, Virginia	73	16	47	63
N-110	Elmore to Deepwater, West Virginia	26	0	0	0
N-111	Fola Mine to Deepwater, West Virginia	24	3	0	3
S-020	Carleton to Ecorse, Michigan	93	15	12	27
	Total Numbers of Receptors		**459**	**575**	**1,034**

[a] At least 70 dBA L_{dn} and an increase of at least 5 dBA L_{dn}

Construction Noise

As part of the noise mitigation program, SEA recommends that the Applicants develop a Construction Noise and Vibration Specification for any construction project associated with the proposed Conrail Acquisition. The qualifications for the noise control engineer that develops the Specification include at least five years experience with major construction noise projects, and board-certification membership with the Institute of Noise Control Engineering or registration as a Professional Engineer in Mechanical Engineering or Civil Engineering.

Wheel Squeal

Wheel squeal can be problematic on tight-radius curved tracks where the steel wheels slide, rather than roll, over the rail. This can produce an annoying tone or squeal. Because the occurrence of such tight-radius curved sections of track is relatively limited in the project area, the associated noise impacts are very limited in comparison to horn and wayside noise impacts project-wide.

Potential solutions to wheel squeal include rail lubrication, high positive friction lubricants, rail profile grinding, noise barriers, track designed with a larger radius of curve, and other treatments to the rail running surface. Each of these options have limitations as well as different benefits. Where the potential for wheel squeal exists (such as at tight-radius curves), SEA recommends that the Applicants employ a noise control engineer with a minimum of five years experience on rail projects and board-certification membership with the Institute of Noise Control Engineering or registration as a Professional Engineer in Mechanical Engineering or Civil Engineering.

ATTACHMENT J-1

Noise Impact Analysis Quality Assurance Checksheet

[THIS PAGE INTENTIONALLY LEFT BLANK]

Noise Impact Analysis Quality Assurance Checksheet

Quality Check

Line segment name and ID:_____

Quality Assurance Procedures	Check Off
1. ID appropriate *Lineseg*.xls* spreadsheet:	
2. Verify that segment exceeds noise analysis thresholds. (≥8 trains/day & ≥2 dB)	
3. Verify trains per day on *Lineseg*.xls* with spreadsheet model.	
4. Verify SEL's.	
5. Verify distances to 65 dB(A) contour lines.	
6. Load project file in ArcView, and look for quirks in project files.	
7. Verify that length of line segment shape file is same as line segment length in Linseg*.xls.	
8. Verify the location and number of grade crossings.	
9. Create new buffers and overlay them: verify buffer lines used in analysis.	
10. Perform spot checks of receptor counts.	
11. Evaluate application of shielding.	
12. Verify school and church counts.	
13. Document QA review.	

Comments and signature of reviewer, and date:

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT J-2

Sensitive Receptor Counts for Rail Line Segments That Meet the Board's Thresholds for Noise Analysis

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT J-2

SENSITIVE RECEPTOR COUNTS FOR RAIL LINE SEGMENTS THAT MEET THE BOARD'S THRESHOLDS FOR NOISE ANALYSIS

Site ID #	State	Ownership		Rail Line Segment		Train and Rail Data					Pre-Aquisition Distance to 65 Ldn (ft.)		Post-Aquisition Distance to 65 Ldn (ft.)			Receptor Counts	
						1995 Base	Post-Acquisition										
		Post Acq.	Pre Acq.	Between	And	Pagr. Trn.	Frt. Trn.	Frt. Trn.	Change in Trn.	% Change MGT	Wayside	Xing	Change in dBA	Wayside	Xing	Pre Acq.	Post Acq.
C-1	Washington DC	CSX	CR	Anacostia	Virginia Ave	0	19.3	28.6	9.3	12	269	517	1.7	343	1,147	0	0
C-2	Washington DC	CSX	CR	Virginia Ave	Potomac Yard, VA	45	17.9	28.6	10.7	18	256	492	0.7	343	1,052	0	0
C-10	Illinois	CSX	CSX	Barr Yard	Blue Island Jct	0	17.0	32.9	15.9	132	248	812	2.9	375	1,257	120	341
C-20	Indiana	CSX	CR	Adams	Ft. Wayne	0	5.9	13.9	8.0	460	128	237	3.7	219	711	1	20
C-21	Indiana	CSX	CSX	Evansville	Amqui, TN	0	23.4	32.7	9.3	53	303	1004	1.5	373	1,253	0	0
C-22	Indiana	CSX	NS	Ft. Wayne	Warsaw	0	2.4	6.4	4.0	214	55	125	4.3	135	425	133	657
C-24	Indiana	CSX	CR	Tolleston	Clark Jct.	0	0.0	5.0	5.0	>1000	0	0	U	115	361	0	174
C-25	Indiana	CSX	CSX	Vincennes	Evansville	0	22.3	30.8	8.5	75	294	972	1.4	360	1,205	0	0
C-26	Indiana	CSX	NS	Warsaw	Tolleston	0	1.0	5.0	4.0	206	32	70	7.0	115	361	14	1,129
C-27	Indiana	CSX	CSX	Willow Creek	Pine Jct.	2	21.1	34.6	13.5	105	284	937	2.0	387	1,301	446	730
C-35	Maryland	CSX	CR	Landover	Anacostia, D.C.	0	3.4	9.1	5.7	117	91	165	4.3	168	537	4	31
C-36	Maryland	CSX	CSX	Pt. of Rock	Harpers Ferry, WV	25	33.3	41.6	8.3	30	378	1269	0.6	434	1,471	0	0
C-40	Michigan	CSX	CSX	Carelton	Toledo, OH	0	21.9	33.1	11.2	61	291	961	1.8	376	1,264	0	0
C-61	Ohio	CSX	CR	Berea	Greenwich	0	14.5	54.2	39.7	250	225	428	5.7	512	1,752	434	2,154
C-62	Indiana	CSX	CR	Bucyrus	Adams, IN	0	5.9	13.9	8.0	412	128	237	3.7	219	711	612	3,027
C-64	Ohio	CSX	CR	Crestline	Bucyrus	0	6.5	14.5	8.0	417	136	253	3.5	225	731	66	350
C-65	Ohio	CSX	CSX	Deshler	Toledo, OH	0	0.6	14.2	13.6	>1000	31	88	13.7	221	720	48	1,205
C-66	Ohio	CSX	CSX	Deshler	Willow Creek, IN	2	21.4	47.7	26.3	111	286	946	3.3	473	1,610	2,237	4,150
C-67	Ohio	CSX	CR	Greenwich	Crestline	0	14.5	30.1	15.6	88	225	428	3.2	355	1,186	358	1,114
C-68	Ohio	CSX	CSX	Greenwich	Willard	2	32.5	55.2	22.7	96	372	1248	2.2	518	1,774	332	414
C-69	Ohio	CSX	CR	Marcy	Short	0	16.4	43.8	27.4	267	243	465	4.3	448	1,522	102	216
C-70	Ohio	CSX	CSX	Marion	Fostoria	0	17.8	27.4	9.6	56	255	837	1.9	334	1,115	0	0
C-71	Ohio	CSX	CR	Marion	Ridgeway	0	16.1	31.8	15.7	31	240	459	3.0	367	1,231	270	566
C-72	Ohio	CSX	CR	Mayfield	Marcy	0	3.4	43.8	40.4	933	91	165	11.1	448	1,522	2	282
C-73	Ohio	CSX	CR	Quaker	Mayfield	0	6.8	43.8	37.0	933	140	260	8.1	448	1,522	73	299
C-74	Ohio	CSX	CR	Short	Berea	0	13.4	47.3	33.9	578	214	407	5.5	470	1,600	125	570
C-75	Ohio	CSX	CSX	Willard	Fostoria	2	32.5	54.0	21.5	97	372	1248	2.1	511	1,749	994	1,334
C-82	Pennsylvania	CSX	CSX	Rankin Jct.	New Castle	0	28.9	38.3	9.4	74	346	1155	1.2	412	1,392	0	0
C-83	Pennsylvania	CSX	CR	RG	Field	0	0.0	16.0	16.0	>1000	0	0	U	239	780	0	14
C-85	Pennsylvania	CSX	CSX	Sinns	Brownsville	0	1.5	10.8	9.3	>1000	54	162	8.6	186	600	194	781
C-86	Pennsylvania	CSX	CSX	Sinns	Rankin Jct.	2	30.8	40.2	9.4	77	360	1205	1.1	425	1,438	0	0
C-110	West Virginia	CSX	CSX	WD Tower	Riversville	0	1.5	3.4	1.9	108	54	162	3.5	90	277	5	12
N-10	Delaware	NS	CR	Edgemoor	Dell	0	5.0	11.8	6.8	165	115	212	3.7	148	358	0	0
N-30	Illinois	NS	NS	IC 95 St. Chicago	Pullman Jct.	0	2.0	5.9	3.9	179	49	110	4.7	96	225	0	0
N-33	Illinois	NS	NS	Tilton	Decatur	0	22.7	39.1	16.4	64	223	551	2.4	313	789	1,100	1,698
N-34	Illinois	NS	CR	Cotenour	Calumet Park	0	1.1	2.5	1.4	125	45	78	3.6	56	128	46	59
N-40	Indiana	NS	NS	Alexandria	Muncie	0	2.6	11.8	9.3	370	57	130	6.6	148	358	83	506
N-41	Indiana	NS	NS	Butler	Ft. Wayne	0	13.6	27.3	13.7	99	162	392	3.0	250	622	240	484
N-42	Indiana	NS	NS	Control Pt. 501	Indiana Harbor	14	45.4	60.3	14.9	33	344	870	1.0	410	1,050	0	0
N-43	Indiana	NS	NS	Ft. Wayne TC	Ft Wayne Yard	0	6.6	9.6	3.0	132	103	242	1.6	130	311	0	0
N-44	Indiana	NS	NS	Ft Wayne	Peru	0	19.0	34.9	15.9	100	199	489	2.6	291	731	809	1,210
N-45	Illinois	NS	NS	Lafayette	Tilton, IL	0	23.6	41.0	17.4	80	228	564	2.4	323	814	559	860
N-46	Indiana	NS	NS	Peru	Lafayette	0	18.4	40.2	21.8	113	195	479	3.4	319	803	825	1,647
N-60	New York	NS	CR	Corning	Geneva	0	0.2	1.6	1.4	500	16	26	8.9	43	97	0	117
N-61	New York	NS	CR	Ebenezer Jct.	Buffalo	0	0.0	11.4	11.4	>1000	0	0	U	145	349	0	23
N-64	New York	NS	CR	Suffern	Ridgewood Jct, NJ	94	7.6	10.6	3.0	123	112	267	0.1	138	333	0	0
N-70	New York	NS	NS	Ashtabula	Buffalo, NY	0	13.0	25.2	12.2	120	157	381	2.9	238	589	1,138	2,136
N-71	Ohio	NS	NS	Bellevue	Bucyrus	0	26.0	34.6	8.6	39	243	602	1.2	290	727	0	0
N-72	Ohio	NS	NS	Bellevue	Vermilion	0	15.6	27.0	11.4	64	176	429	2.4	248	617	171	244
N-73	Ohio	NS	NS	Bucyrus	Fairgrounds Col	0	26.0	34.3	8.3	41	243	602	1.2	288	723	0	0
N-74	Ohio	NS	CR	Cleveland	Shortline Jt.	0	2.0	4.2	2.2	>1000	65	116	3.2	78	180	2	20

ATTACHMENT J-2

SENSITIVE RECEPTOR COUNTS FOR RAIL LINE SEGMENTS THAT MEET THE BOARD'S THRESHOLDS FOR NOISE ANALYSIS

Site ID #	State	Ownership		Rail Line Segment		Train and Rail Data					Pre-Aquisition Distance to 65 Ldn (ft.)		Post-Aquisition Distance to 65 Ldn (ft.)			Receptor Counts	
						1995 Base		Post-Acquisition									
		Post Acq.	Pre Acq.	Between	And	Pagr. Trn.	Frt. Trn.	Frt. Trn.	Change in Trn.	% Change in GT	Wayside	Xing	Change in dBA	Wayside	Xing	Pre Acq.	Post Acq.
N-75	Ohio	NS	NS	Cleveland	Ashtabula	0	13.0	36.6	23.6	214	157	381	4.5	300	755	743	1,933
N-77	Ohio	NS	CR	Oak Harbor	Miami	4	48.0	61.5	13.5	21	475	943	1.0	416	1,064	0	0
N-79	Ohio	NS	NS	Oak Harbor	Bellevue	0	7.7	27.2	19.5	185	113	269	5.5	250	620	232	571
N-80	Ohio	NS	NS	Vermilion	Cleveland	0	13.5	34.1	20.6	81	161	390	4.0	287	720	2,523	4,816
N-81	Ohio	NS	CR	White	Cleveland	2	12.5	29.7	17.2	131	205	388	3.4	264	657	30	66
N-82	Ohio	NS	CR	Youngstown	Ashtabula	0	11.7	23.8	12.1	76	196	372	3.1	230	568	205	329
N-85	Ohio	NS	CR	Bellevue	Sandusky Dock	0	1.4	12.9	11.5	139	52	92	9.6	157	379	5	58
N-86	Ohio	NS	CR	Miami	Airline	4	55.4	64.0	8.6	9	519	1036	0.6	426	1,092	0	0
N-90	Pennsylvania	NS	CR	Harrisburg	Rutherford	0	44.3	57.9	13.6	4	451	894	1.2	400	1,022	0	0
N-91	Pennsylvania	NS	NS	Harrisburg	Riverton Jct., VA	0	11.1	19.6	8.6	82	142	342	2.5	203	500	895	1,627
N-93	Pennsylvania	NS	CR	Harrisburg	Shocks	0	2.2	6.0	3.8	143	69	124	4.4	97	228	24	76
N-100	Virginia	NS	NS	Riverton Jct.	Roanoke	0	3.9	12.1	8.2	228	74	171	5.0	150	363	466	1,560
N-110	West Virginia	NS	NS	Elmore	Deepwater	0	0.3	2.3	2.0	>1000	15	32	8.8	53	121	0	230
N-111	West Virginia	NS	CR	Folsom Mine	Deepwater	0	0.6	2.0	1.4	331	31	53	5.2	49	110	37	161
S-20	Michigan	SH	CR	Carleton	Ecorse	0	2.0	11.2	9.2	>1000	65	116	7.5	191	616	30	615
S-21	Michigan	SH/NEC	CR	W.Detroit	North Yard	0	7.9	13.2	5.3	119	154	287	2.2	212	688	8	34
S-40	Pennsylvania	NEC	NEC	Arsenal	Davis, DE	131	2.3	10.5	8.2	63	71	127	0.3	184	590	0	0
S-42	Pennsylvania	SH	CR	South Phil.	Field	0	8.2	21.1	12.9	303	157	294	4.1	284	937	78	219

ATTACHMENT J-3

Sensitive Receptor Counts for Intermodal Facilities and Rail Yards That Meet the Board's Thresholds for Noise Analysis

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT J-3

SENSITIVE RECEPTOR COUNTS FOR INTERMODAL FACILITIES THAT MEET THE BOARD'S THRESHOLDS FOR NOISE ANALYSIS

Facility Description					Change in	% Increase	Trucks / Day		Change	Distance	Receptor Counts	
Site ID#	State	Location	RR	Facility	Trks/Day	In Avg Traffic	Pre Acq.	Post Acq.	in dBA	to 65 Ldn	Pre	Post
NM-01	Georgia	Atlanta	NS	Inman	143	0.2-2.6	569	712	1.0	---	0	0
NM-02	Illinois	Chicago	NS	Landers	95	0.1-1.0	412	507	1.0	---	0	0
NM-03	Illinois	Chicago	NS	47th St.	205	0.1-3.6	532	737	1.4	---	0	0
NM-04	Kentucky	Louisville	NS	Buechel	54	0.1-2.7	119	173	1.6	---	0	0
NM-05	Lousiana	New Orleans	NS		63	0.1-2.1	64	127	3.0	107	0	0
NM-06	Maryland	Baltimore	NS		92	0.5-3.2	108	200	2.7	145	0	0
NM-07	Michigan	Detroit	NS	Melvindale	57	0.1-1.1	257	314	0.9	---	0	0
NM-08	Missouri	Kansas City	NS	Voltz	120	0.5-14.1	229	349	1.8	---	0	0
NM-09	Missouri	St. Louis	NS	Luther	194	0.1-4.6	188	382	3.1	223	0	0
NM-10	New Jersey	Elizabeth	NS	E-rail	335	0.3-6.7	72	407	7.5	233	0	0
NM-11	Ohio	Sandusky	NS	Sandusky	71	U	0	71	28.5	73	0	0
NM-12	Ohio	Colombus	NS	Discovery Park	53	.1-3.5	131	184	1.5	---	0	0
NM-14	Pennsylvania	Allentown	NS		99	0.3-1.0	39	138	5.5	113	0	0
NM-15	Pennsylvania	Harrisburg	NS	Rutherford	330	0.4-7.8	68	398	7.7	229	0	0
NM-16	Pennsylvania	Philadelphia	NS	Morrisville	61	0.7-33.3	164	225	1.4	157	0	0
NM-17	Pennsylvania	Pittsburgh	NS	Pitcairn	114	0.4-1.6	0	114	U	100	0	0
NM-18	Tennessee	Memphis	NS	Forest	76	0.1-1.8	120	196	2.1	143	0	0
NM-19	Pennsylvania	Philadelphia	NS	Ameriport	122	.18-2.2	0	122	U	104	0	0
CM-01	Georgia	Atlanta	CSX	Hulsey	80	0.1-1.0	523	603	0.6	---	0	0
CM-02	Illinois	Chicago	CSX	59th Street	815	0.3-12.1	0	815	U	370	0	18
CM-03	New Jersey	Little Ferry	CSX	Little Ferry	177	1.1-8.6	215	392	2.6	227	0	0
CM-04	New Jersey	South Kearny	CSX	South Kearny	78	.1-2.1	410	488	0.7	---	0	0
CM-05	Pennsylvania	Philadelphia	CSX	Greenwich	272	0.3-8.6	0	272	U	178	0	0
SM-01	New Jersey	Elizabeth	Shared	Portside	50	.1-2.9	26	76	4.7		0	0

* U = Undefined

SENSITIVE RECEPTOR COUNTS FOR RAIL YARDS THAT MEET THE BOARD'S THRESHOLDS FOR NOISE ANALYSIS

Yard Description					Change in	% Increase	Rail Cars / Day		Change	Distance	Receptor Counts	
Site ID#	State	Location	Yard	Facility	Trks/Day	In Avg Traffic	Pre Acq.	Post Acq.	in dBA	to 65 Ldn	Pre	Post
NY-03	Indiana	Ft. Wayne	NS		300	106	283	583	3.1	1,376	44	130
NY-06	Ohio	Conneaut	NS		44	145	30	74	3.9	504	12	59
NY-08	Ohio	Toledo	NS	Airline	520	U	0	520	<2*	---	0	0
NY-09	Pennsylvania	Harrisburg	NS		129	110	117	246	<2*	---	0	0

* Existing rail activity is major noise source

[THIS PAGE INTENTIONALLY LEFT BLANK]

ATTACHMENT J-4

Noise Contour Maps Showing Receptors That Meet the Noise Mitigation Criteria

[THIS PAGE INTENTIONALLY LEFT BLANK]

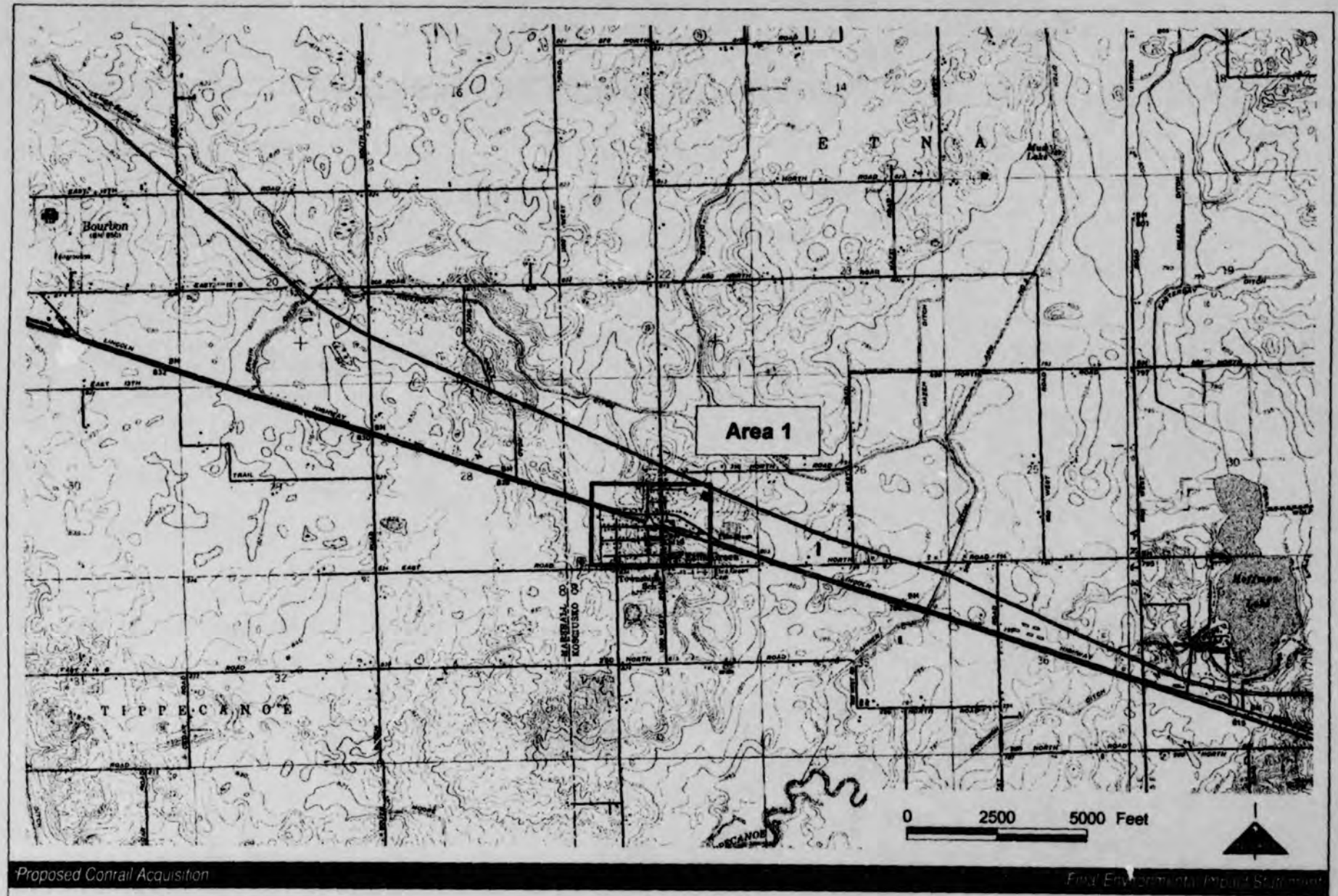


FIGURE 1A Key Map

WARSAW-TO-TOLLESTON, C-026 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

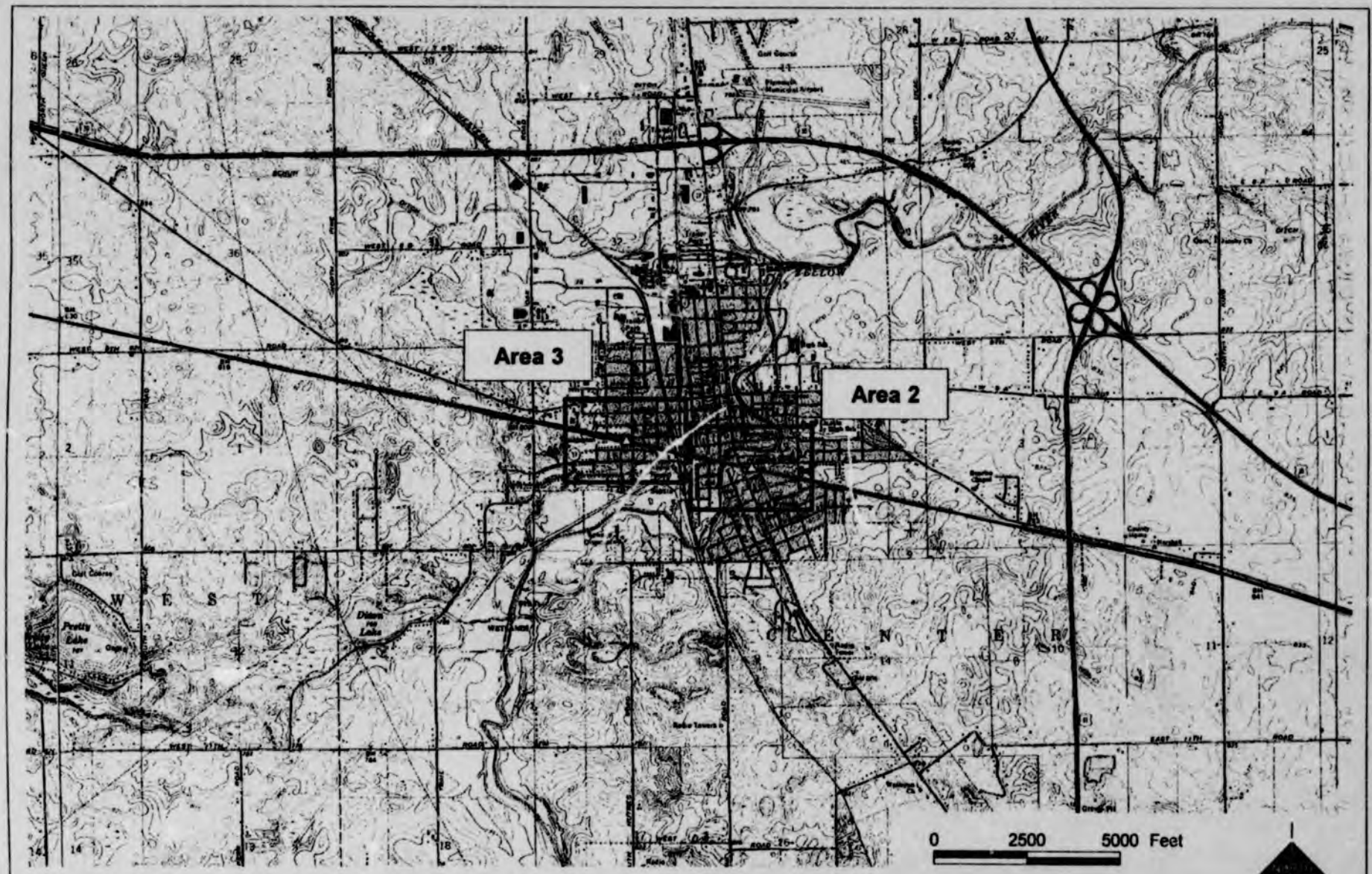


FIGURE 1B Key Map

WARSAW-TO-TOLLESTON, C-026 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

FIGURE 2 Area 1

WARSAW-TO-TOLLESTON, C-026 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 3 Area 2

WARSAW-TO-TOLLESTON, C-026 Receptors Within 70dBA Ldn Wayside Noise Contour

Proposed Conrail Acquisition — Final Environmental Impact Statement

FIGURE 4 Area 3

WARSAW-TO-TOLLESTON, C-026 Receptors Within 70dBA Ldn Wayside Noise Contour

[THIS PAGE INTENTIONALLY LEFT BLANK]

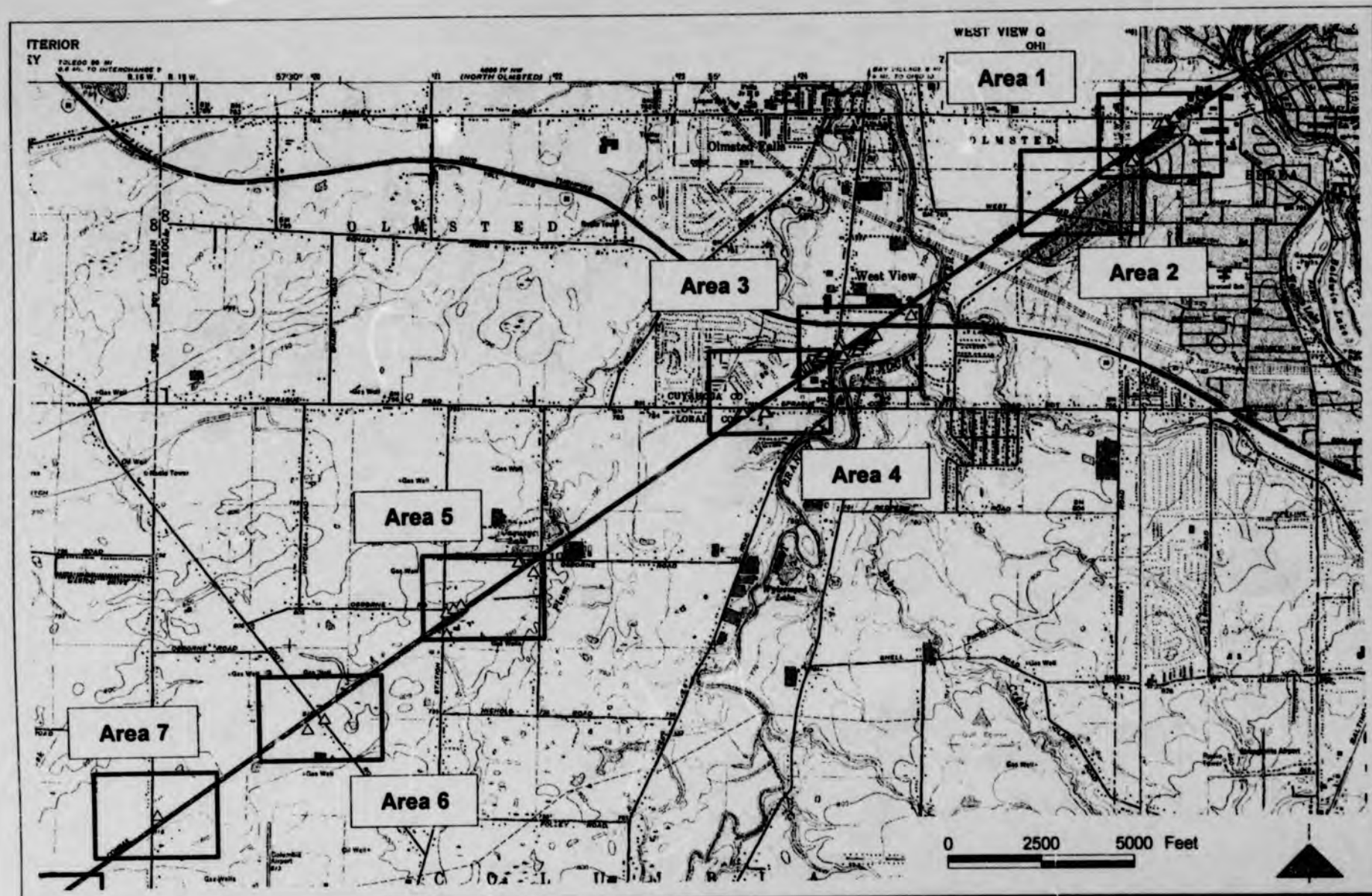


FIGURE 5A Key Map

BEREA-TO-GREENWICH, C-061 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

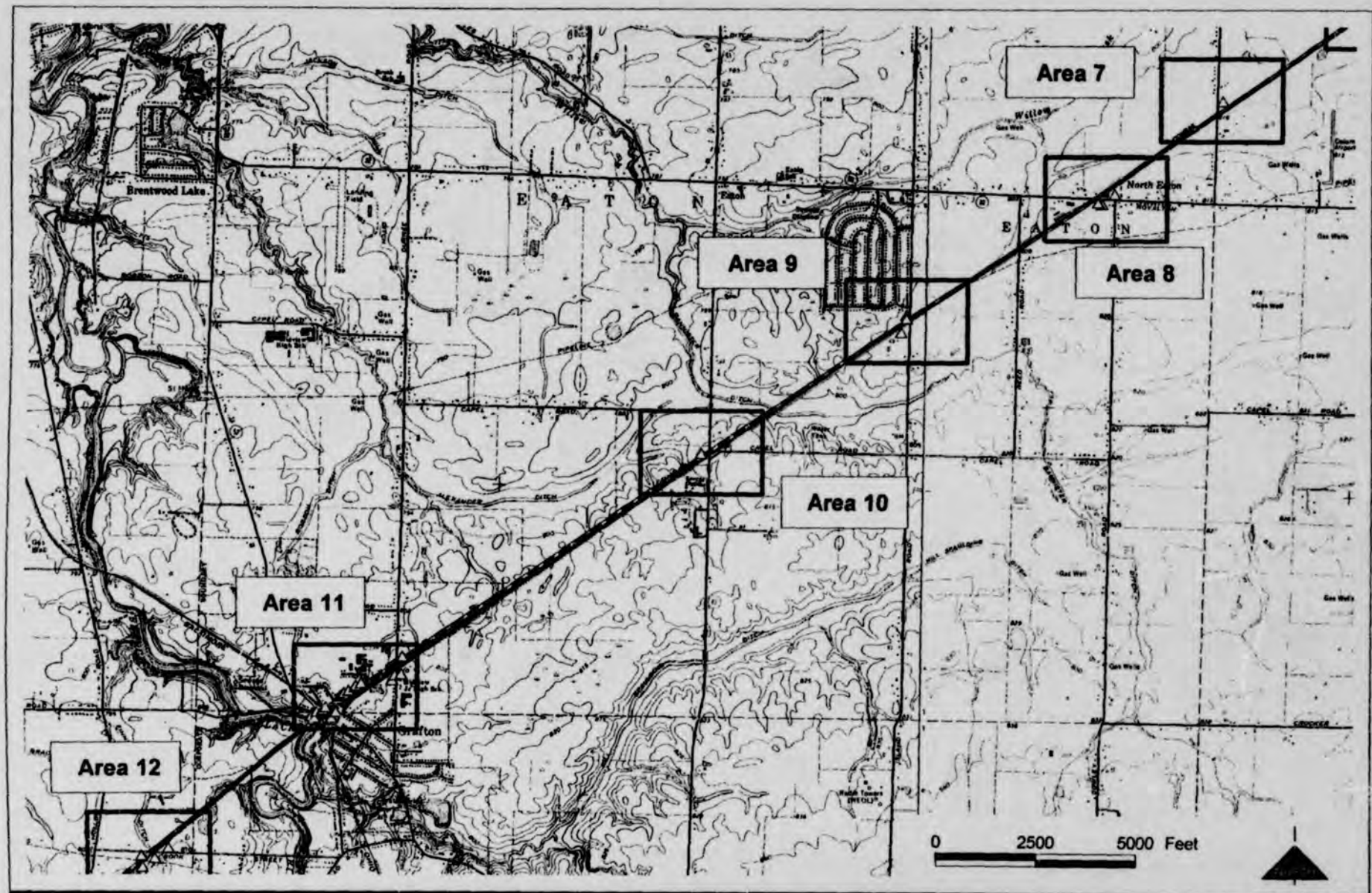


FIGURE 5B Key Map

BEREA-TO-GREENWICH, C-061 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

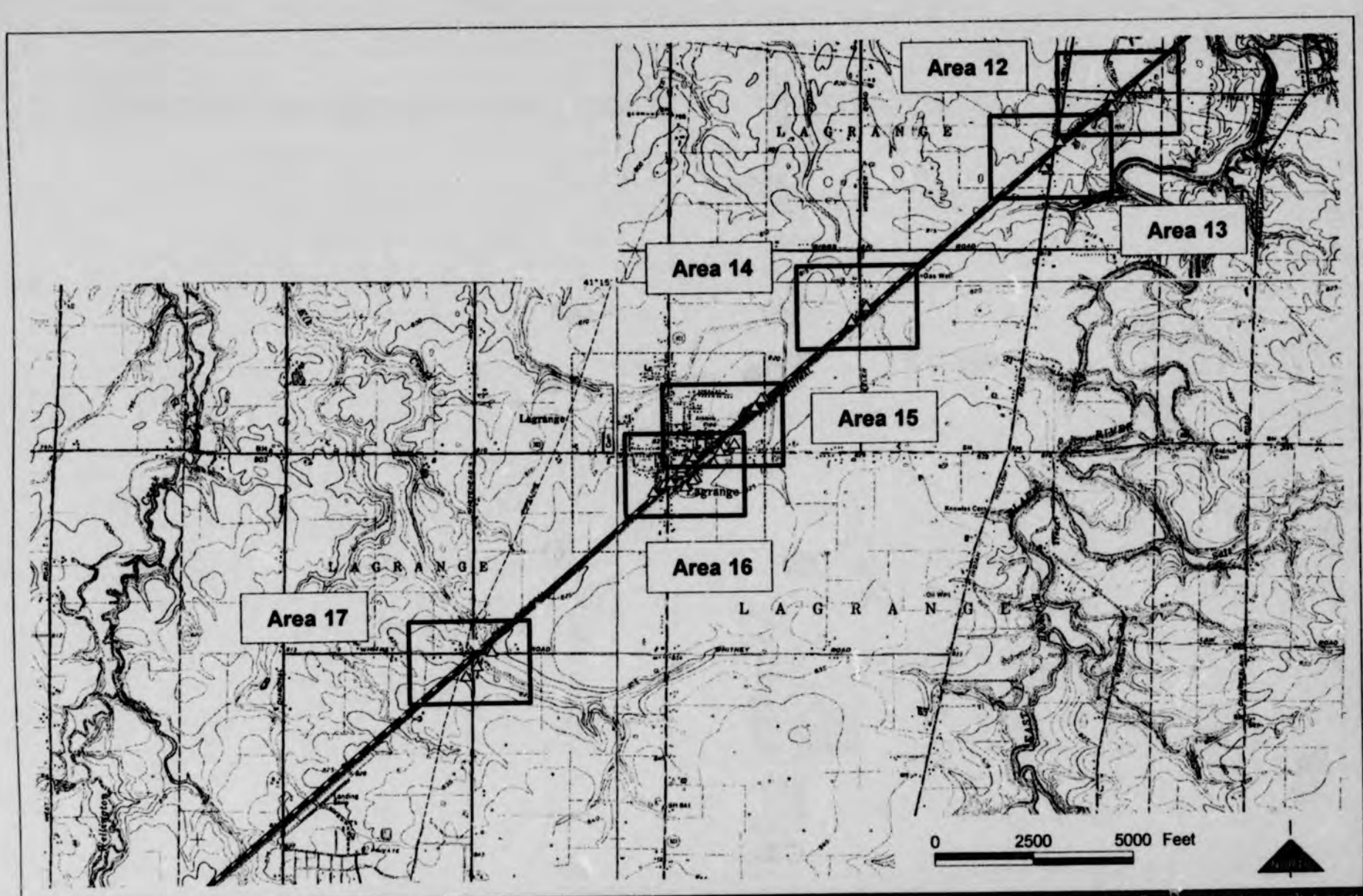


FIGURE 5C Key Map

BEREA-TO-GREENWICH, C-061 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

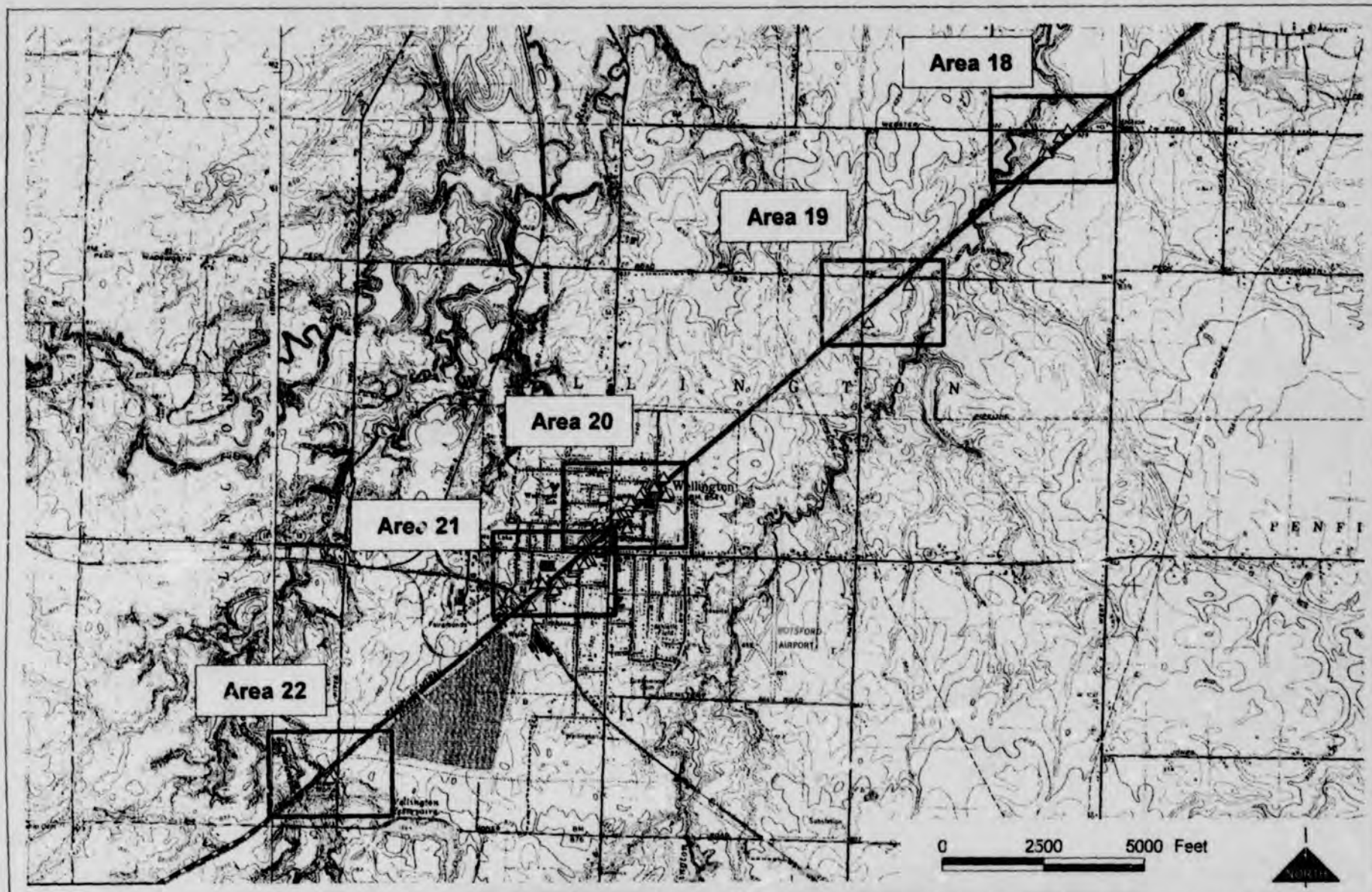


FIGURE 5D Key Map

BEREA-TO-GREENWICH, C-061 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

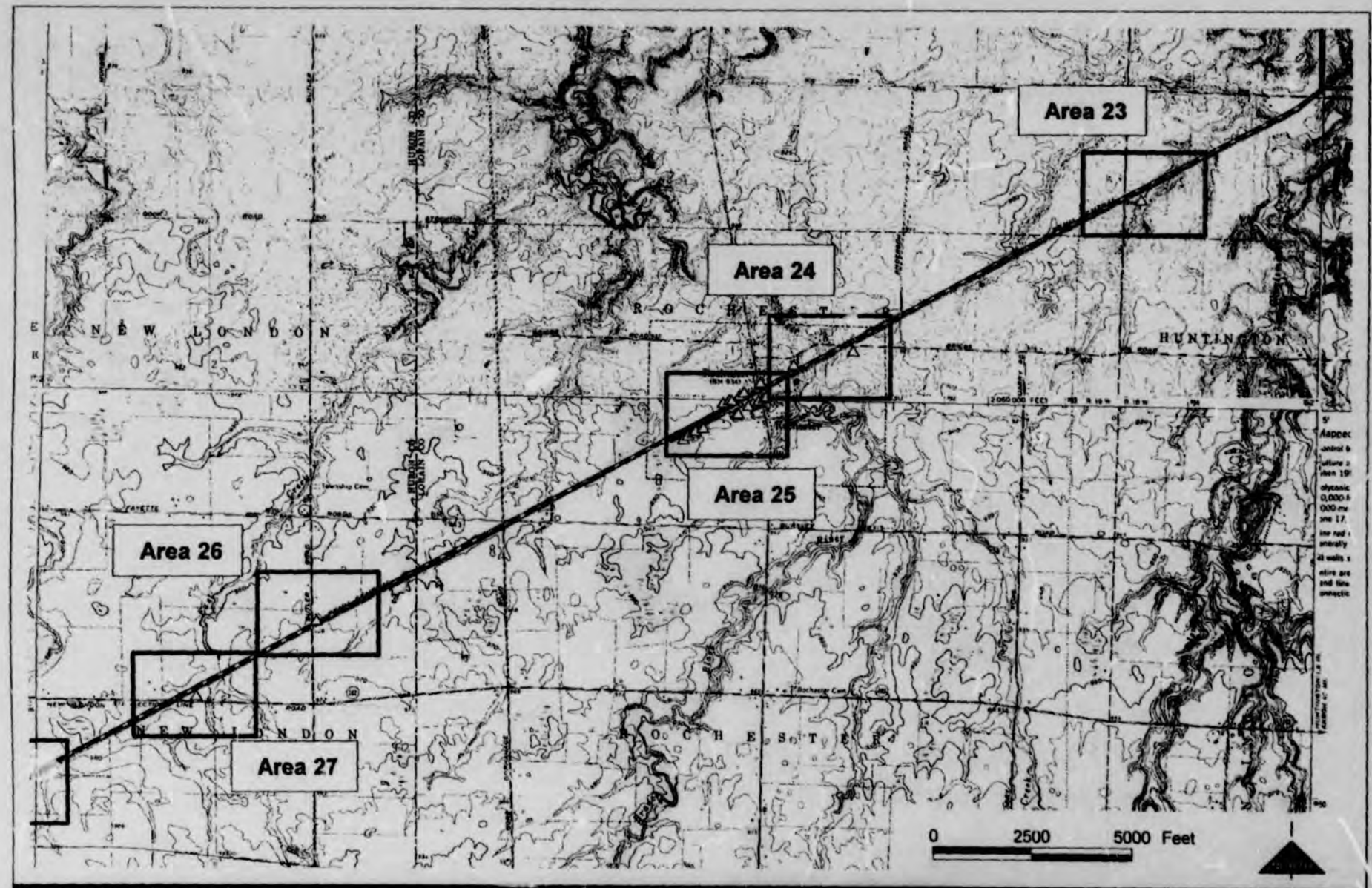


FIGURE 5E Key Map

BEREA-TO-GREENWICH, C-061 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

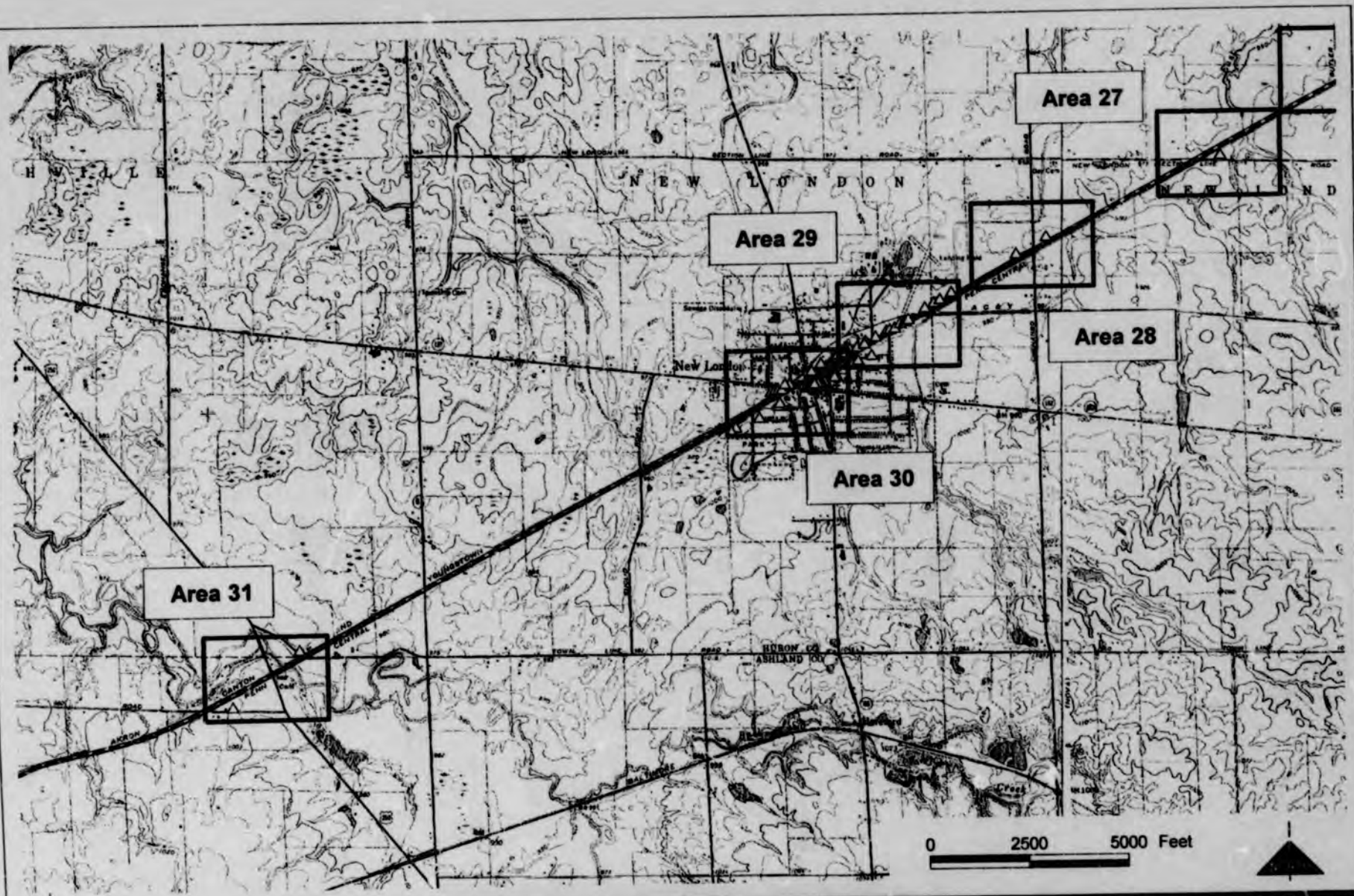


FIGURE 5F Key Map

BEREA-TO-GREENWICH, C-061 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

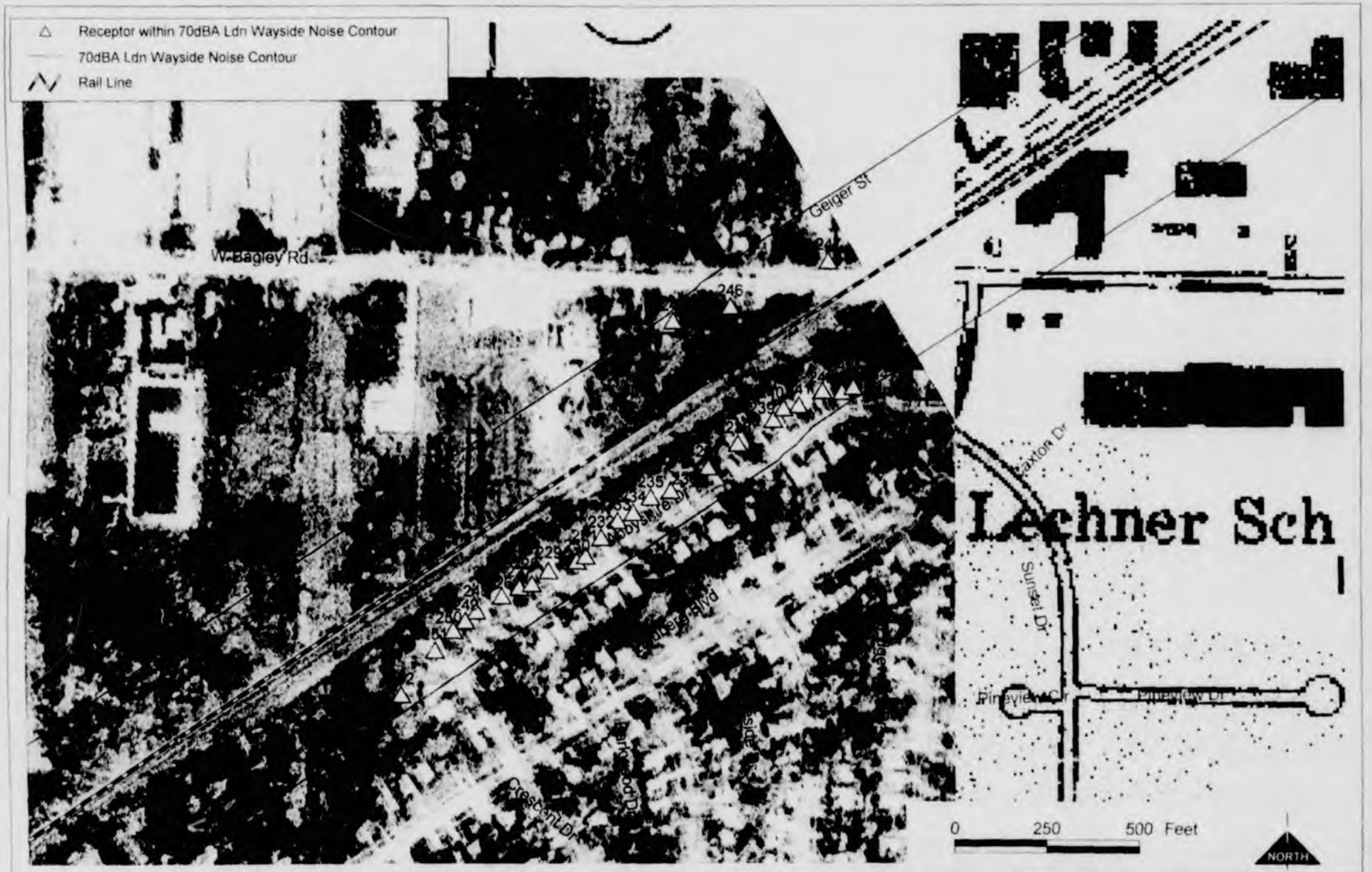


FIGURE 6 Area 1

BEREA-TO-GREENWICH, C^61 Receptors Within 70dBA Ldn Wayside Noise Contour

Proposed Conrail Acquisition

Final Environmental Impact Statement

FIGURE 7 Area 2

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

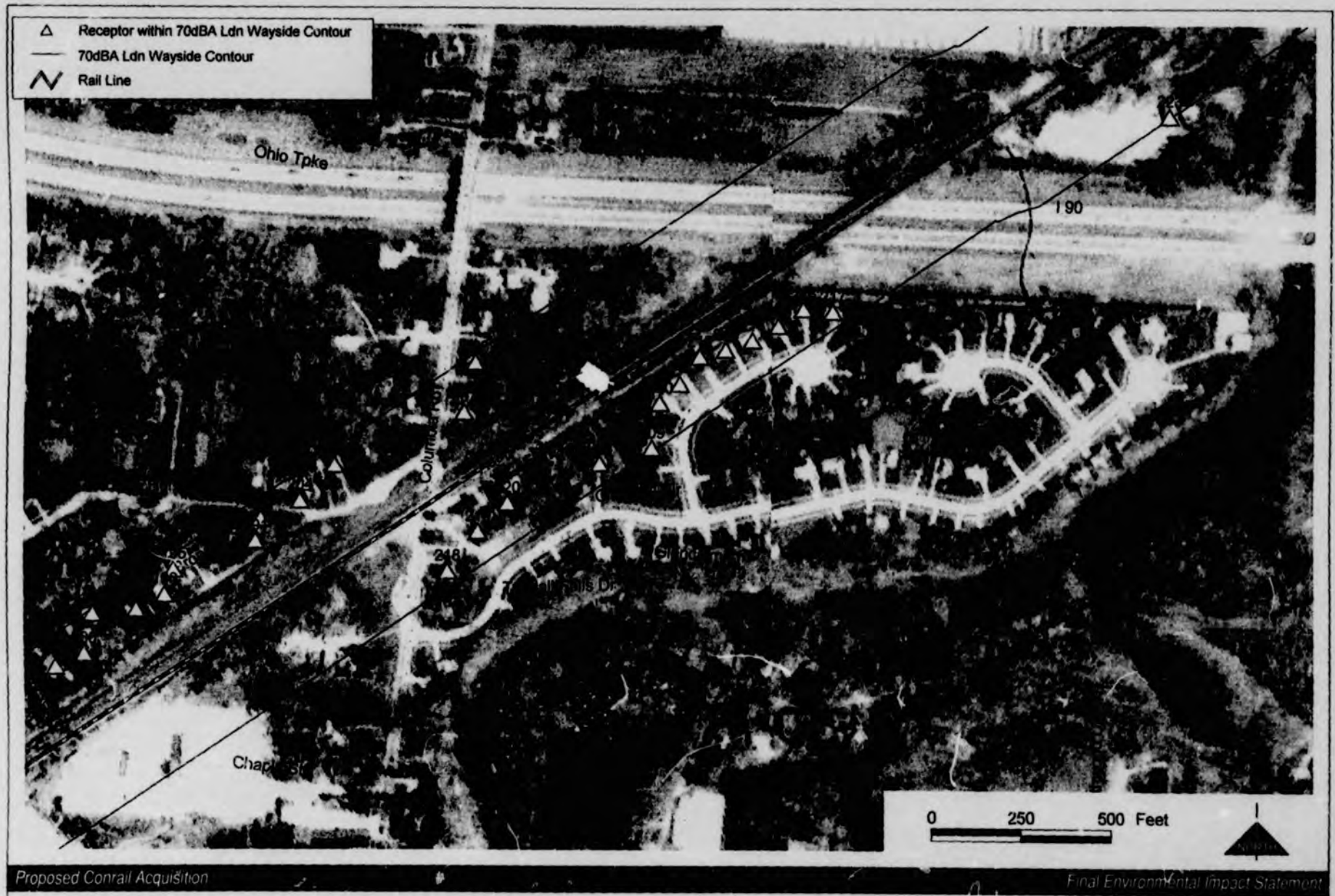


FIGURE 8 Area 3

BEREA TO GREENWICH, C-61 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 9 Area 4

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 10 Area 5

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 11 Area 6

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 12 Area 7

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 13 Area 8

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 14 Area 9

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

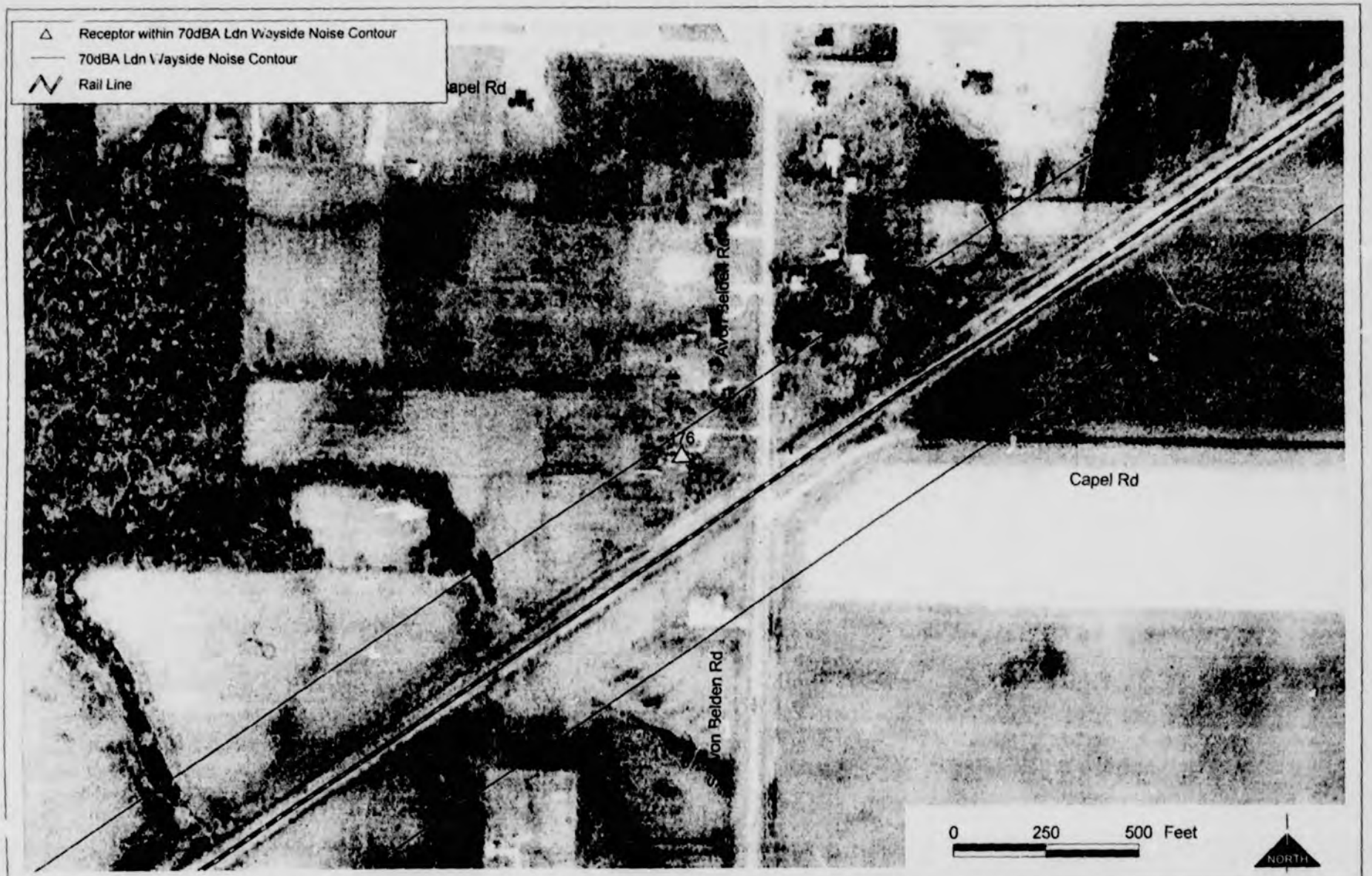


FIGURE 15 Area 10

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

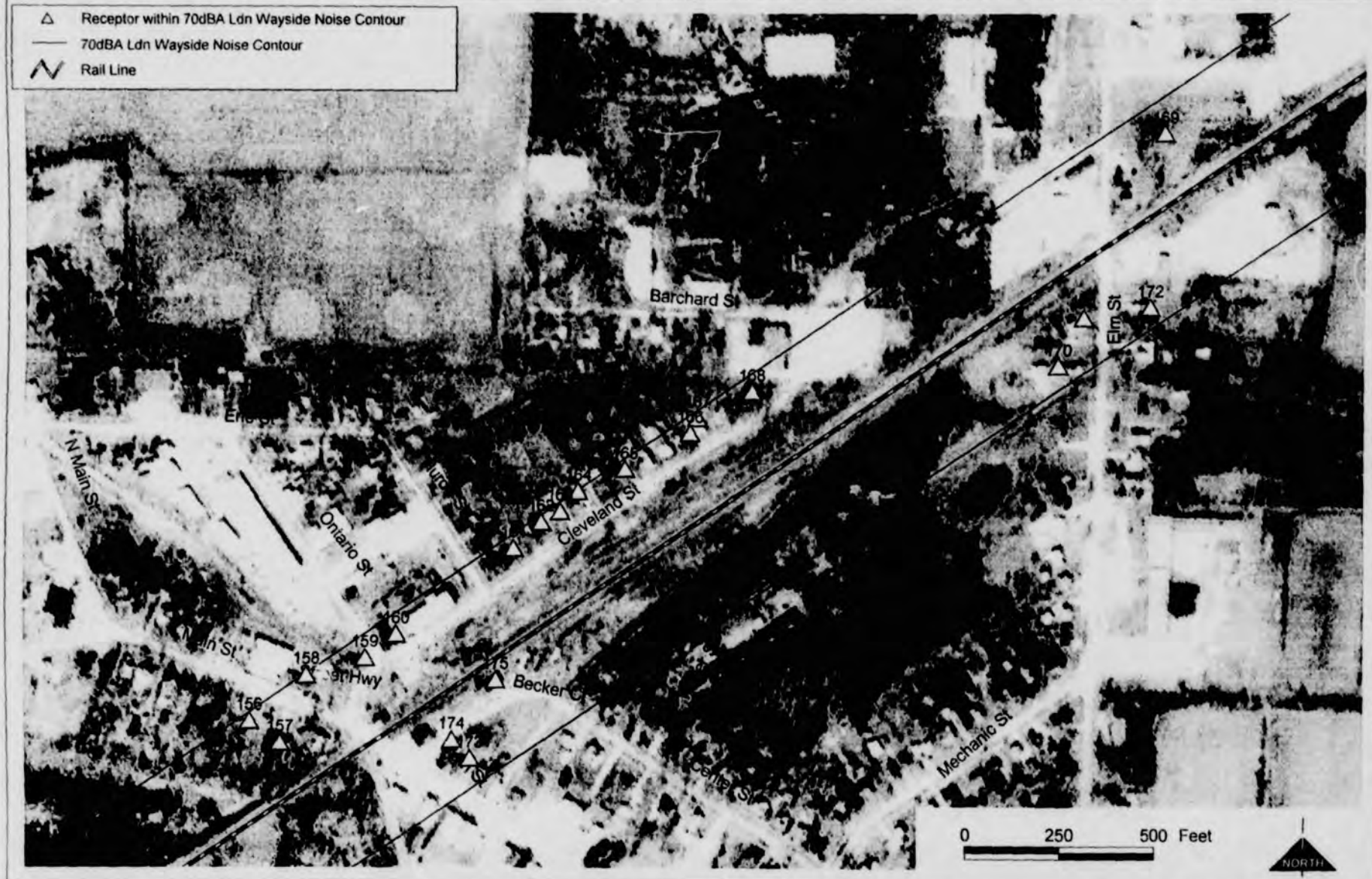


FIGURE 16 Area 11

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 17 Area 12

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

Proposed Conrail Acquisition — Final Environmental Impact Statement

FIGURE 18 Area 13

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 19 Area 14

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

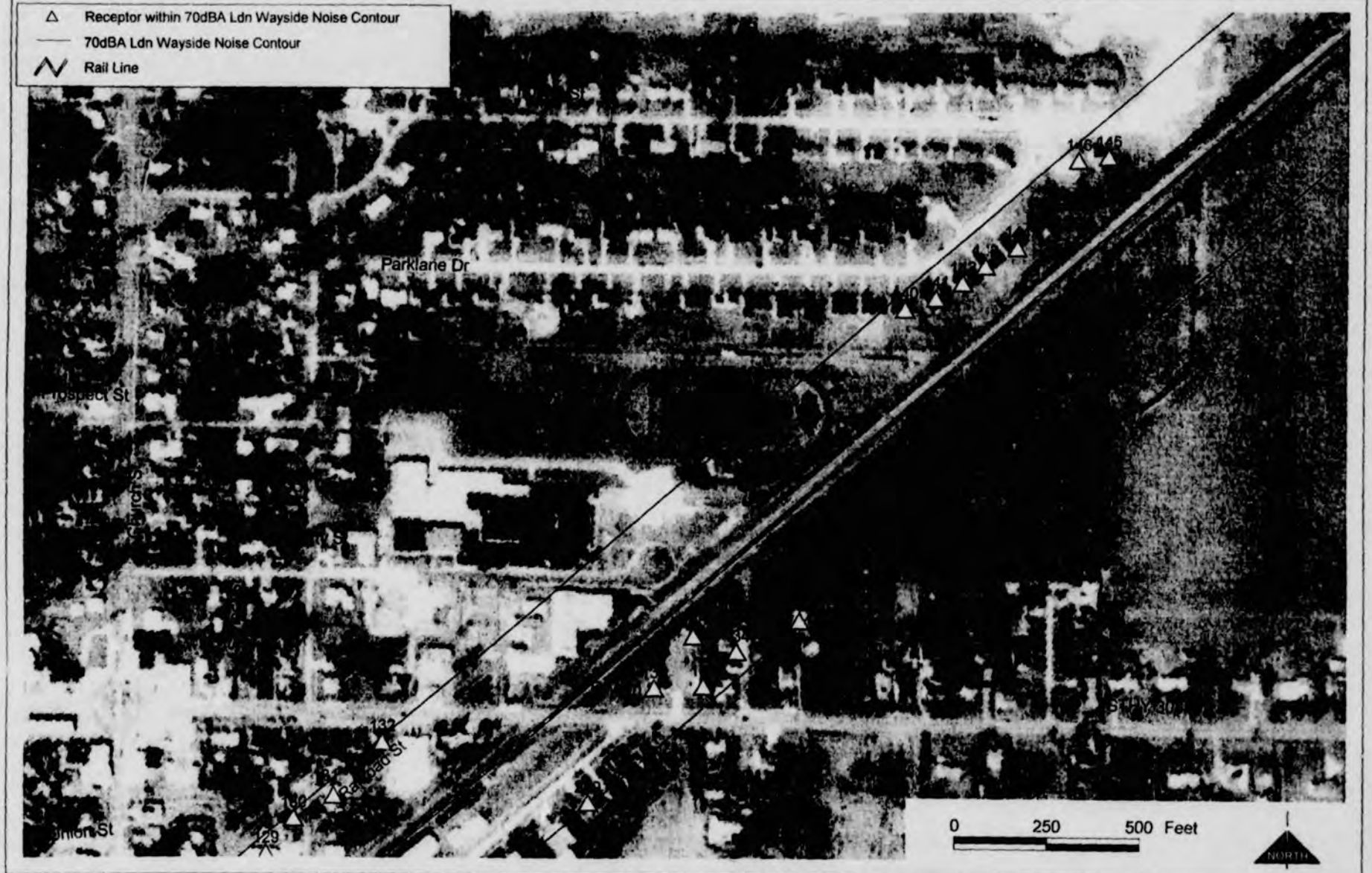


FIGURE 20 Area 15

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

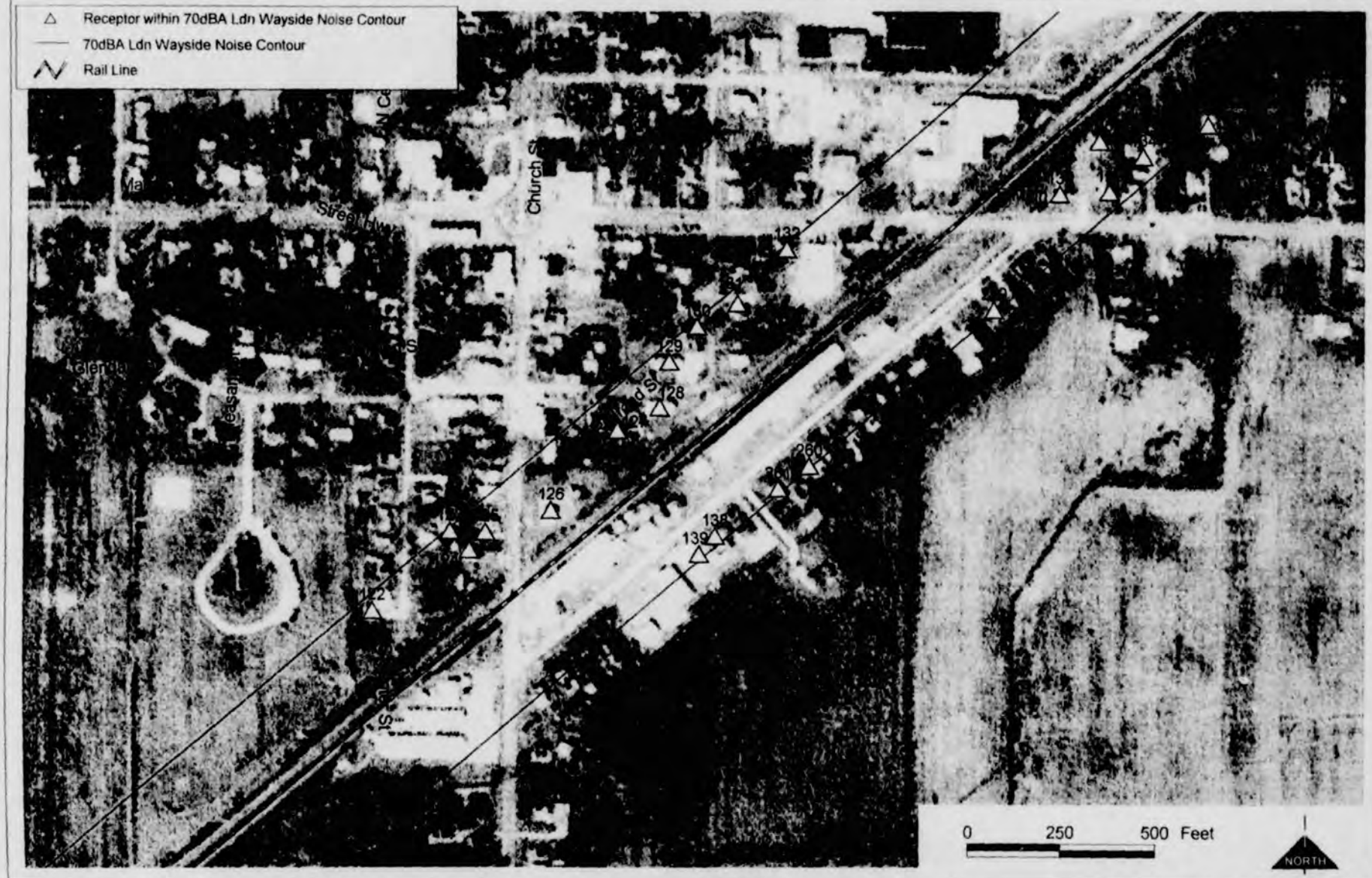


FIGURE 21 Area 16

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 22 Area 17

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 23 Area 18

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 24 Area 19

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 25 Area 20

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 26 Area 21

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 27 Area 22

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 28 Area 23

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 29 Area 24

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 30 Area 25

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 31 Area 26

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 32 Area 27

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 33 Area 28

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 34 Area 29

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 35 Area 30

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 36 Area 31

BEREA-TO-GREENWICH, C-061 Receptors Within 70dBA Ldn Wayside Noise Contour

[THIS PAGE INTENTIONALLY LEFT BLANK]

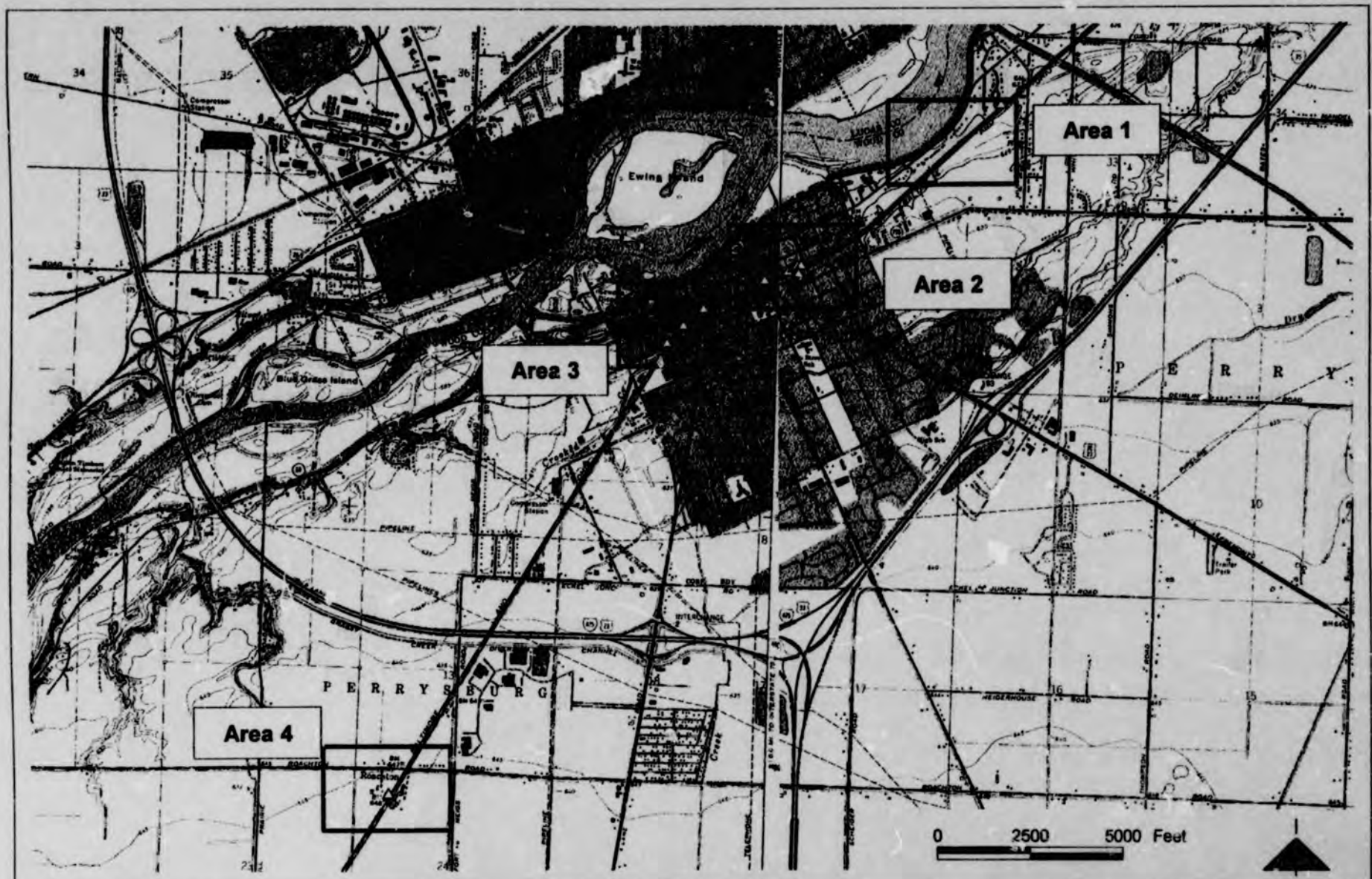


FIGURE 37A Key Map

DESHLER-TO-TOLEDO, C-065 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

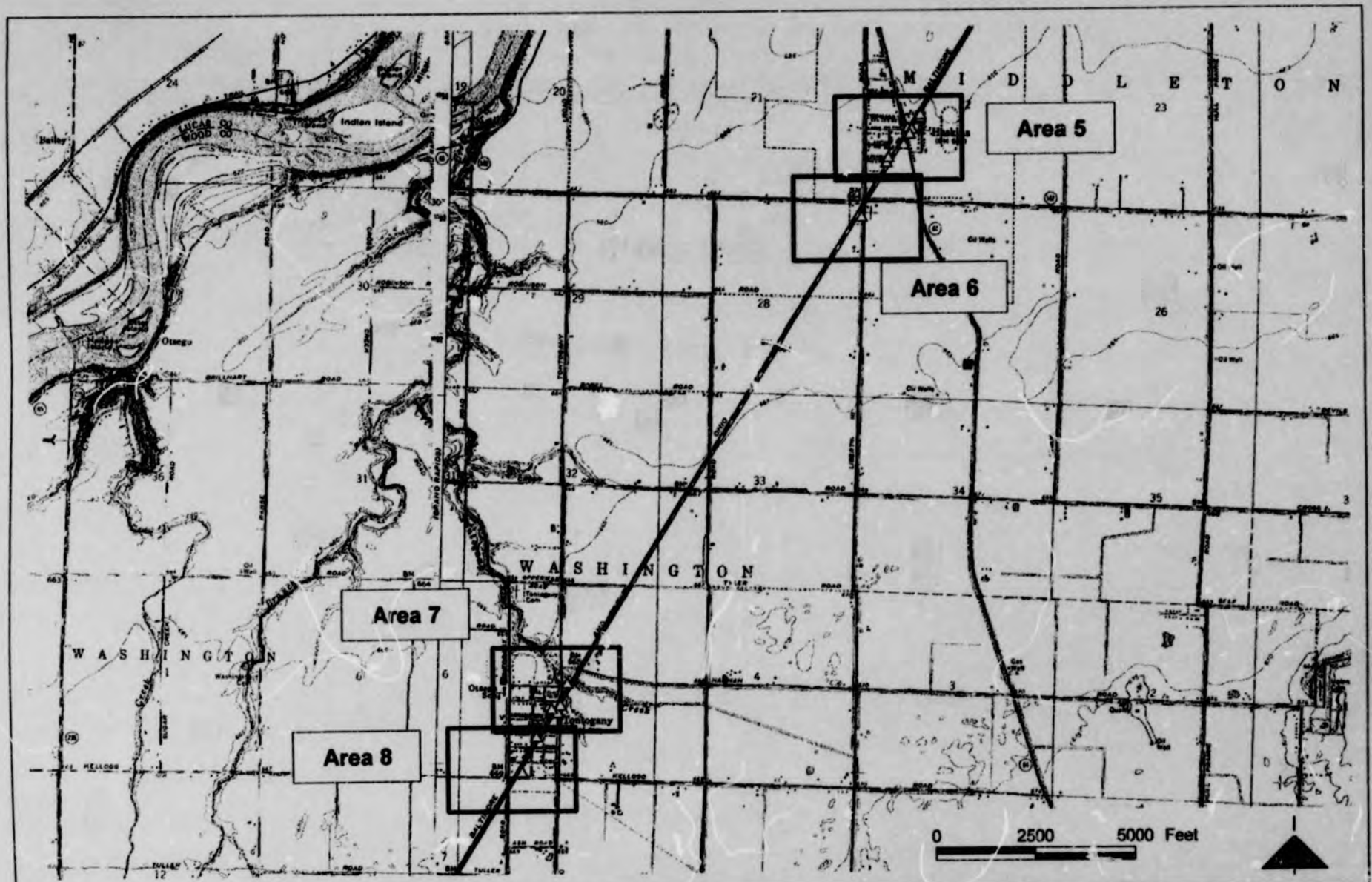


FIGURE 37B Key Map

DESHLER-TO-TOLEDO, C-065 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

STB FD .33388 5-22-98 K .29206V6C 3/15

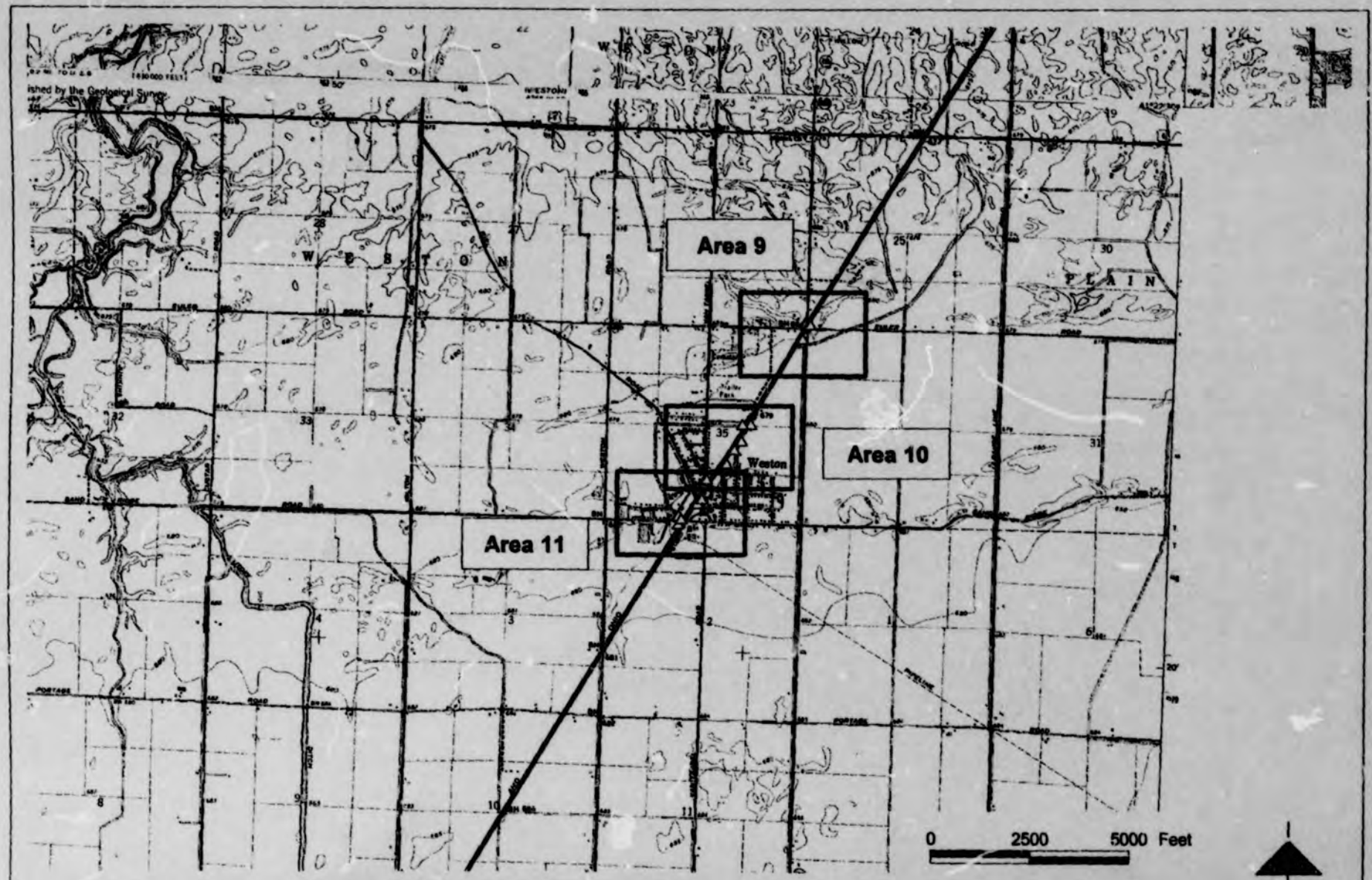


FIGURE 37C Key Map

DESHLER-TO-TOLEDO, C-065 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

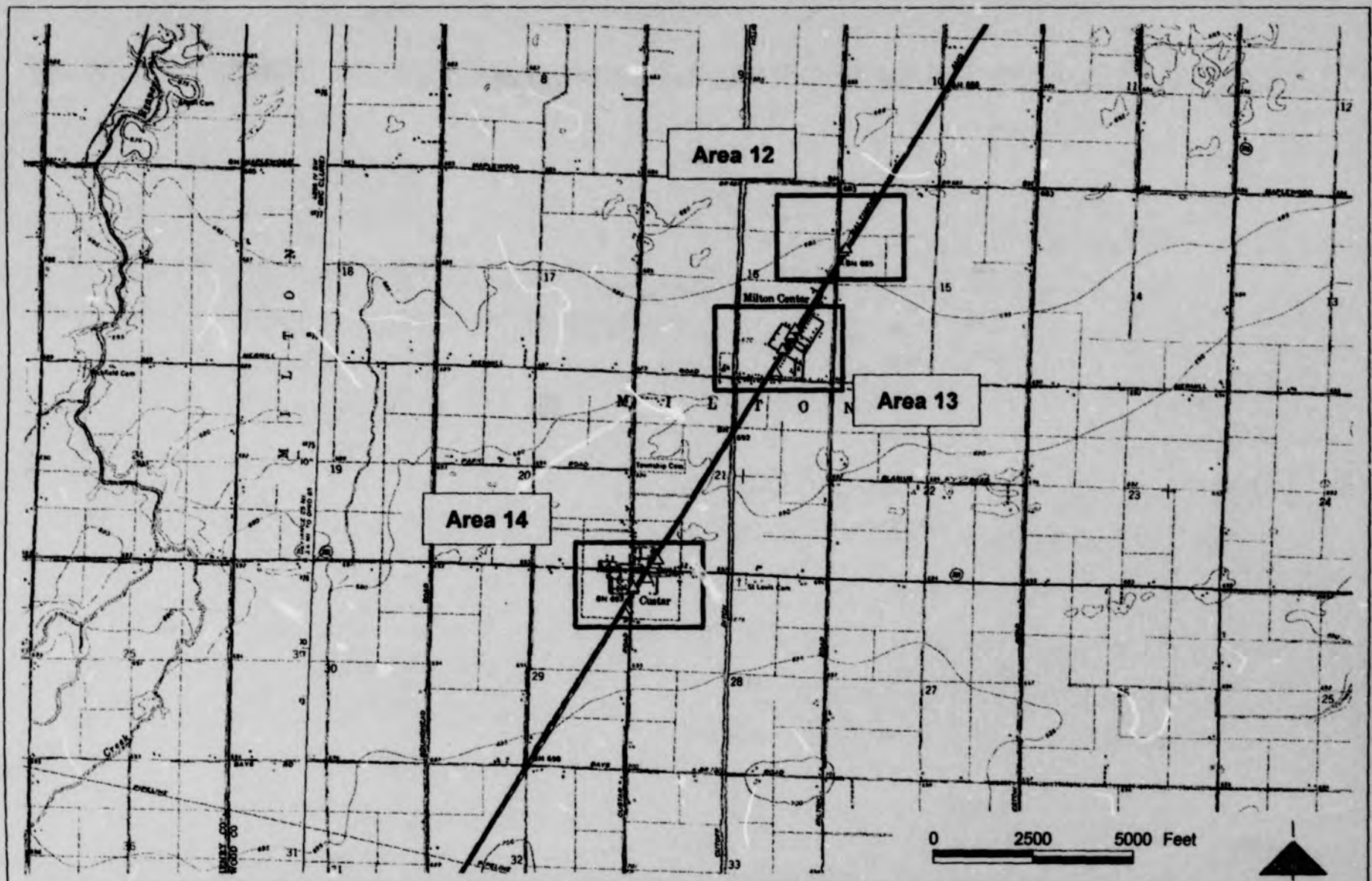


FIGURE 37D Key Map

DESHLER-TO-TOLEDO, C-065 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

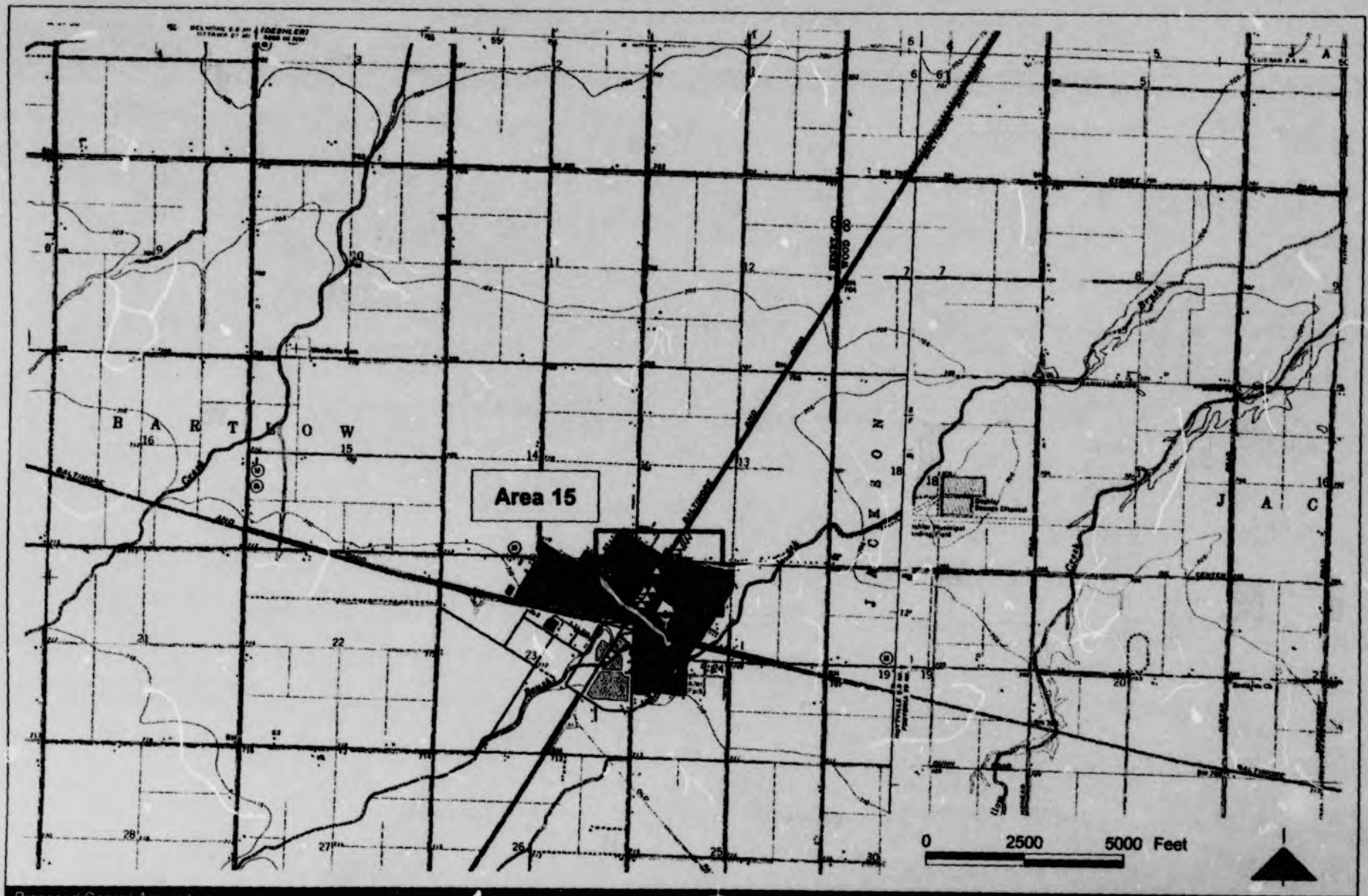


FIGURE 37E Key Map

DESHLER-TO-TOLEDO, C-065 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

FIGURE 38 Area 1

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

Proposed Conrail Acquisition *Final Environmental Impact Statement*

FIGURE 39 Area 2

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

Proposed Conrail Acquisition *Final Environmental Impact Statement*

FIGURE 40 Area 3

DESHLER-TO-TOLEDO, C-055 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 41 Area 4

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

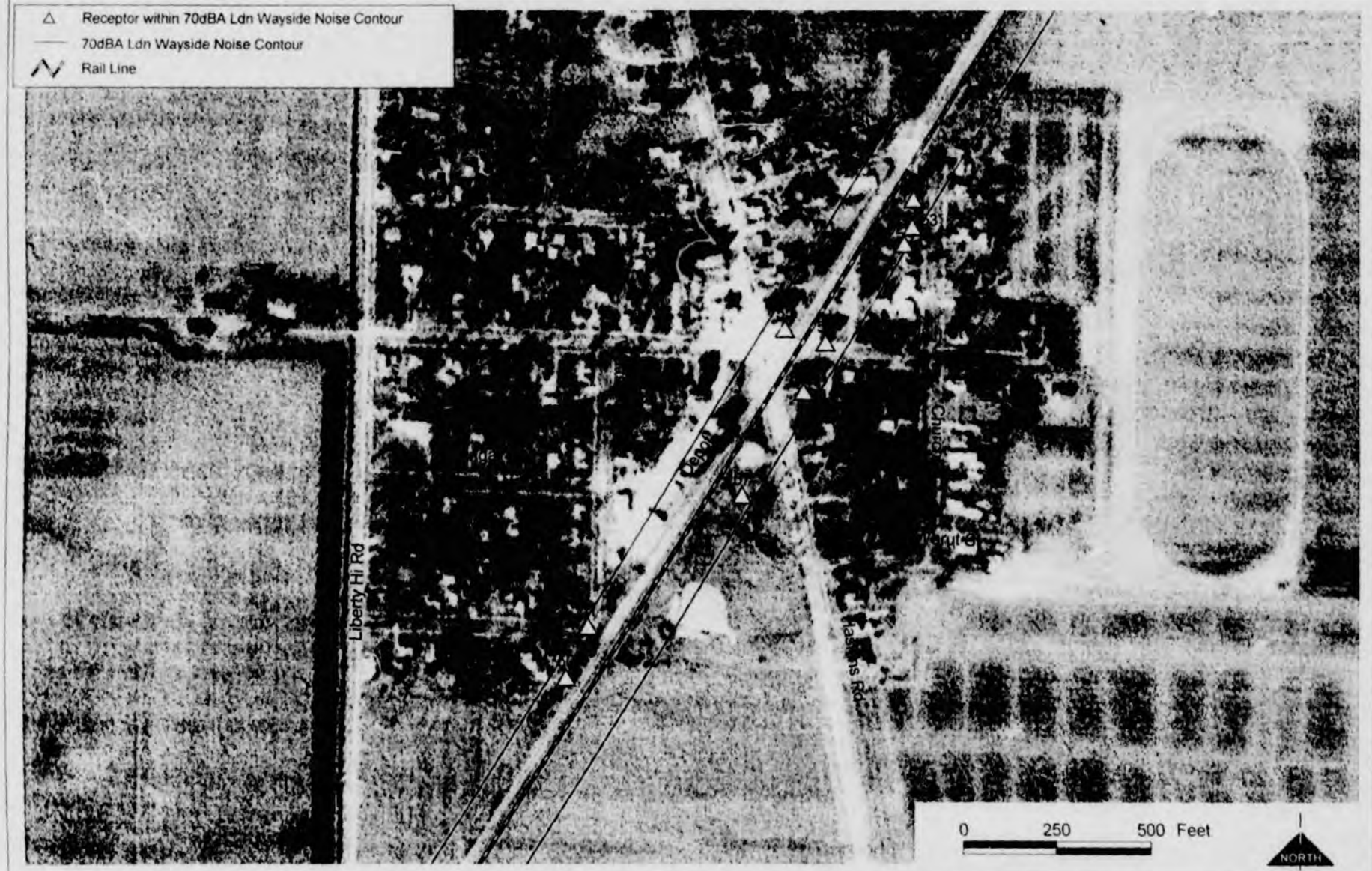


FIGURE 42 Area 5

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

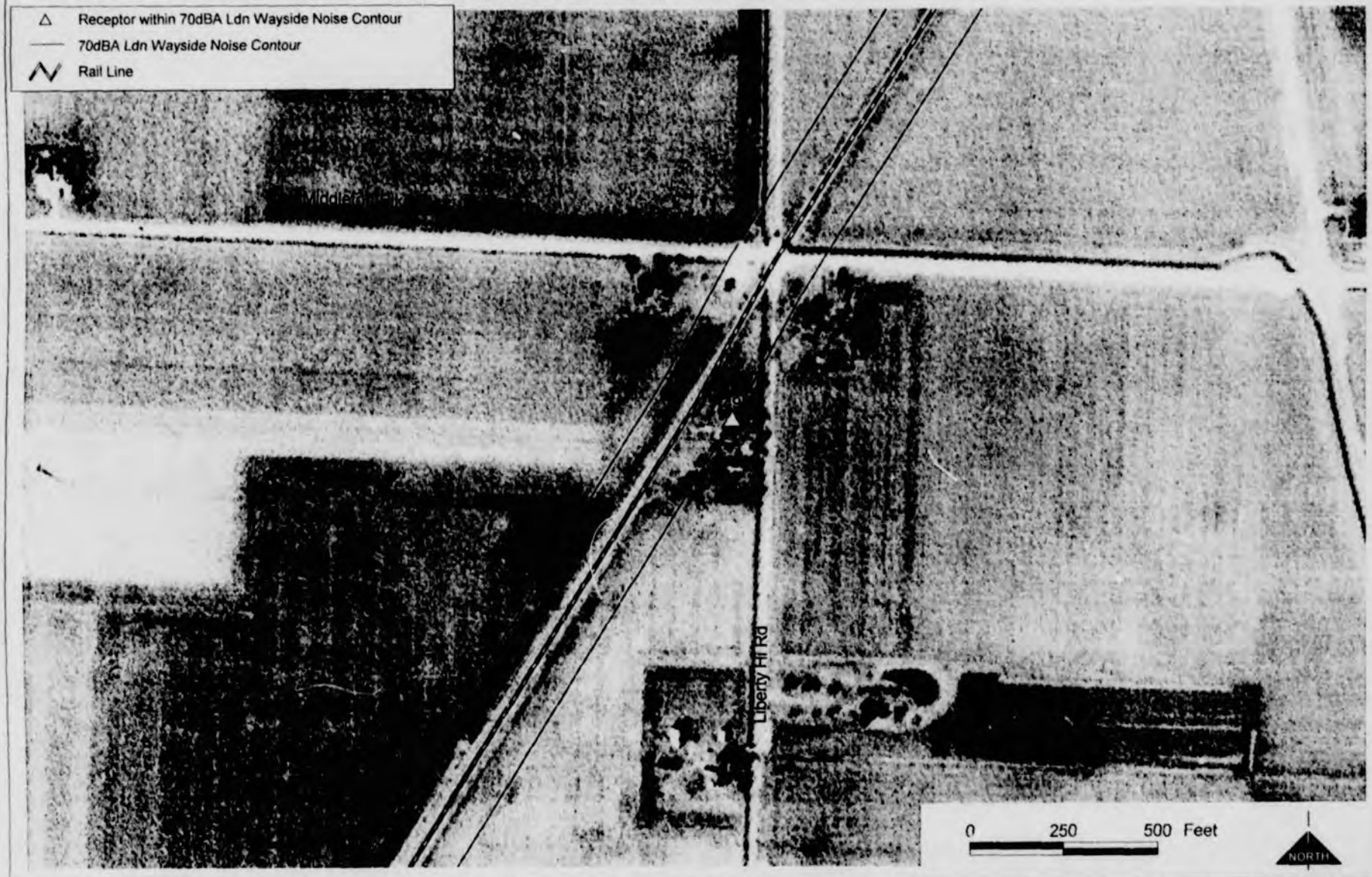


FIGURE 43 Area 6

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 44 Area 7

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 45 Area 8

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 46 Area 9

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

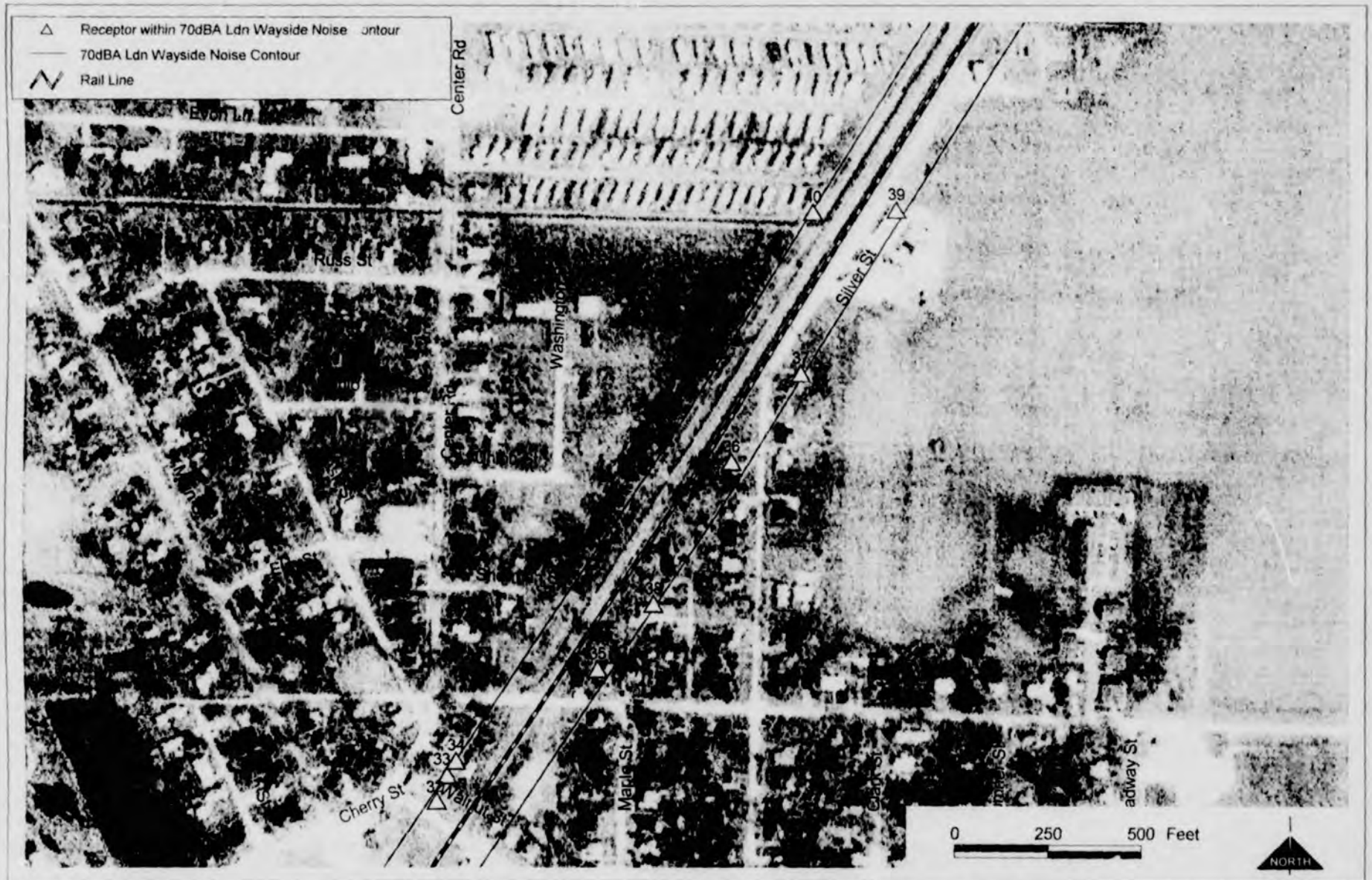


FIGURE 47 Area 10

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 48 Area 11

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 49 Area 12

DESH".ER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 50 Area 13

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 51 Area 14

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 52 Area 15

DESHLER-TO-TOLEDO, C-065 Receptors Within 70dBA Ldn Wayside Noise Contour

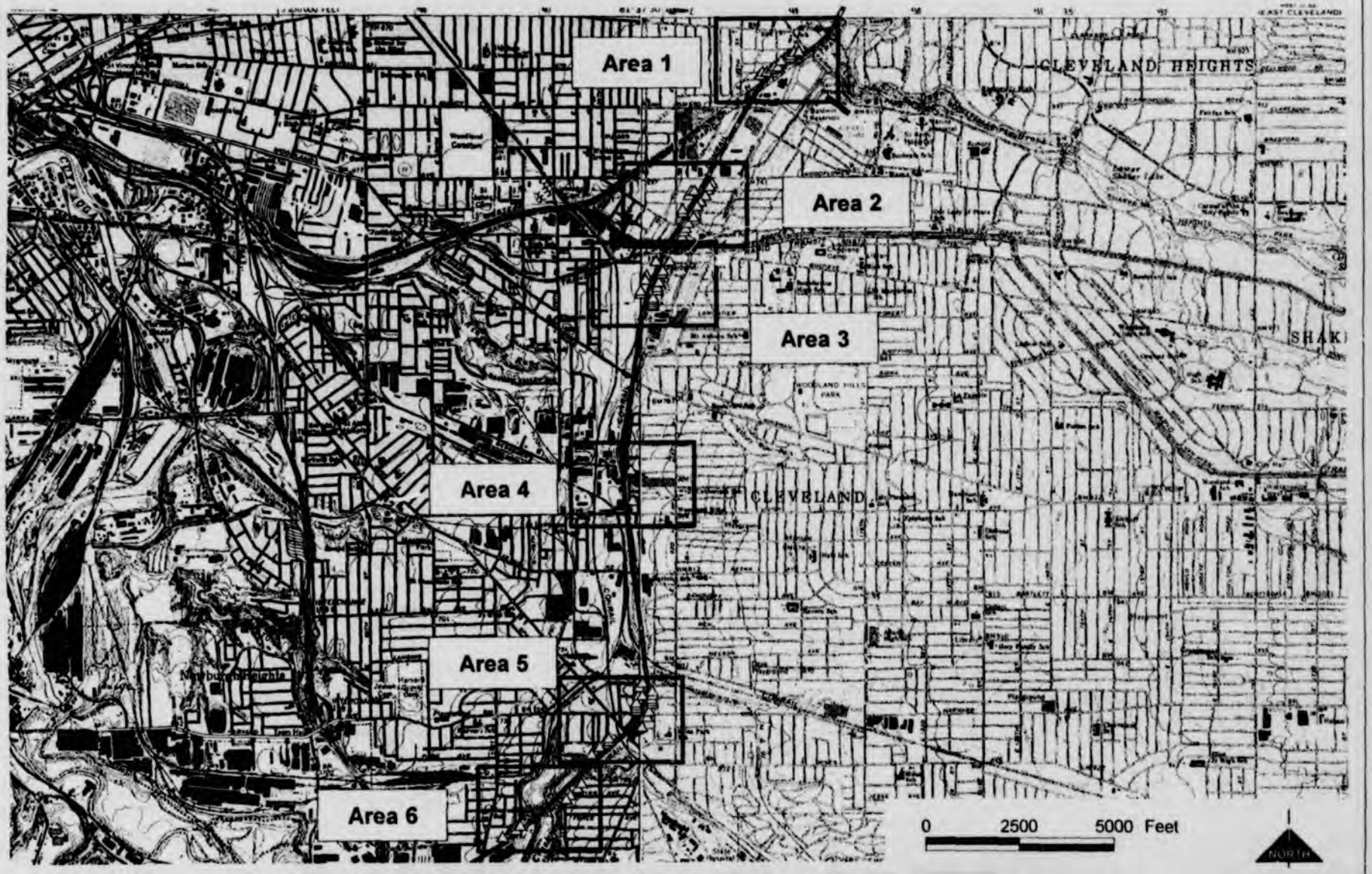


FIGURE 53 Key Map

MAYFIELD-TO-MARCY, C-072 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

FIGURE 54 Area 1

MAYFIELD-TO-MARCY, C-072 Receptors Within 70dBA Ldn Wayside Noise Contour

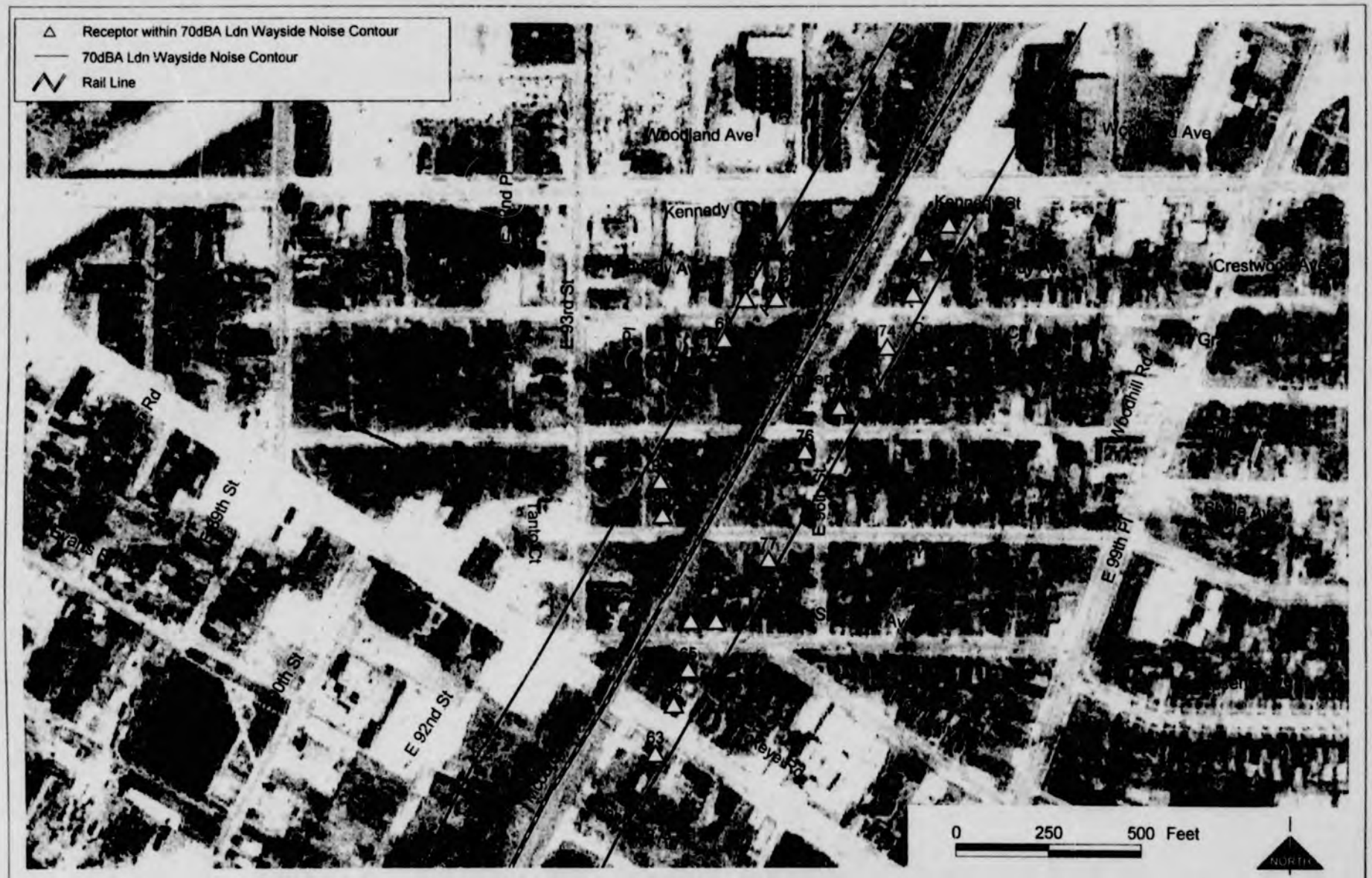


FIGURE 55 Area 2

MAYFIELD-TO-MARCY, C-072 Receptors Within 70dBA Ldn Wayside Noise Contour

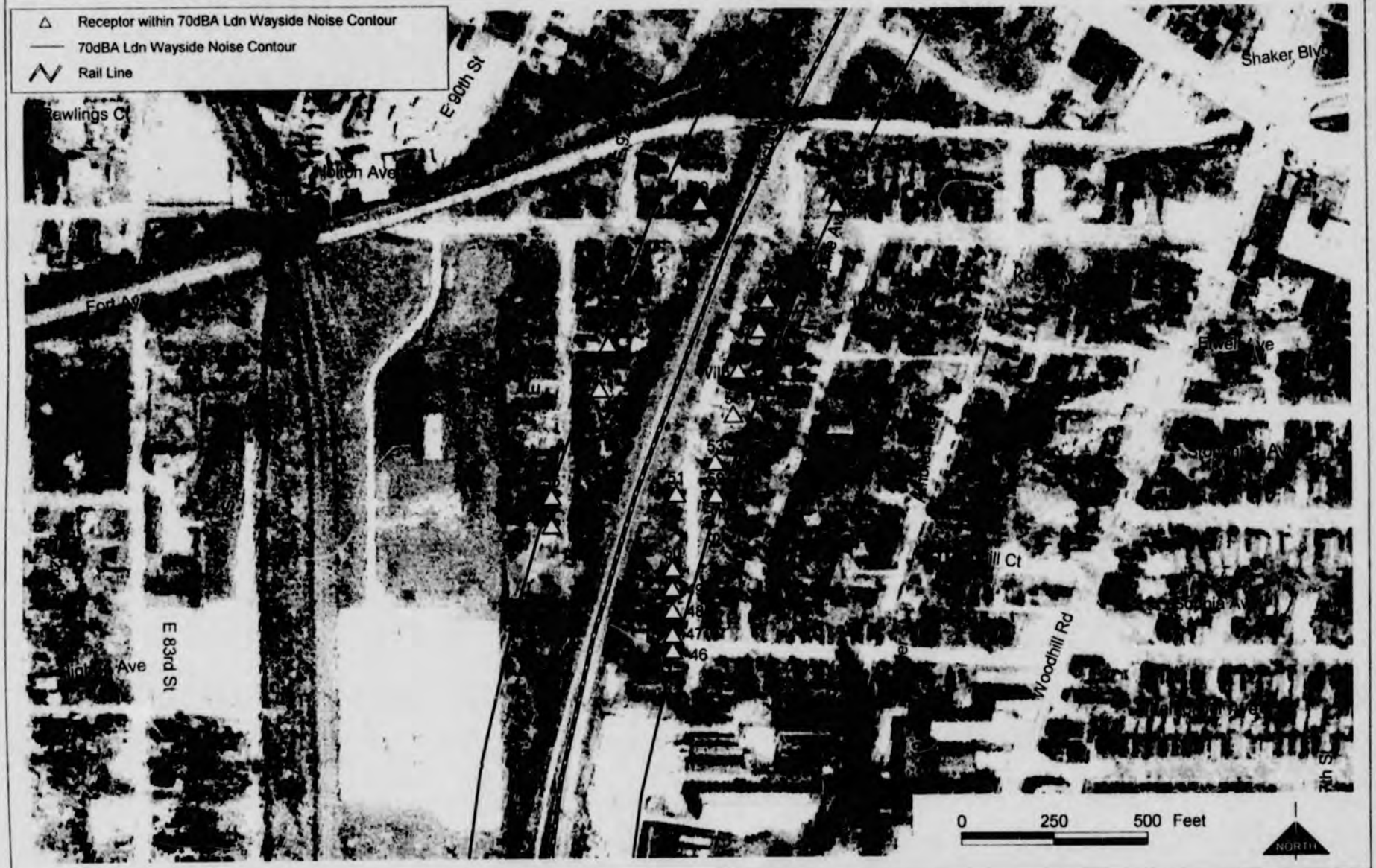


FIGURE 56 Area 3

MAYFIELD-TO-MARCY, C-072 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 57 Area 4

MAYFIELD-TO-MARCY, C-072 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 58 Area 5

MAYFIELD-TO-MARCY, C-072 Receptors Within 70dBA Ldn Wayside Noise Contour

Proposed Conrail Acquisition — Final Environmental Impact Statement

FIGURE 50 Area 6

MAYFIELD-TO-MARCY, C-072 Receptors Within 70dBA Ldn Wayside Noise Contour

[THIS PAGE INTENTIONALLY LEFT BLANK]

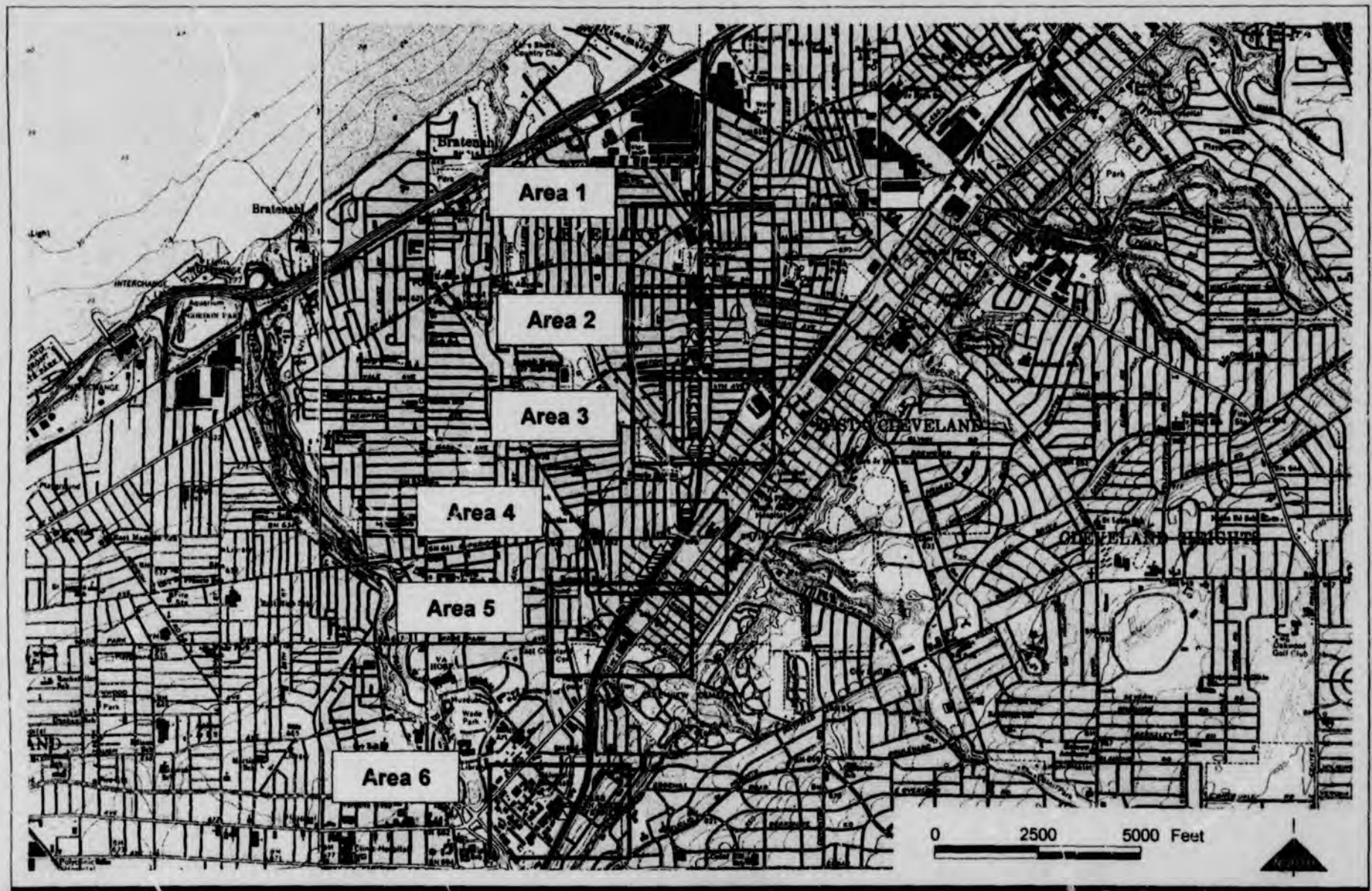


FIGURE 60 Key Map

QUAKER-TO-MAYFIELD, C-073 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

Proposed Conrail Acquisition — Final Environmental Impact Statement

FIGURE 61 Area 1

QUAKER-TO-MAYFIELD, C-073 Receptors Within 70dBA Ldn Wayside Noise Contour

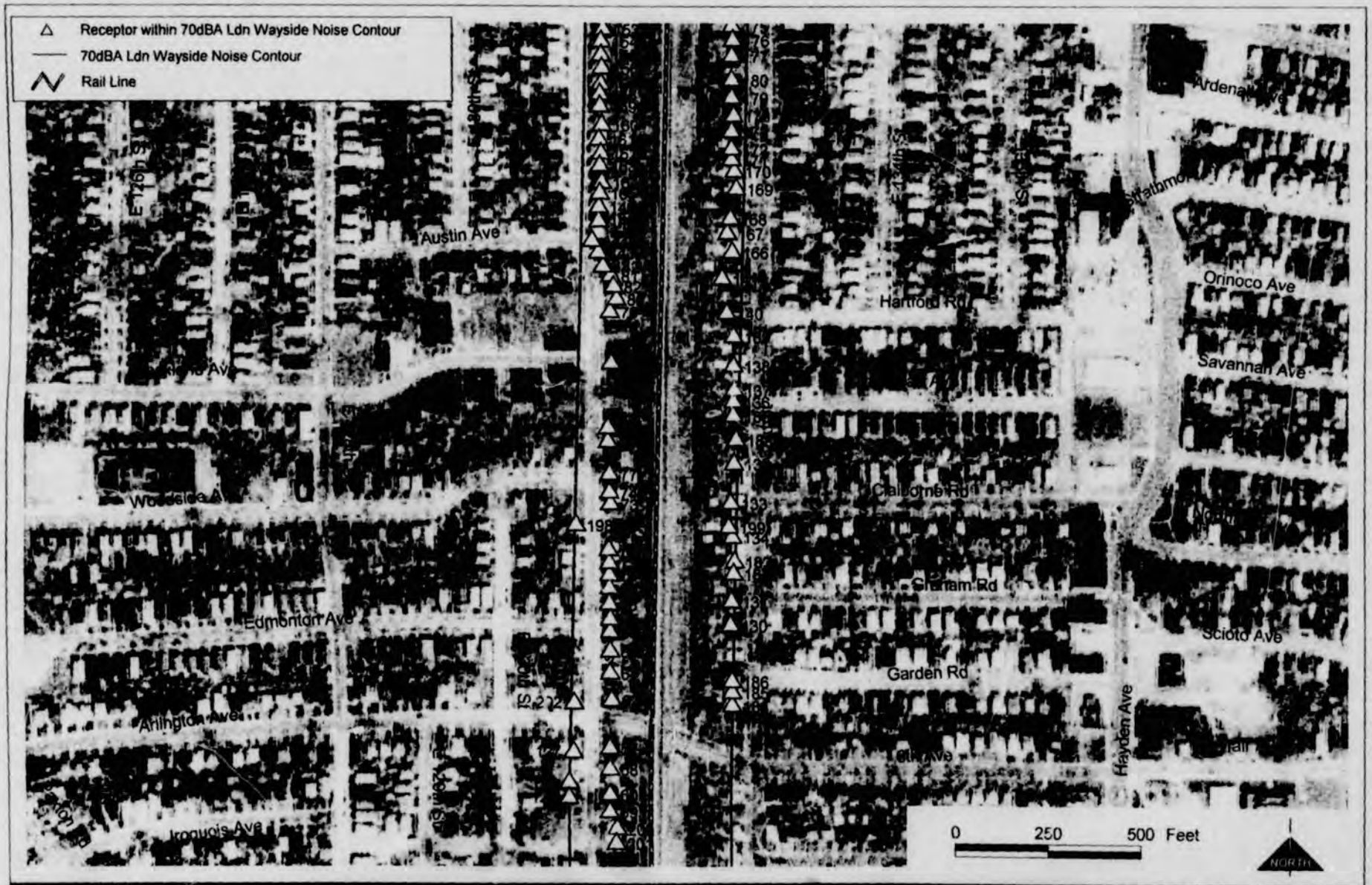


FIGURE 62 Area 2

QUAKER-TO-MAYFIELD, C-073 Receptors Within 70dBA Ldn Wayside Noise Contour

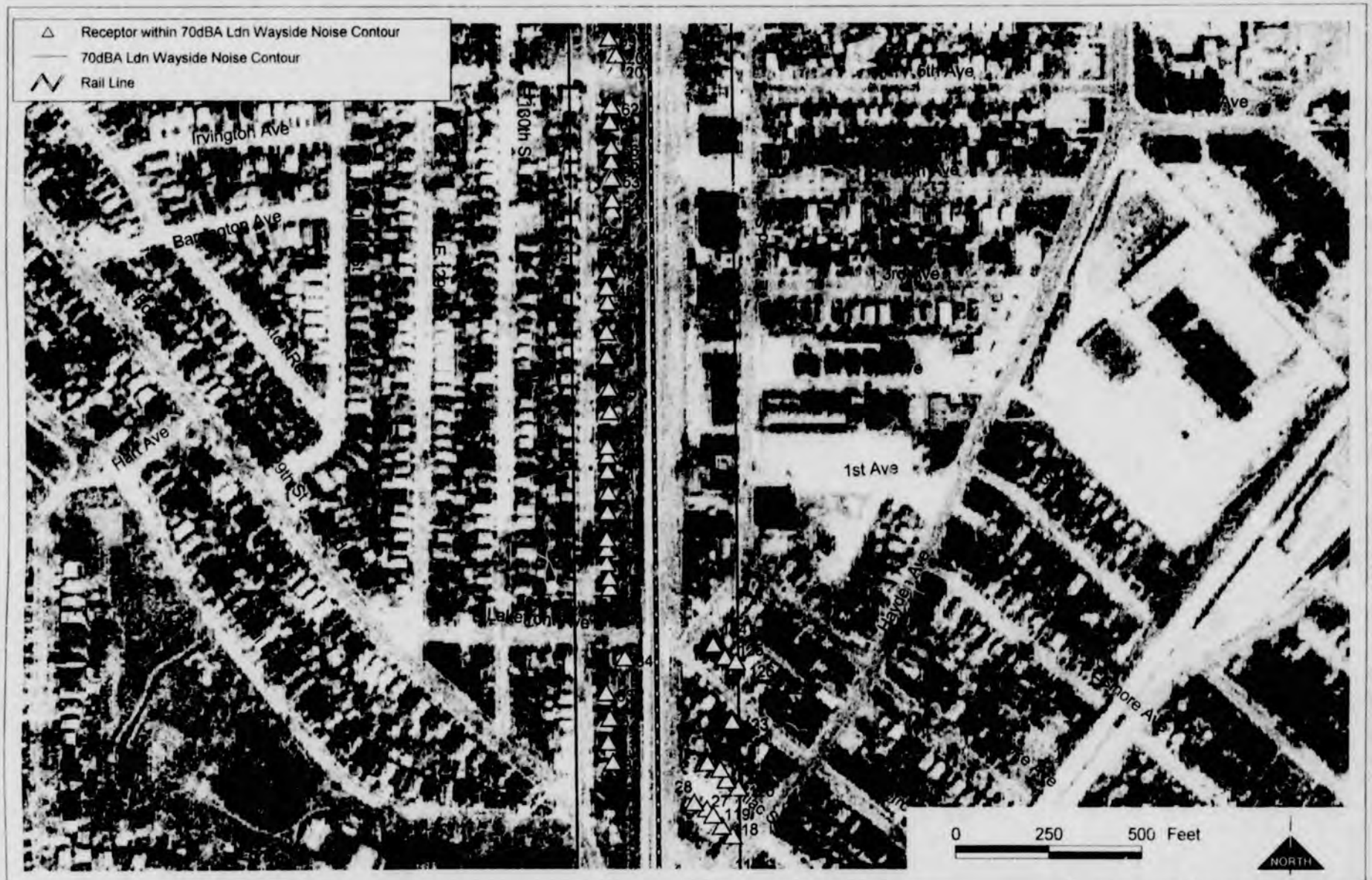


FIGURE 63 Area 3

QUAKER-TO-MAYFIELD, C-073 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 64 Area 4

QUAKER-TO-MAYFIELD, C-073 Receptors Within 70dBA Ldn Wayside Noise Contour