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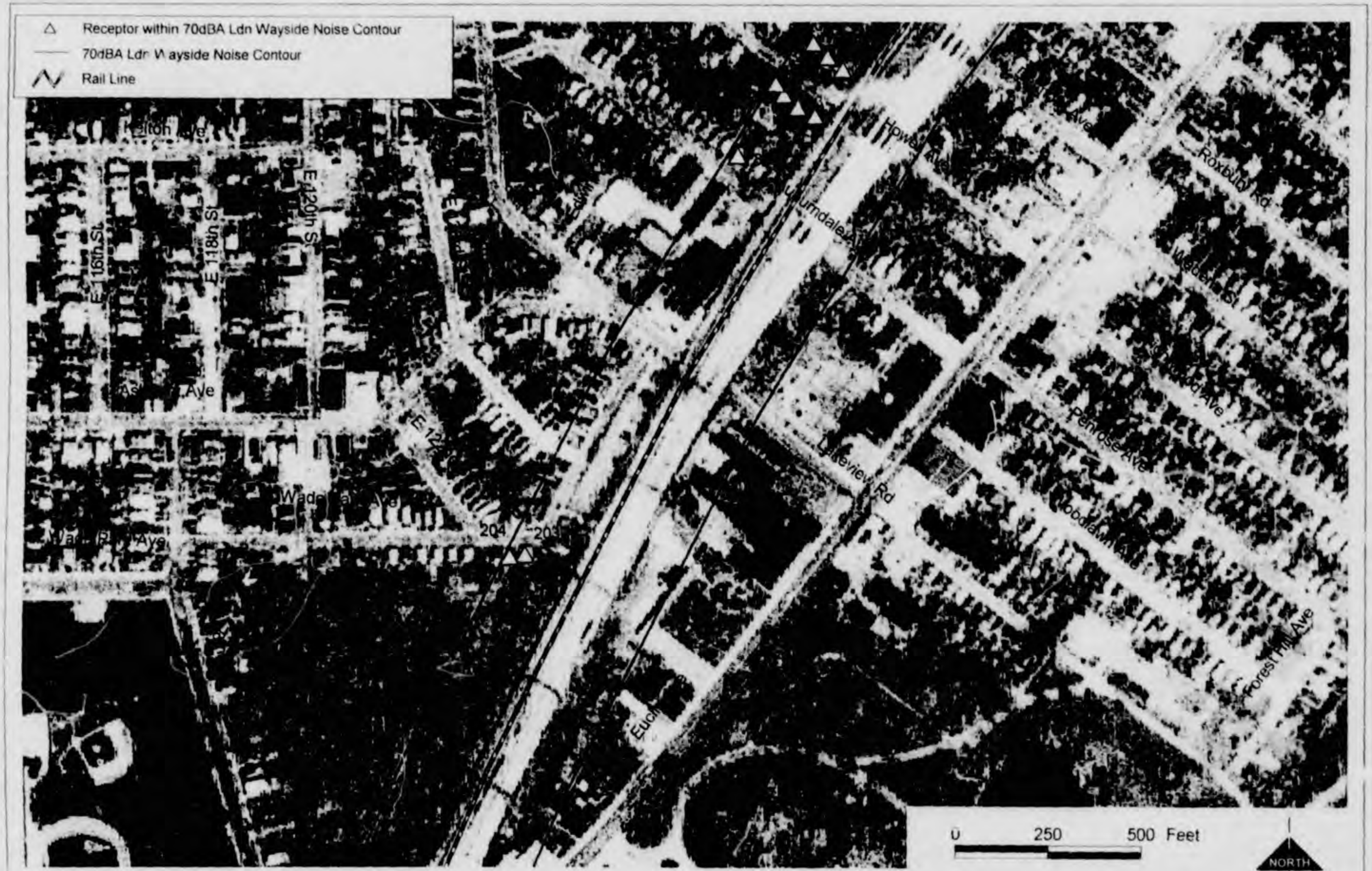

FIGURE 65 Area 5

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

J-100

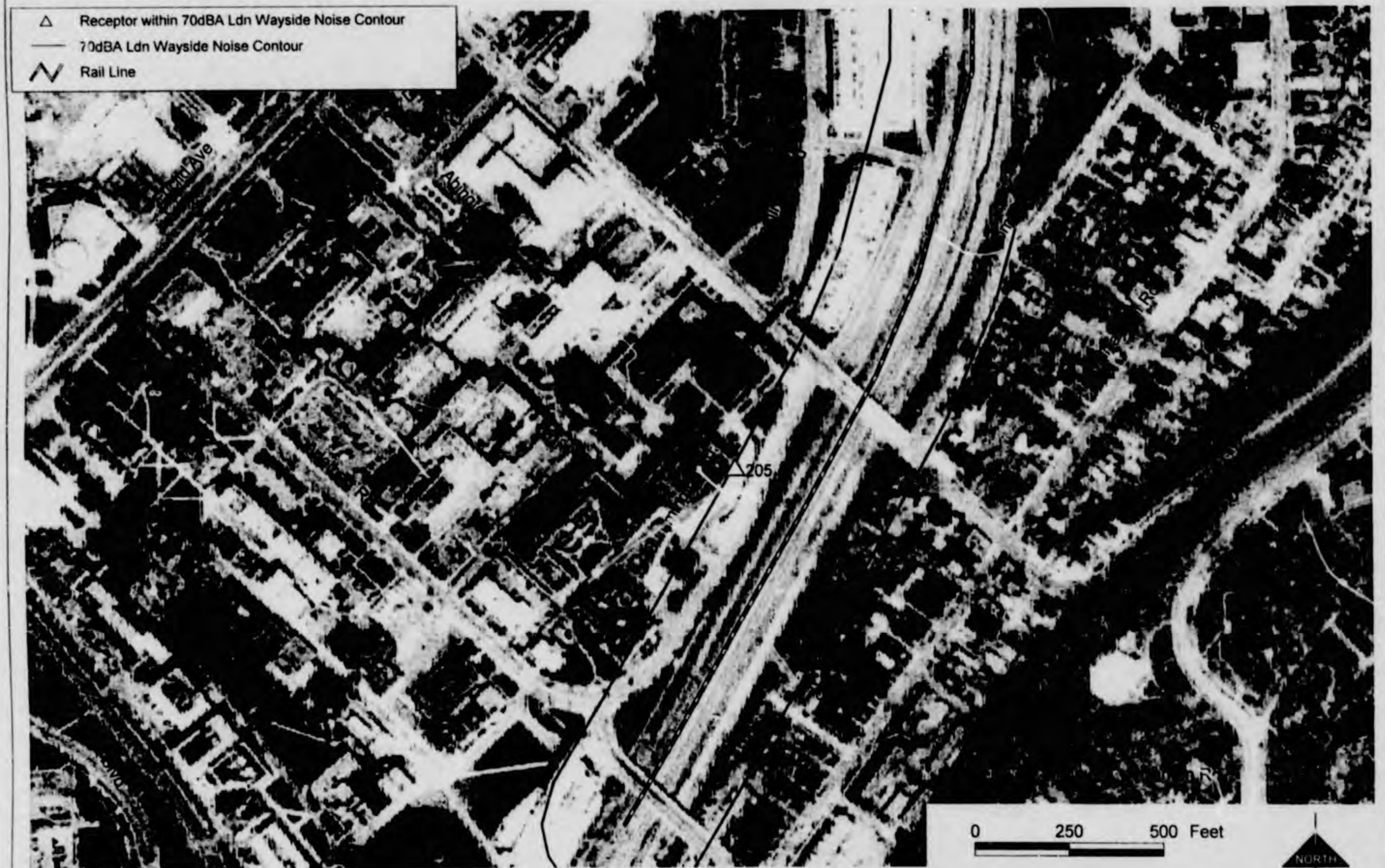

FIGURE 66 Area 6

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

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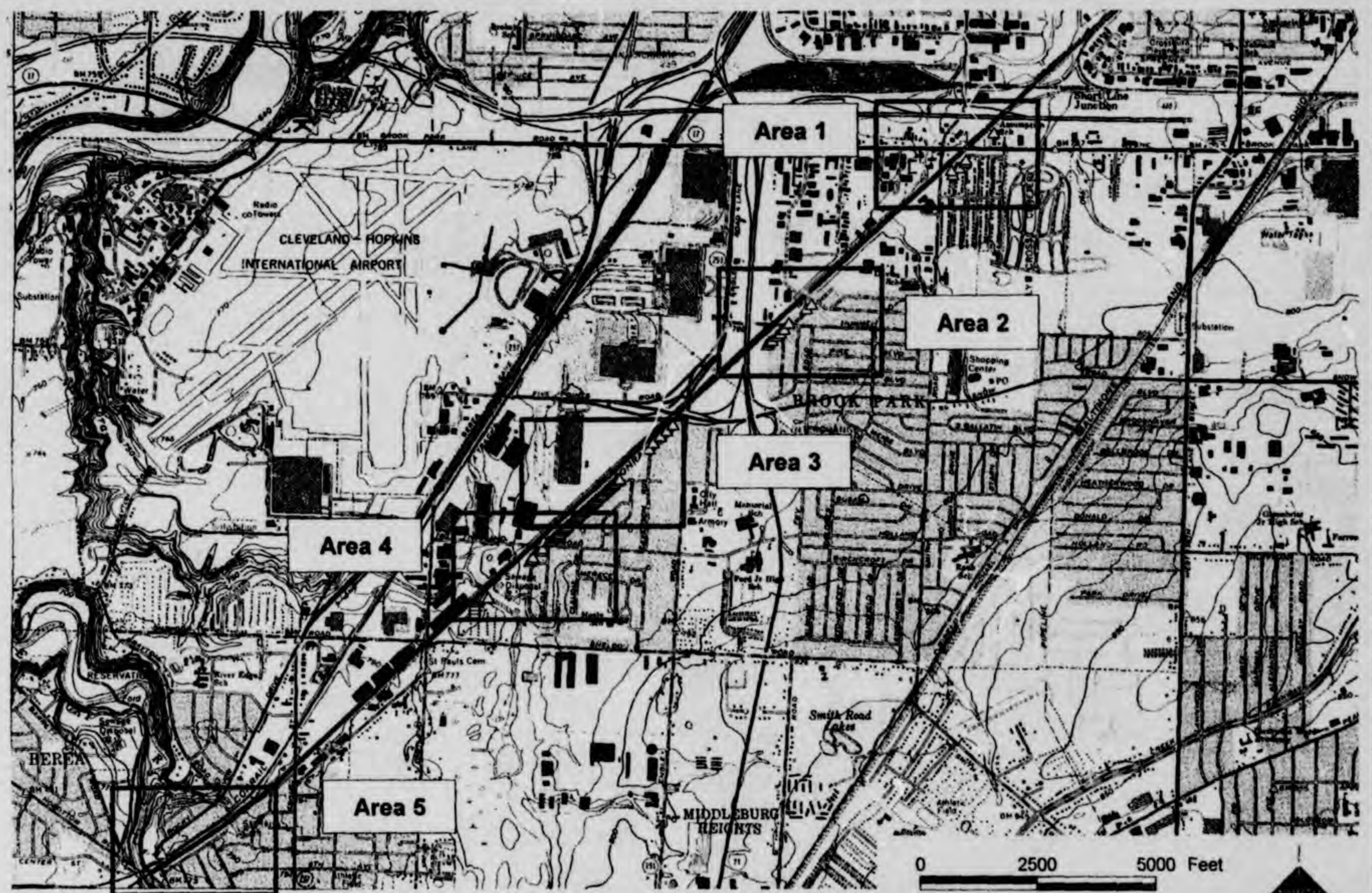

FIGURE 67 Key Map

SHORT-TO-BEREA, C-074 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

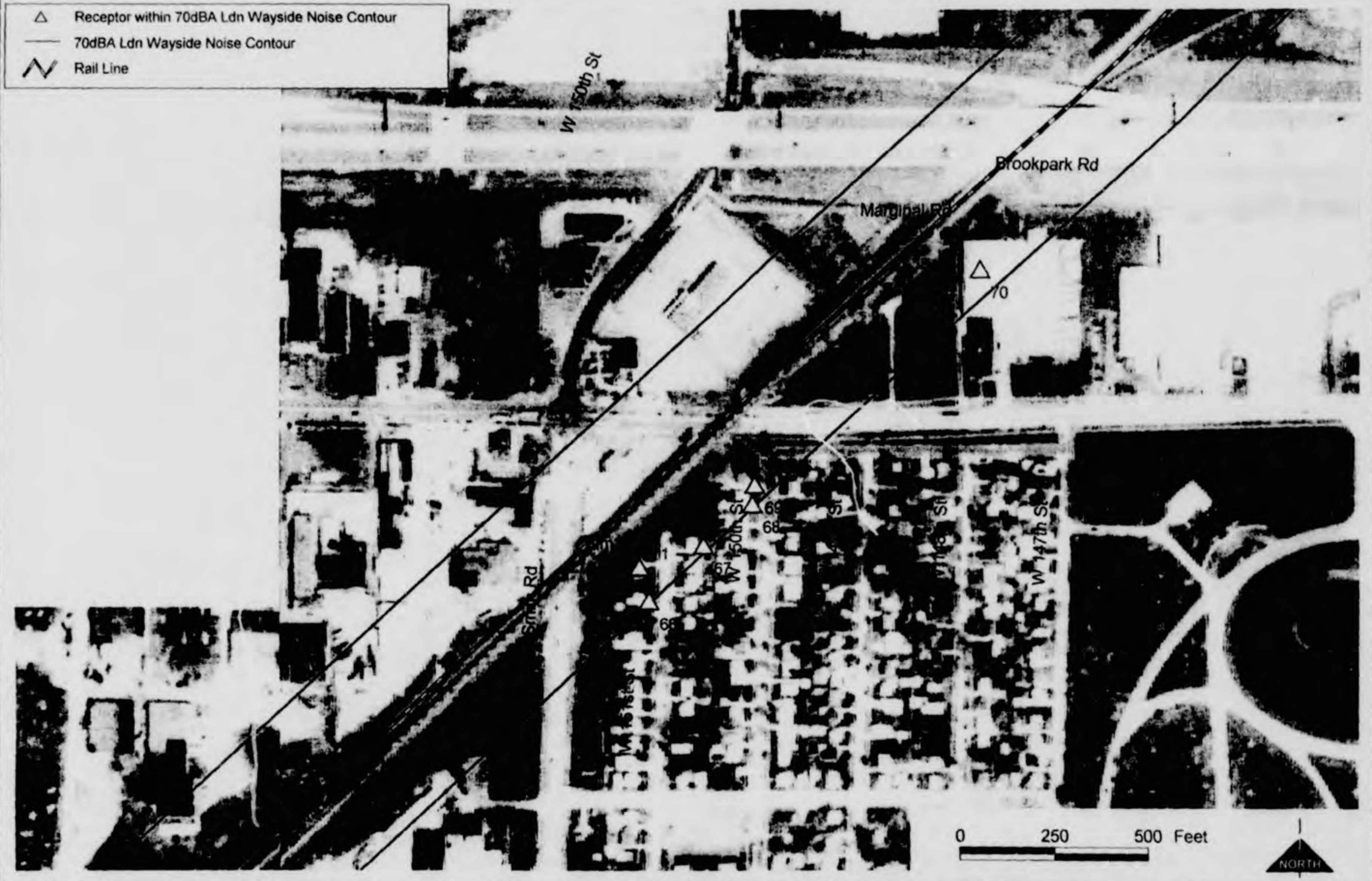

FIGURE 68 Area 1

SHORT-TO-BEREA, C-074 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 69 Area 2

SHORT-TO-BEREA, C-074 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 70 Area 3

SHORT-TO-BEREA, C-074 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 71 Area 4

SHORT-TO-BEREA, C-074 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 72 Area 5

SHORT-TO-BEREA, C-074 Receptors Within 70dBA Ldn Wayside Noise Contour

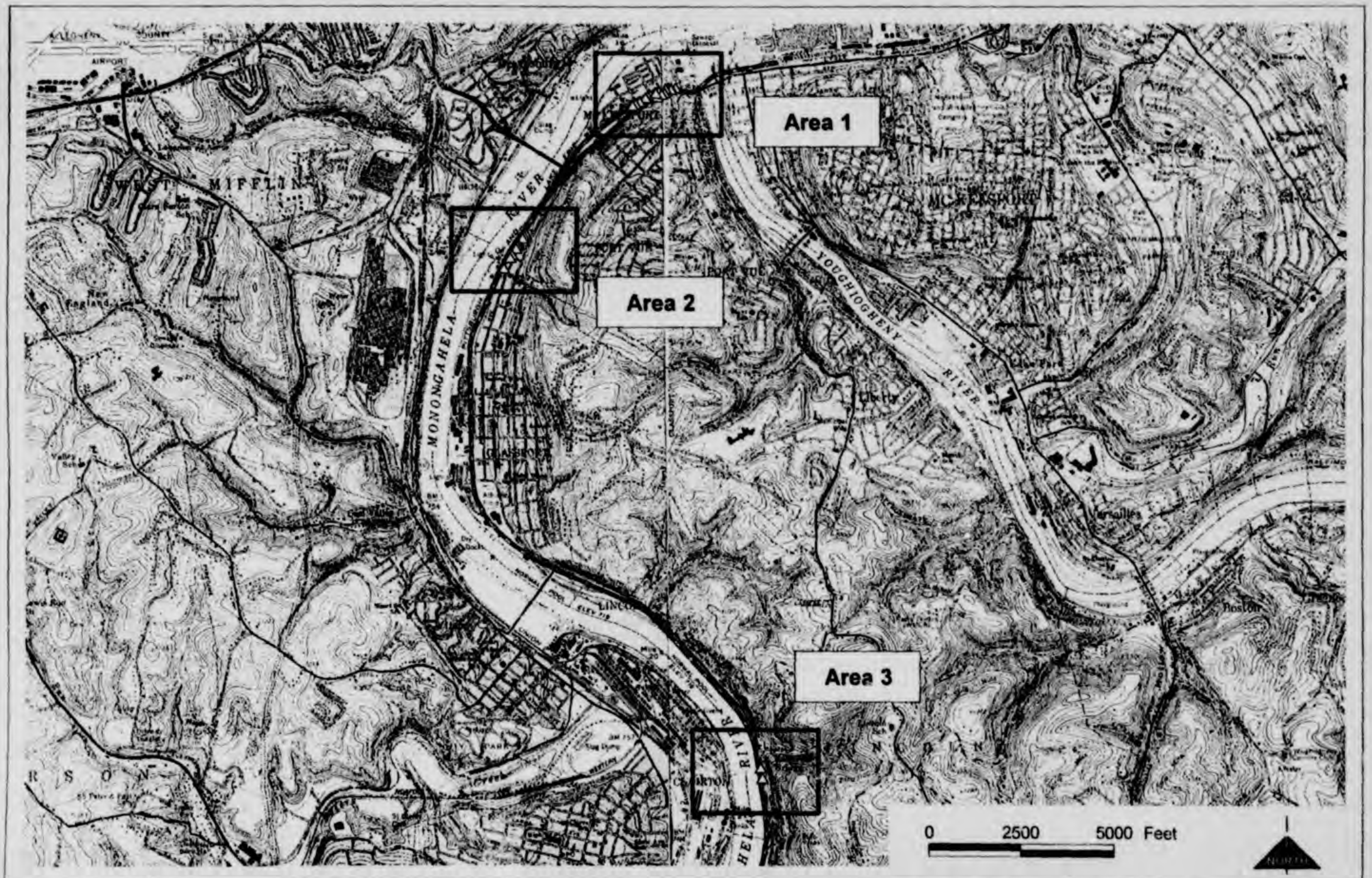

FIGURE 73A Key Map

SINNS-TO-BROWNSVILLE, C-085 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

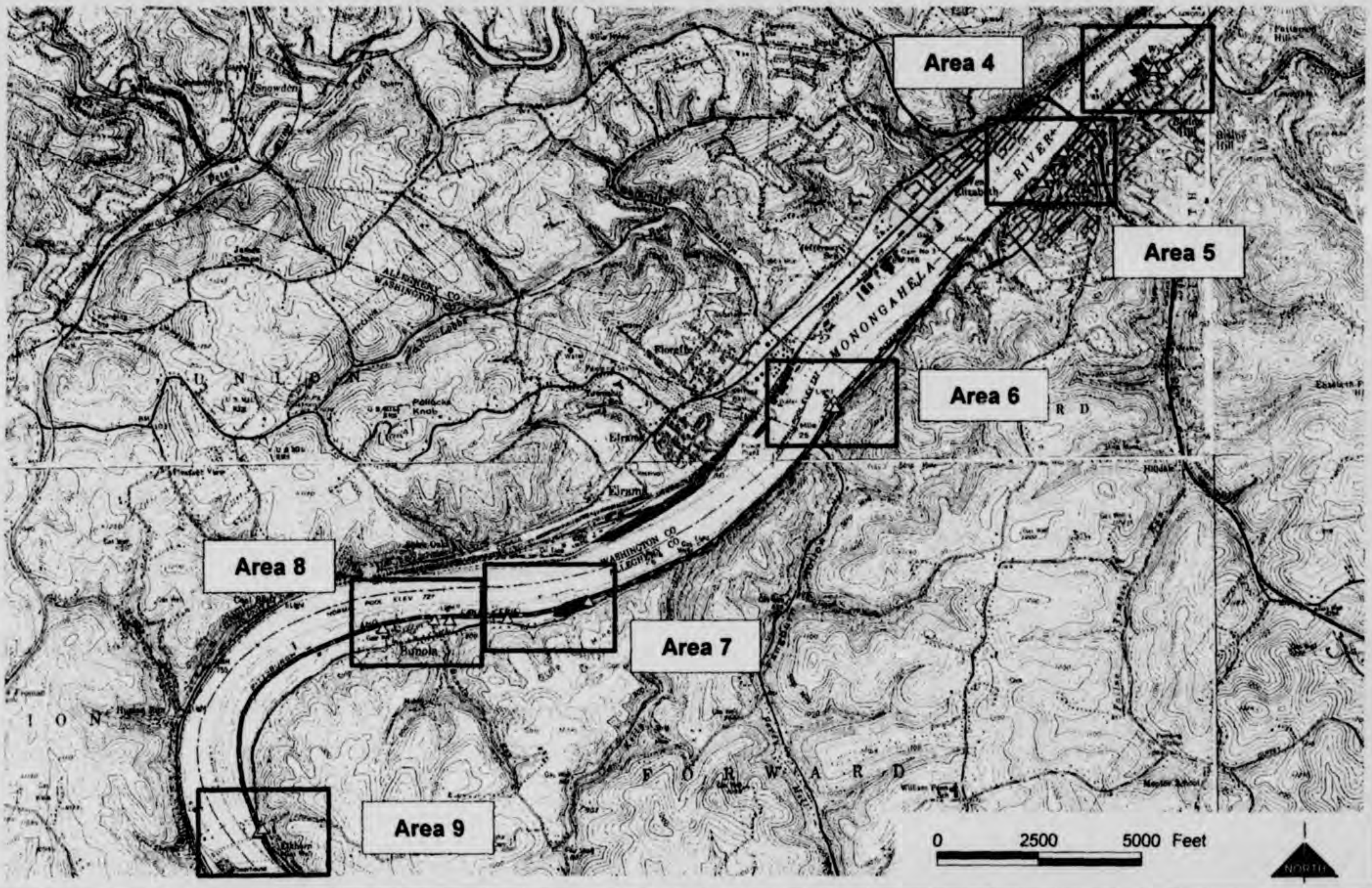

FIGURE 73B Key Map

SINNS-TO-BROWNSVILLE, C-085 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

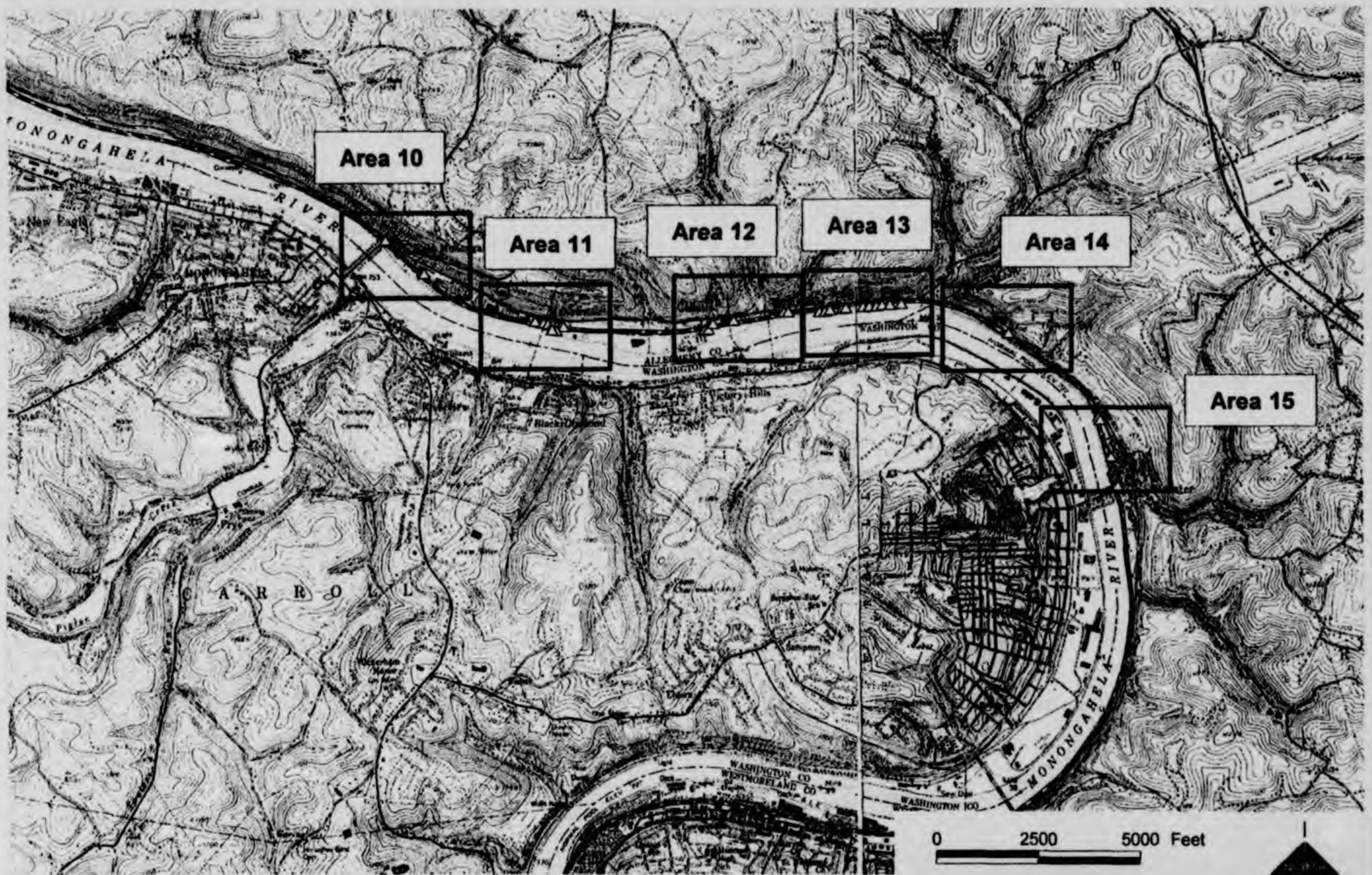

FIGURE 73C Key Map

SINNS-TO-BROWNSVILLE, C-085 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

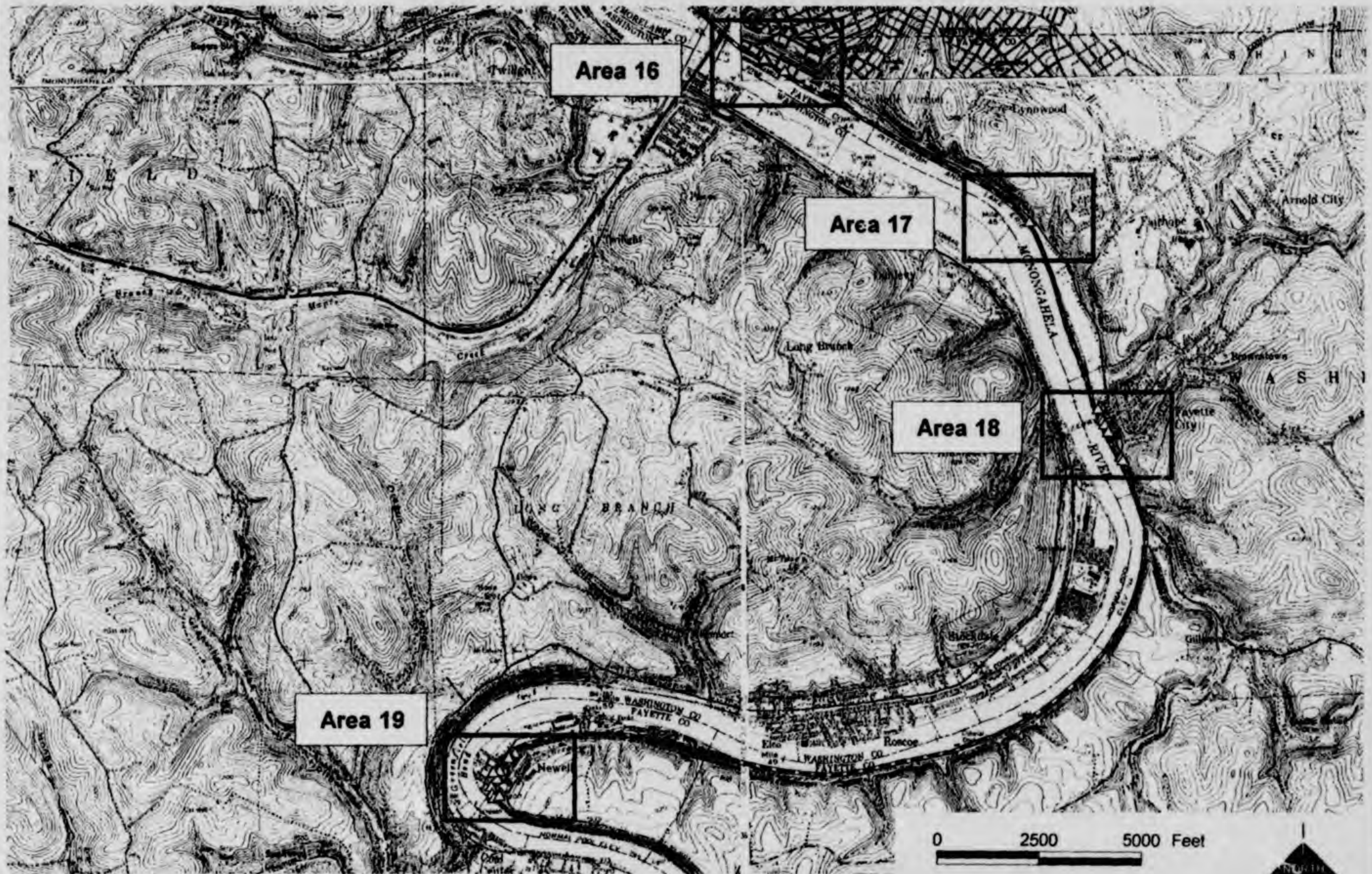

FIGURE 73D Key Map

SINNS-TO-BROWNSVILLE, C-085 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

FIGURE 74 Area 1

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 75 Area 2

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 76 Area 3

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

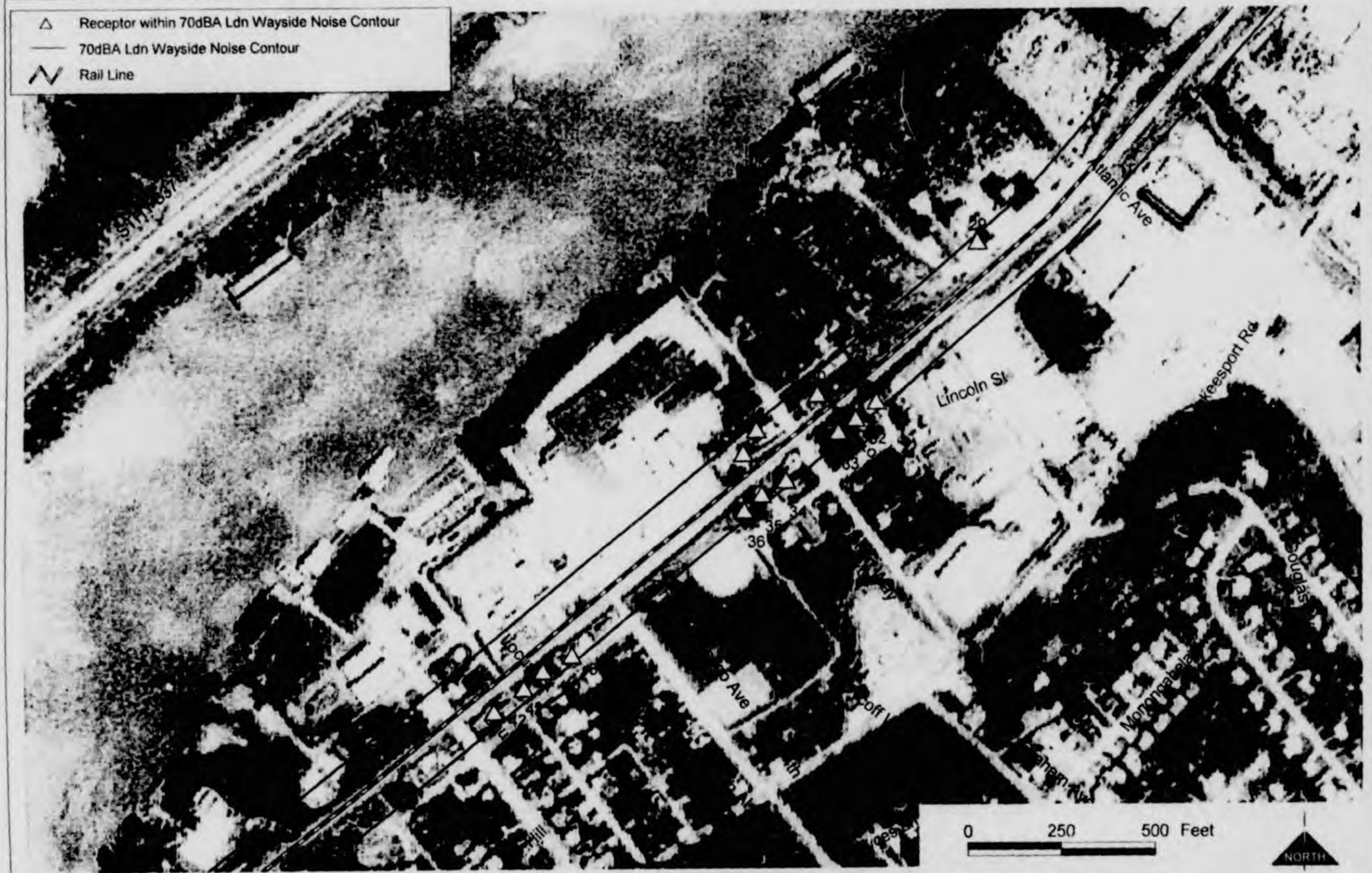

FIGURE 77 Area 4

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 78 Area 5

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 79 Area 6

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

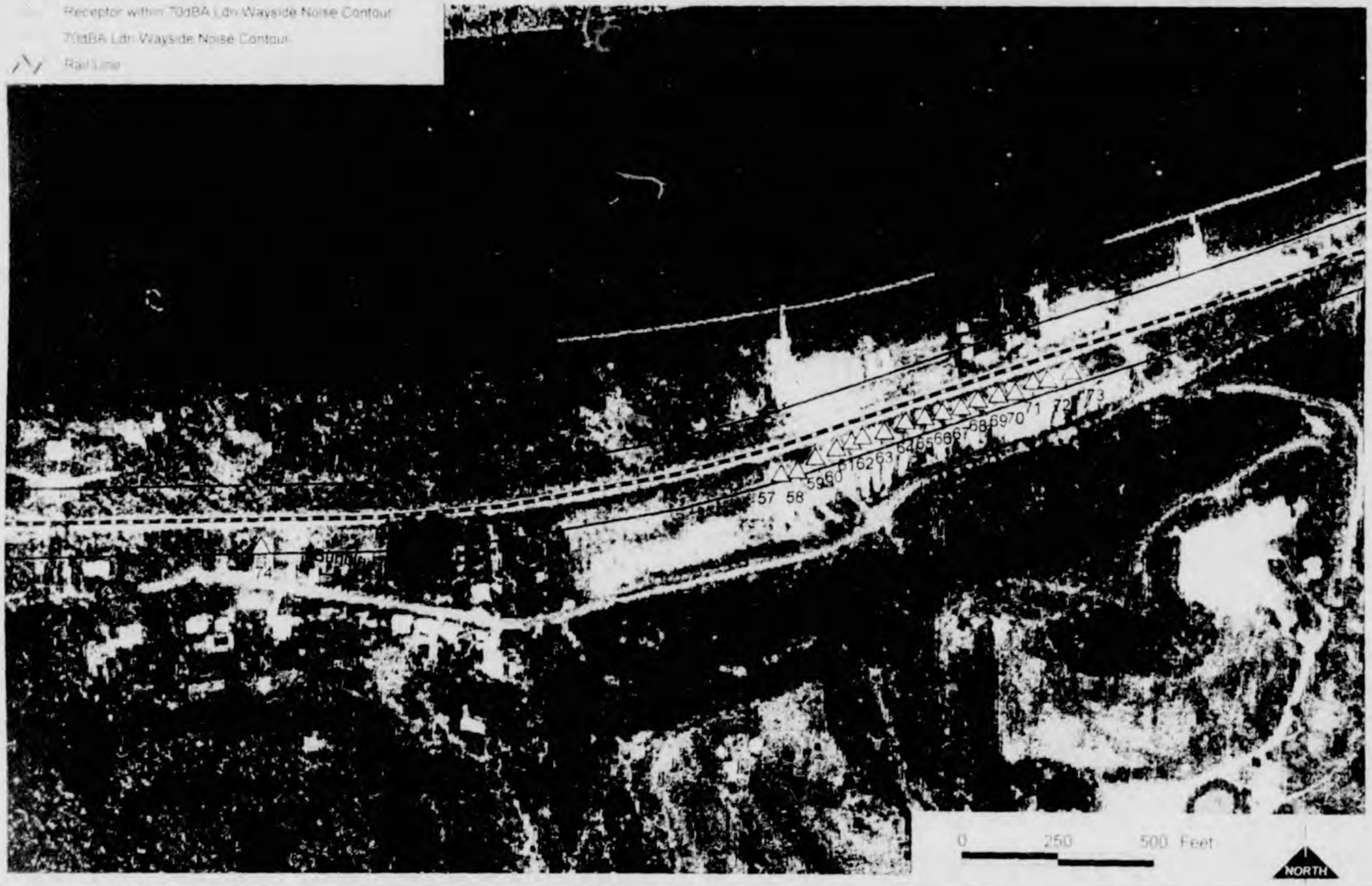

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FIGURE 80 Area 7

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 81 Area 8

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 82 Area 9

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 83 Area 10

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 84 Area 11

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 85 Area 12

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

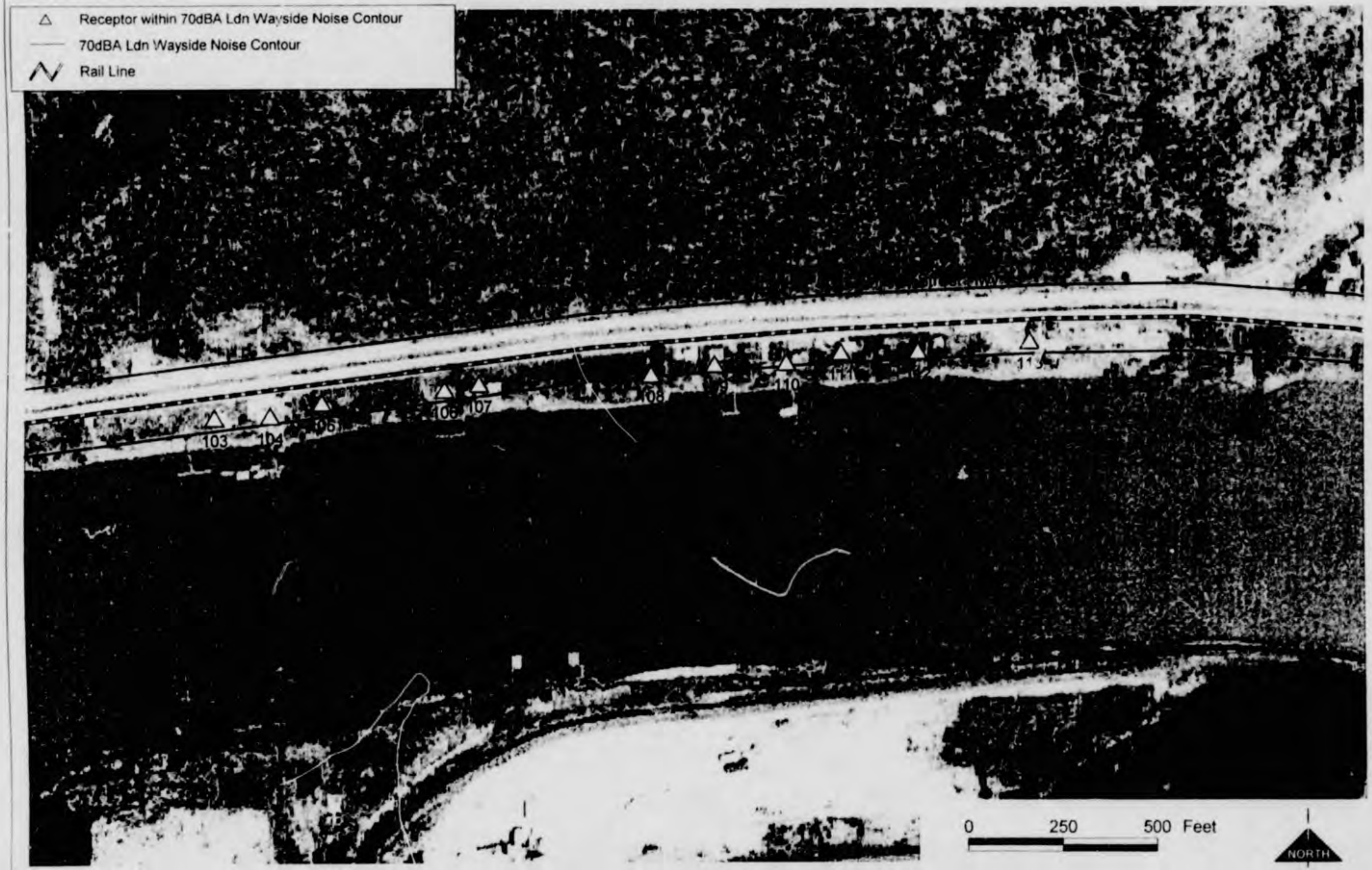

FIGURE 86 Area 13

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 87 Area 14

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 88 Area 15

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 89 Area 16

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 90 Area 17

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 91 Area 18

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 92 Area 19

SINNS-TO-BROWNSVILLE, C-085 Receptors Within 70dBA Ldn Wayside Noise Contour

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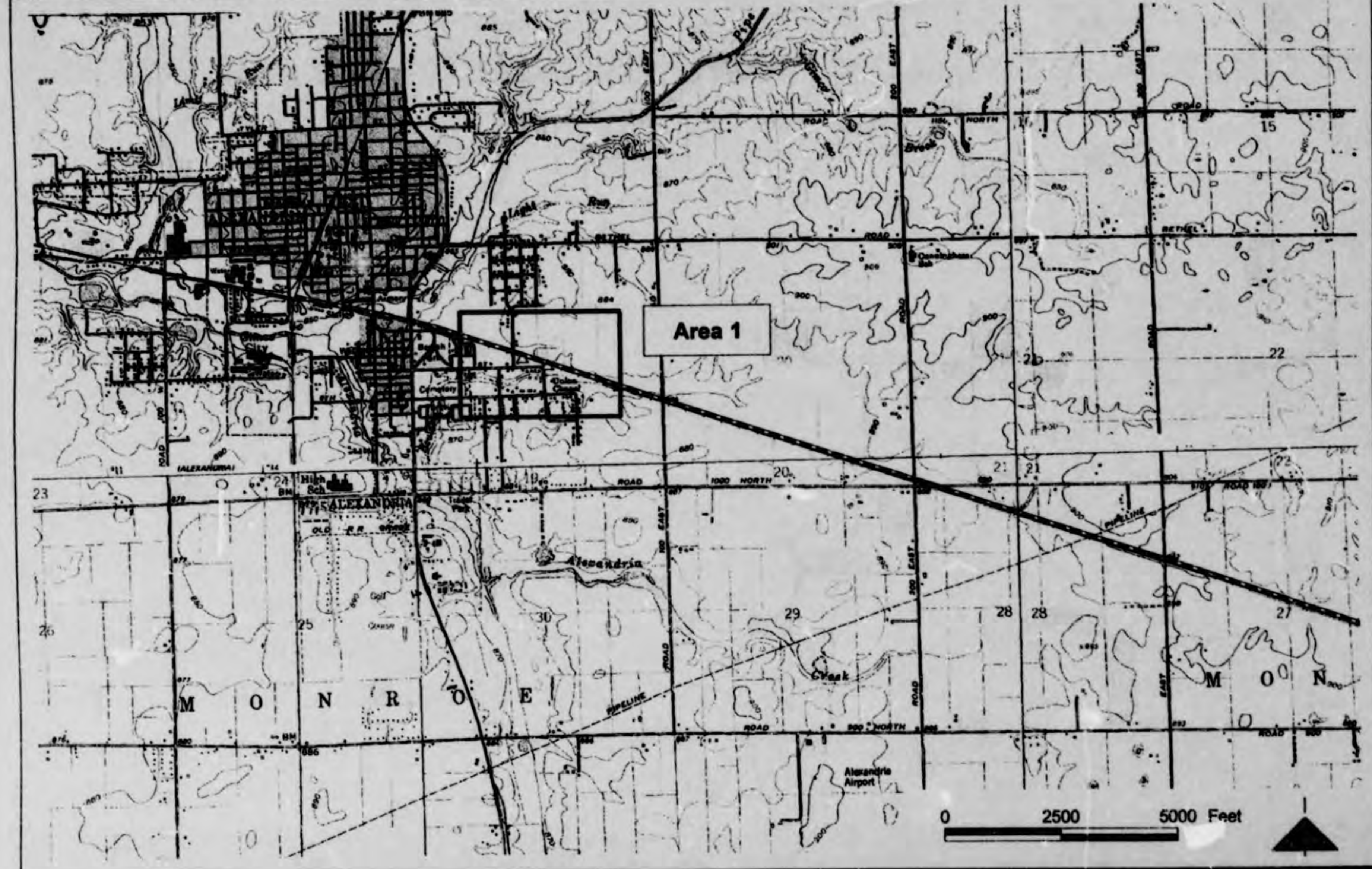

FIGURE 93A Key Map

ALEXANDRIA-TO-MUNCIE, N-040 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

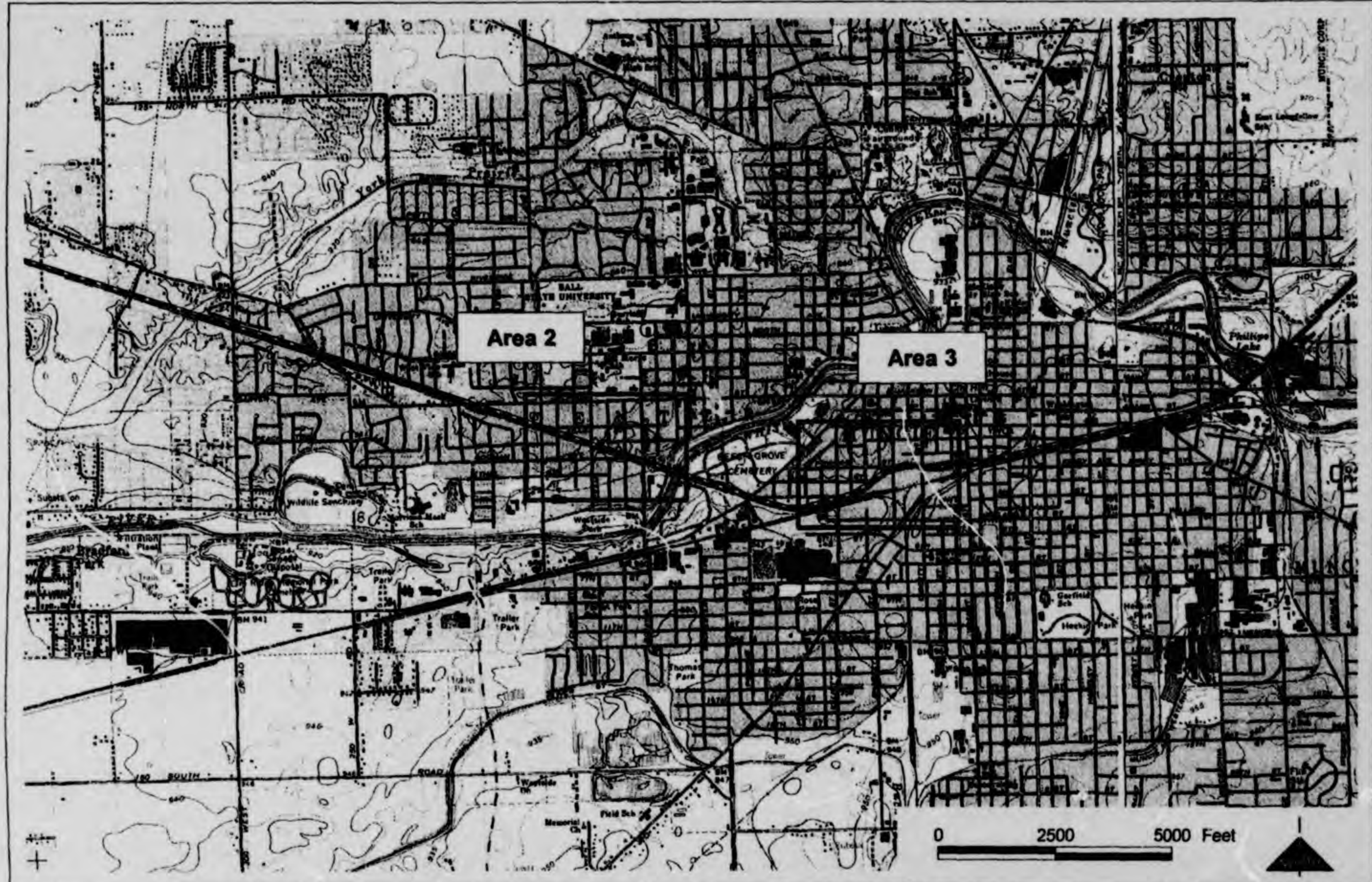

FIGURE 93B Key Map

ALEXANDRIA-TO-MUNCIE, N-040 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

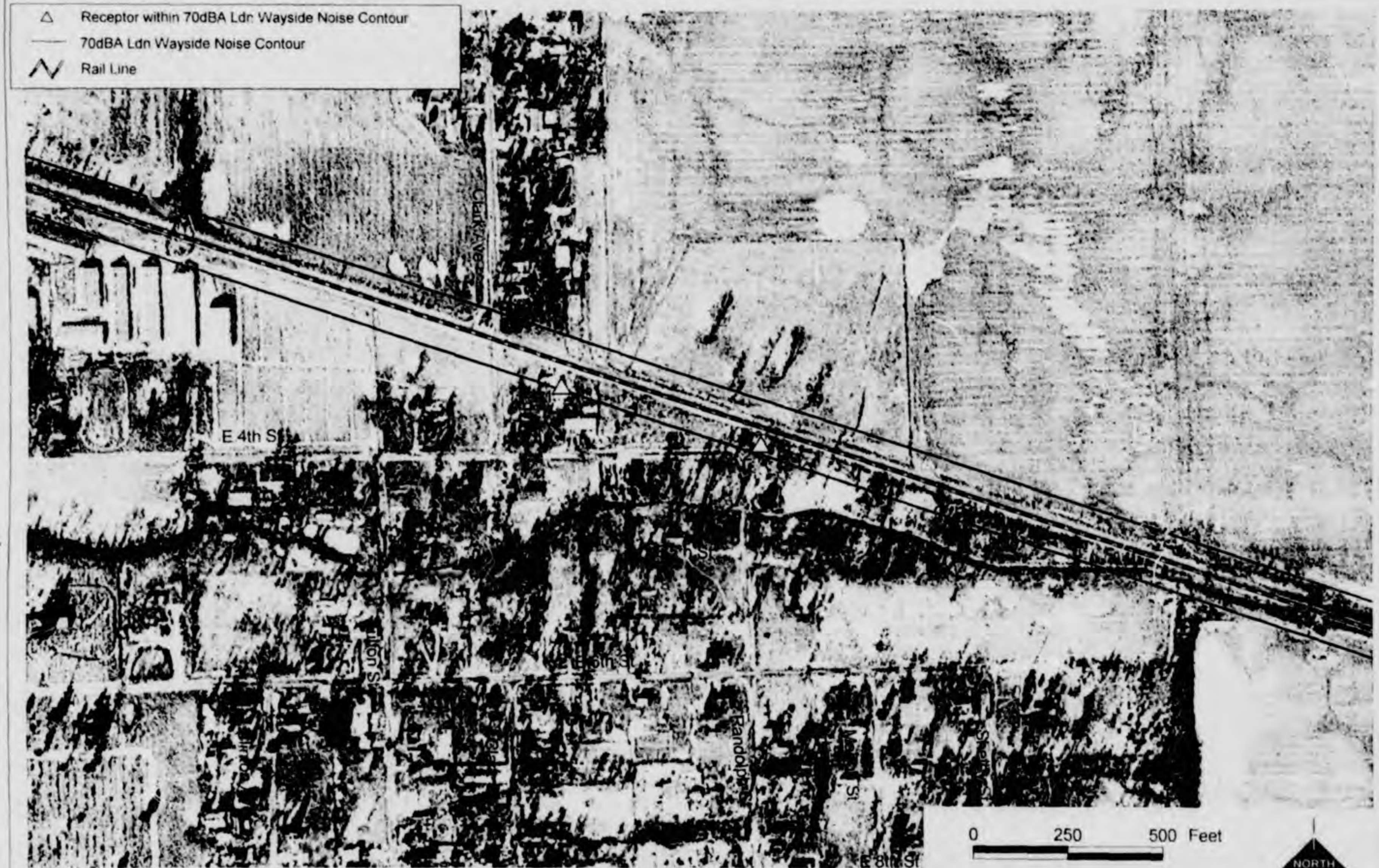

FIGURE 94 Area 1

ALEXANDRIA-TO-MUNCIE, N-040 Receptors With... 70dBA Ldn Wayside Noise Contour

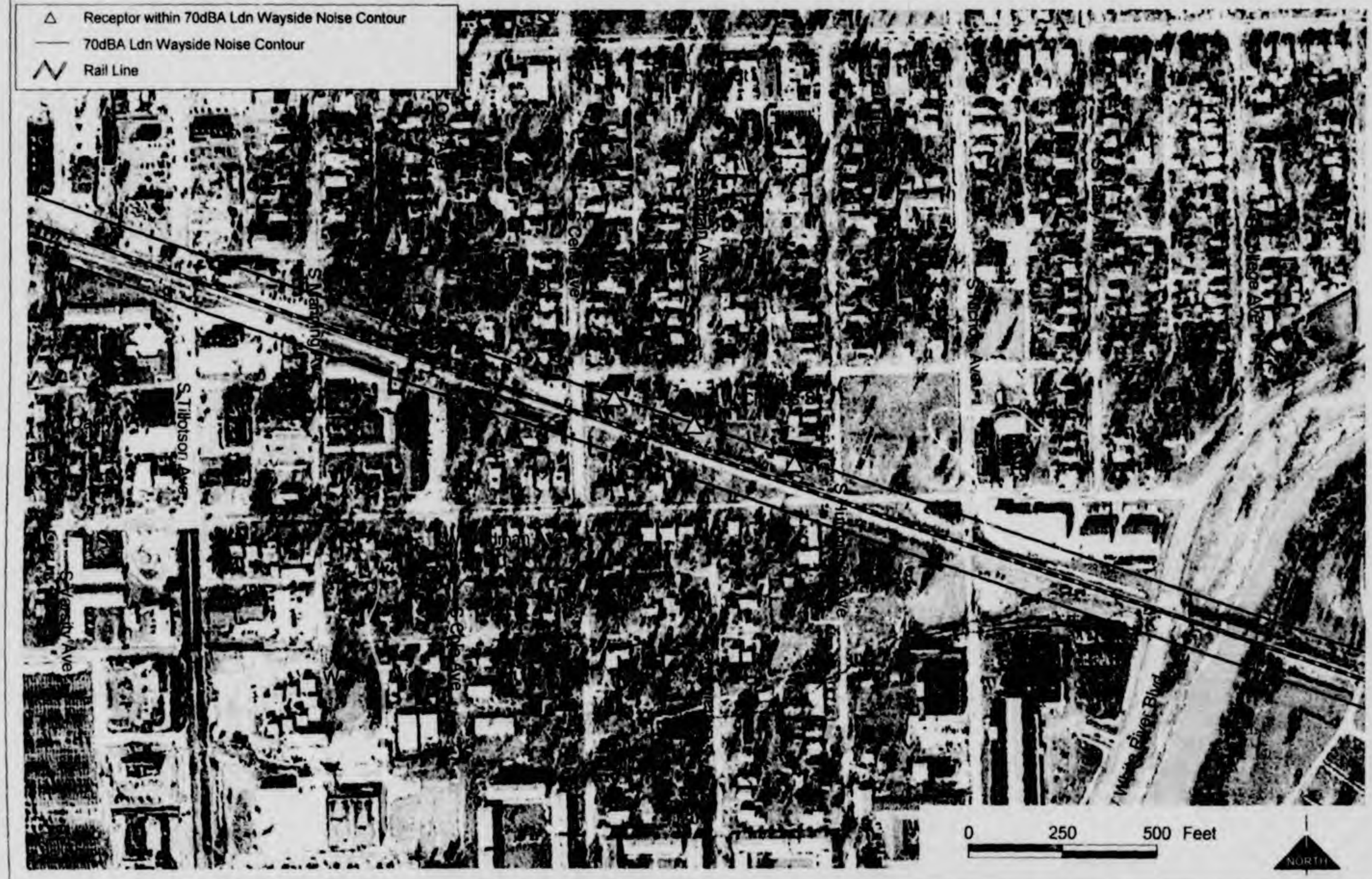

FIGURE 95 Area 2

ALEXANDRIA-TO-MUNCIE, N-040 Receptors Within 70dBA Ldn Wayside Noise Contour

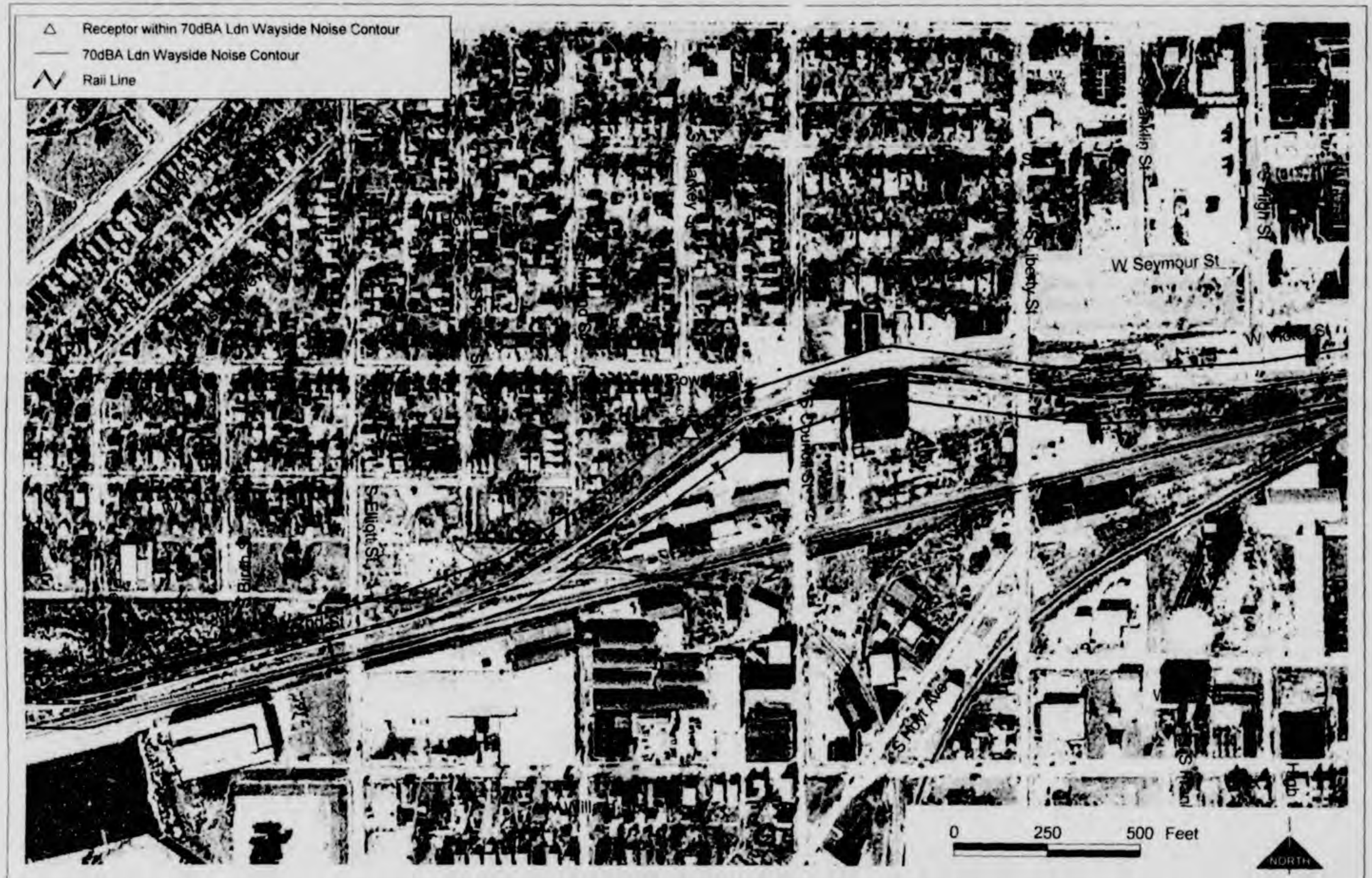

FIGURE 96 Area 3

ALEXANDRIA-TO-MUNCIE, N-040 Receptors Within 70dBA Ldn Wayside Noise Contour

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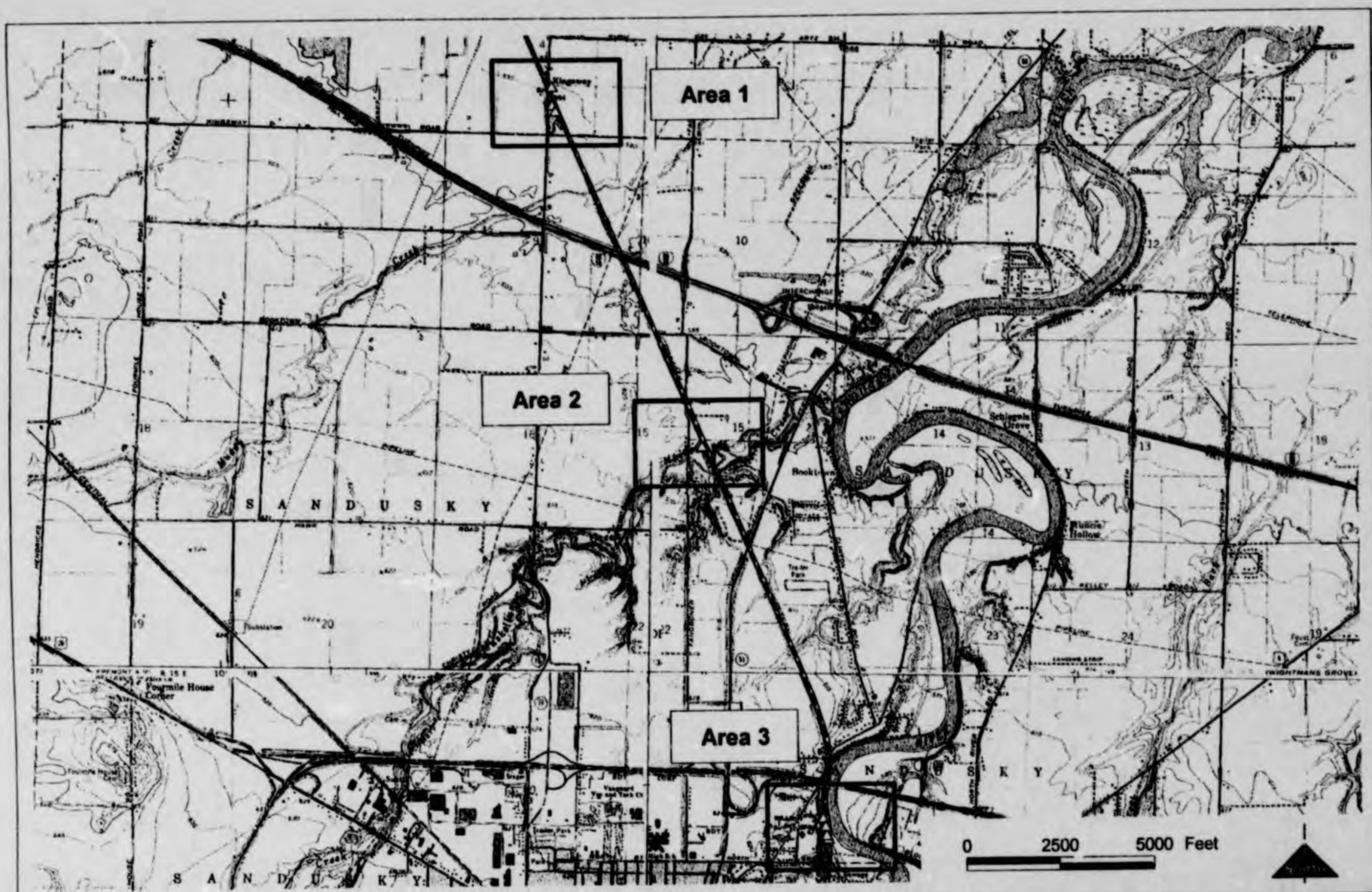

FIGURE 97A Key Map

OAK HARBOR-TO-BELLEVUE, N-079 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

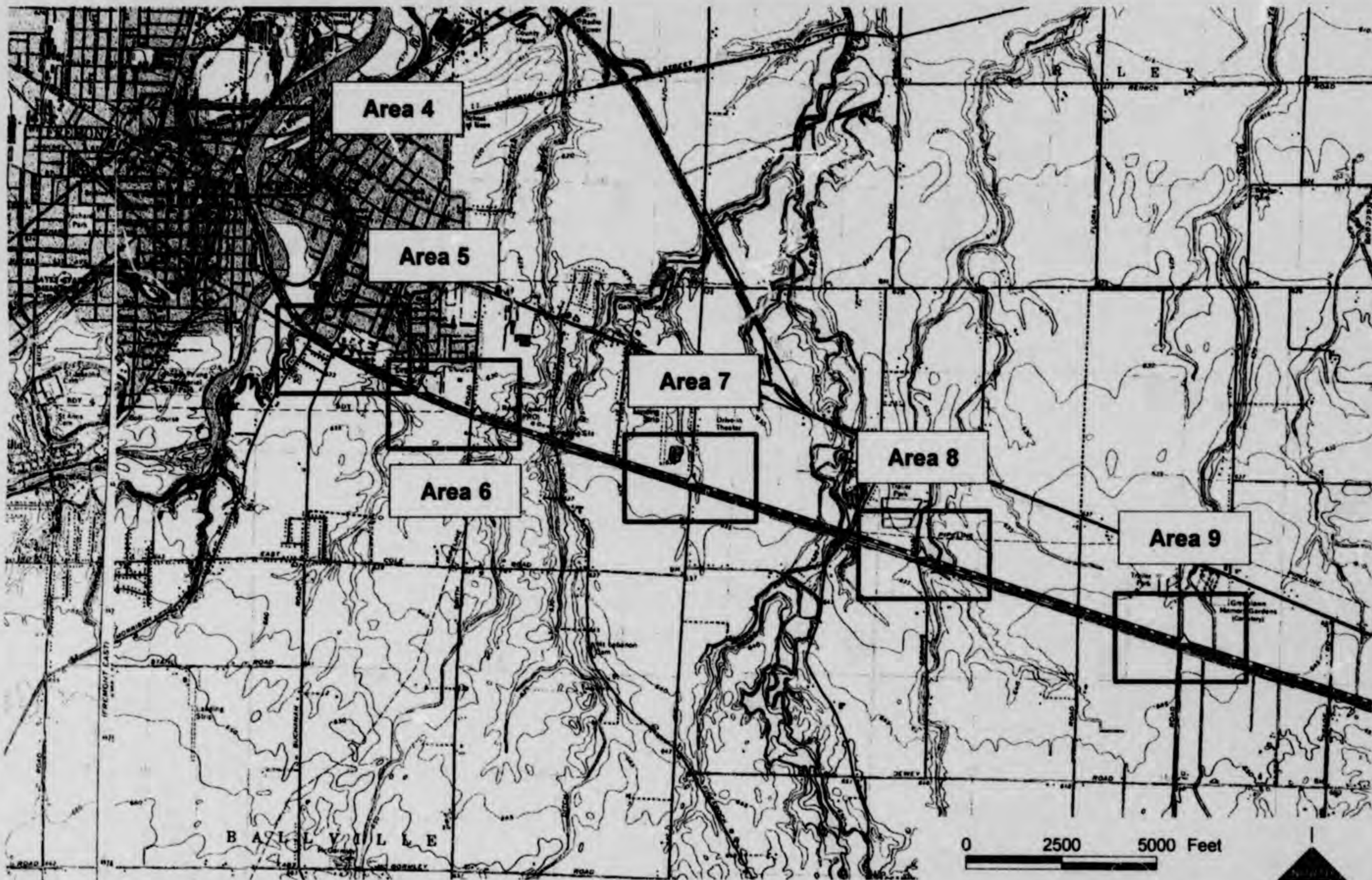

FIGURE 97B Key Map

OAK HARBOR-TO-BELLEVUE, N-079 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

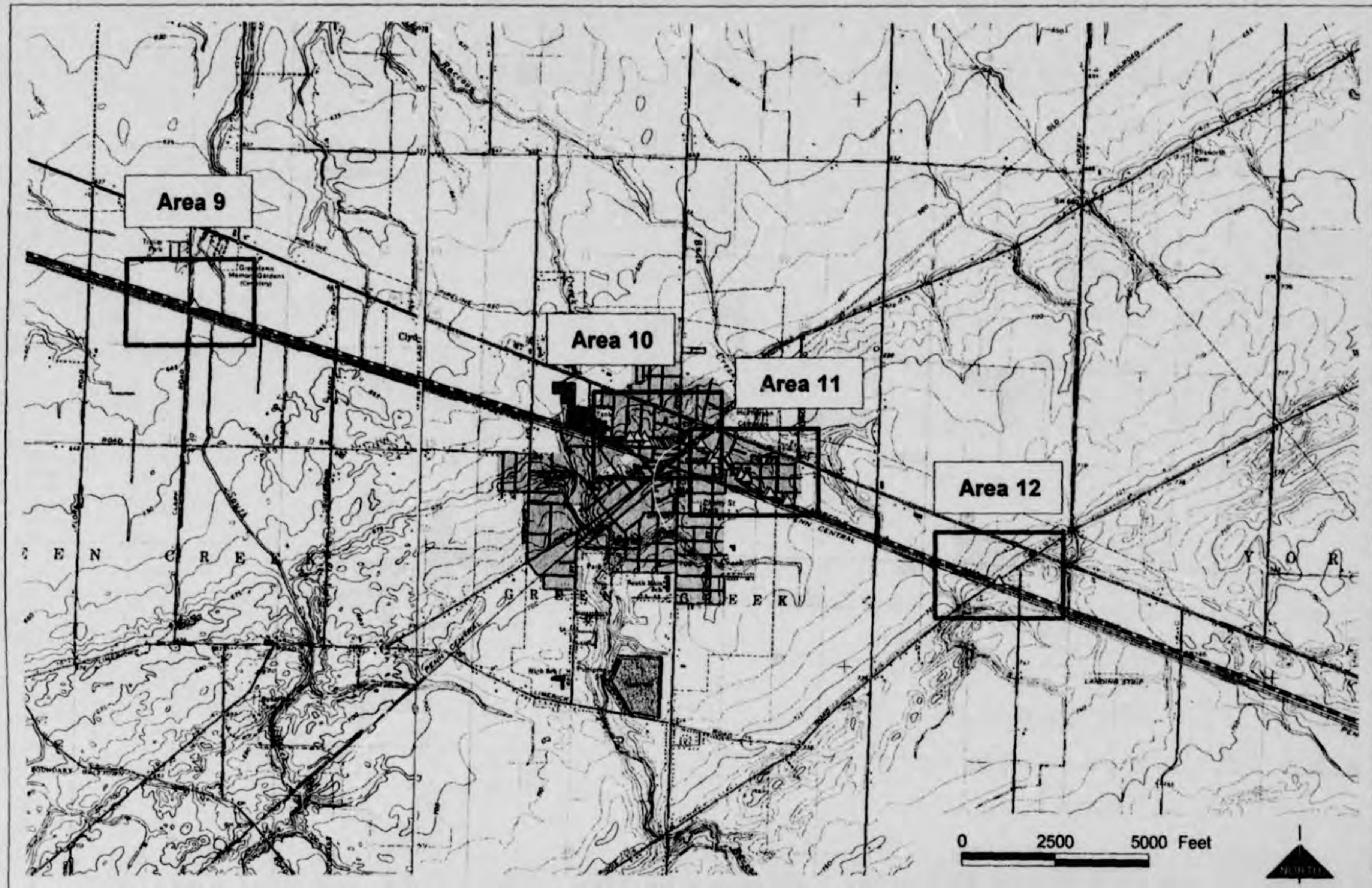

FIGURE 97C Key Map

OAK HARBOR-TO-BELLEVUE, N-079 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

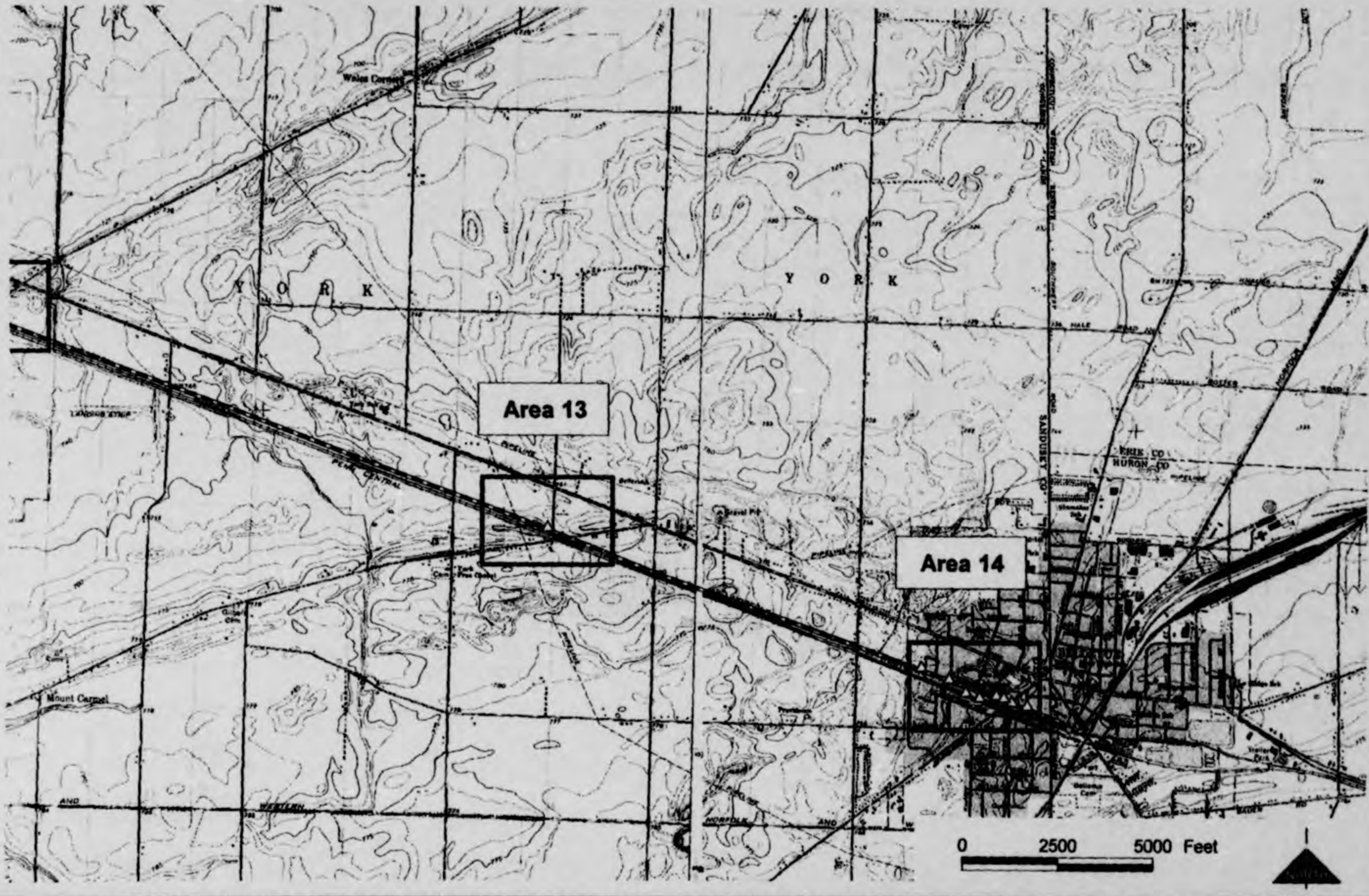

FIGURE 97D Key Map

OAK HARBOR-TC-BELLEVUE, N-079 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

FIGURE 98 Area 1

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 99 Area 2

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

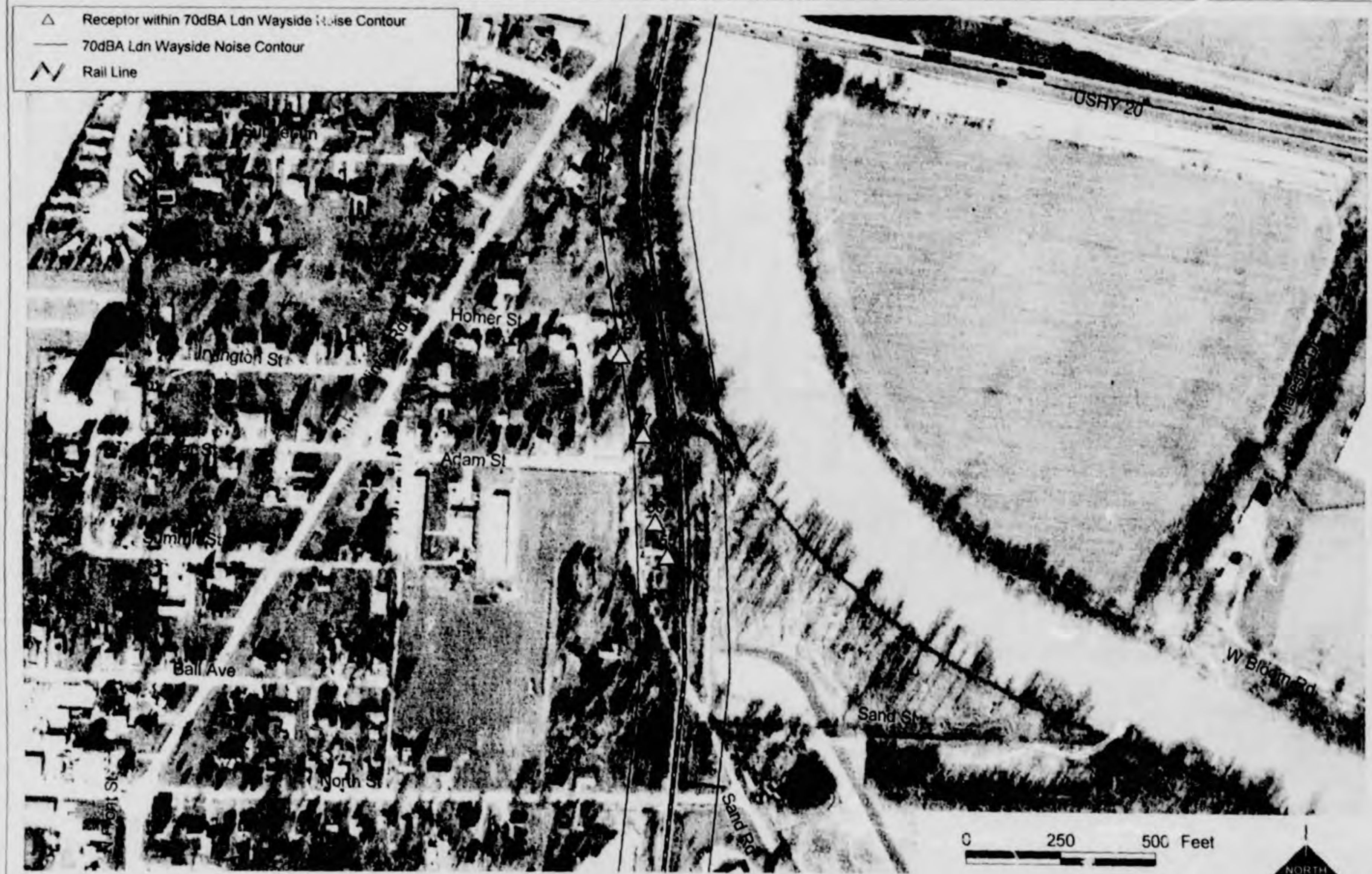

FIGURE 100 Area 3

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 101 Area 4

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

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FIGURE 102 Area 5

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 103 Area 6

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 104 Area 7

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

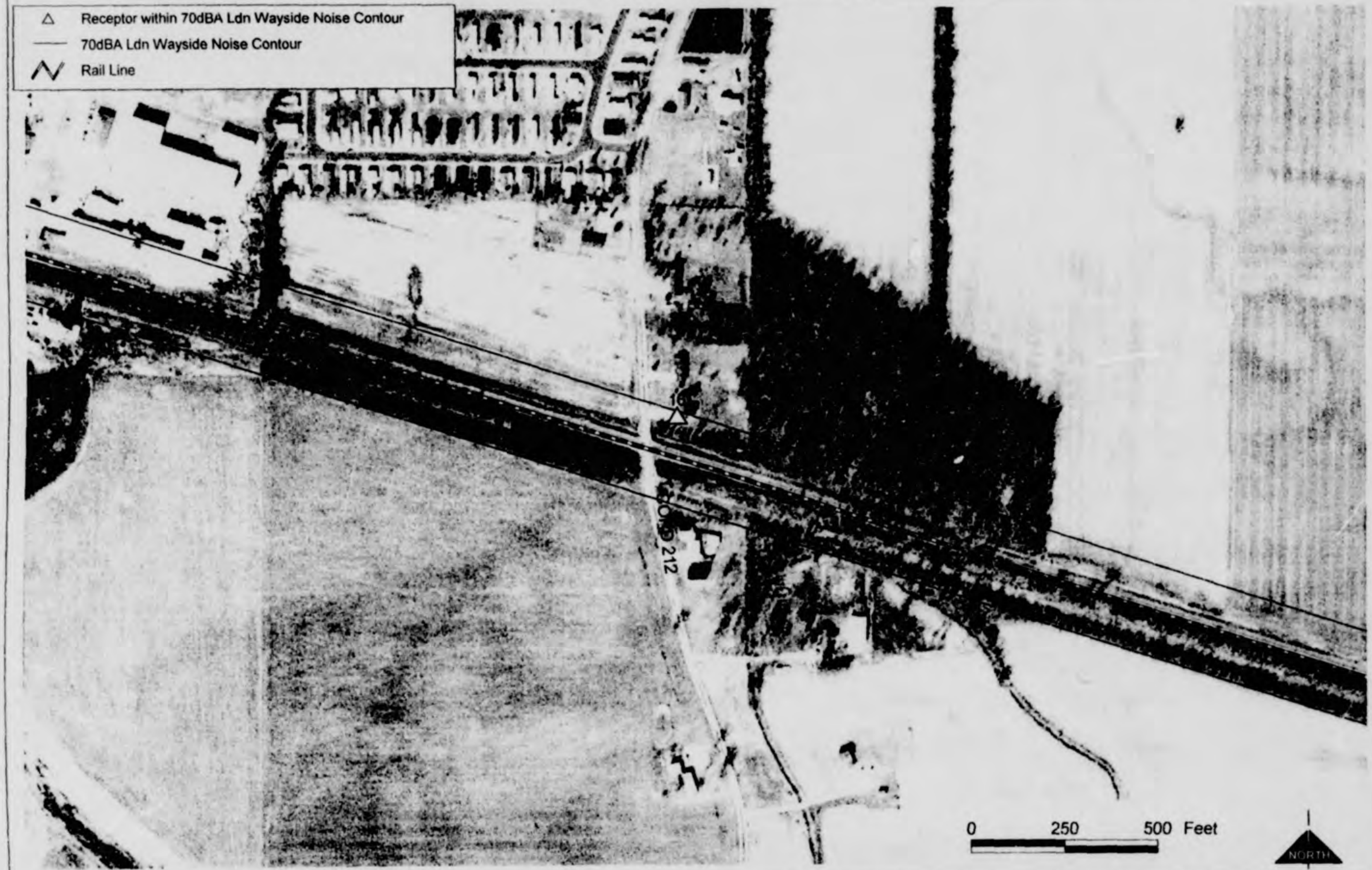

FIGURE 105 Area 8

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 106 Area 9

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 107 Area 10

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 108 Area 11

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

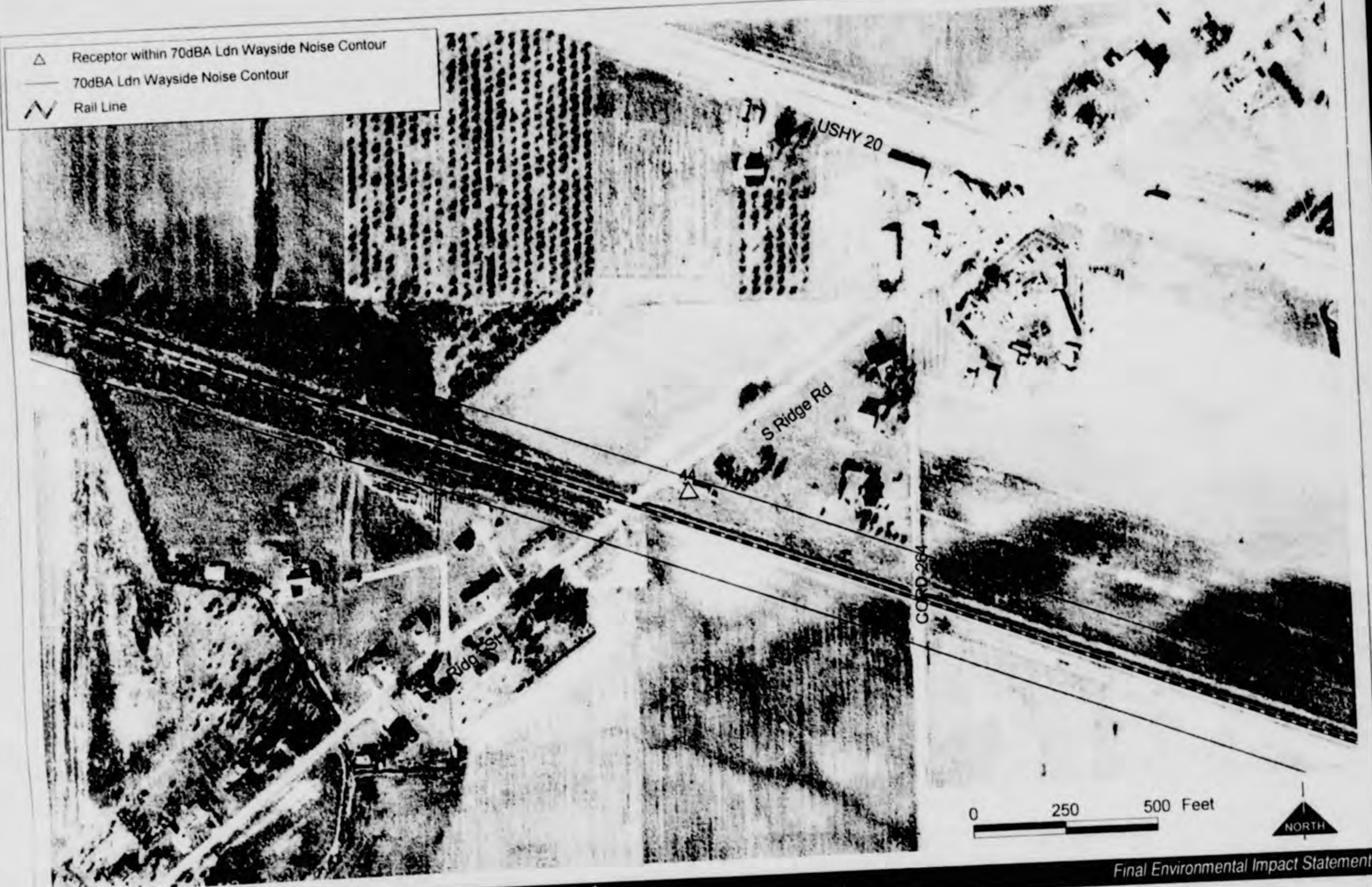

FIGURE 109 Area 12

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 110 Area 13

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

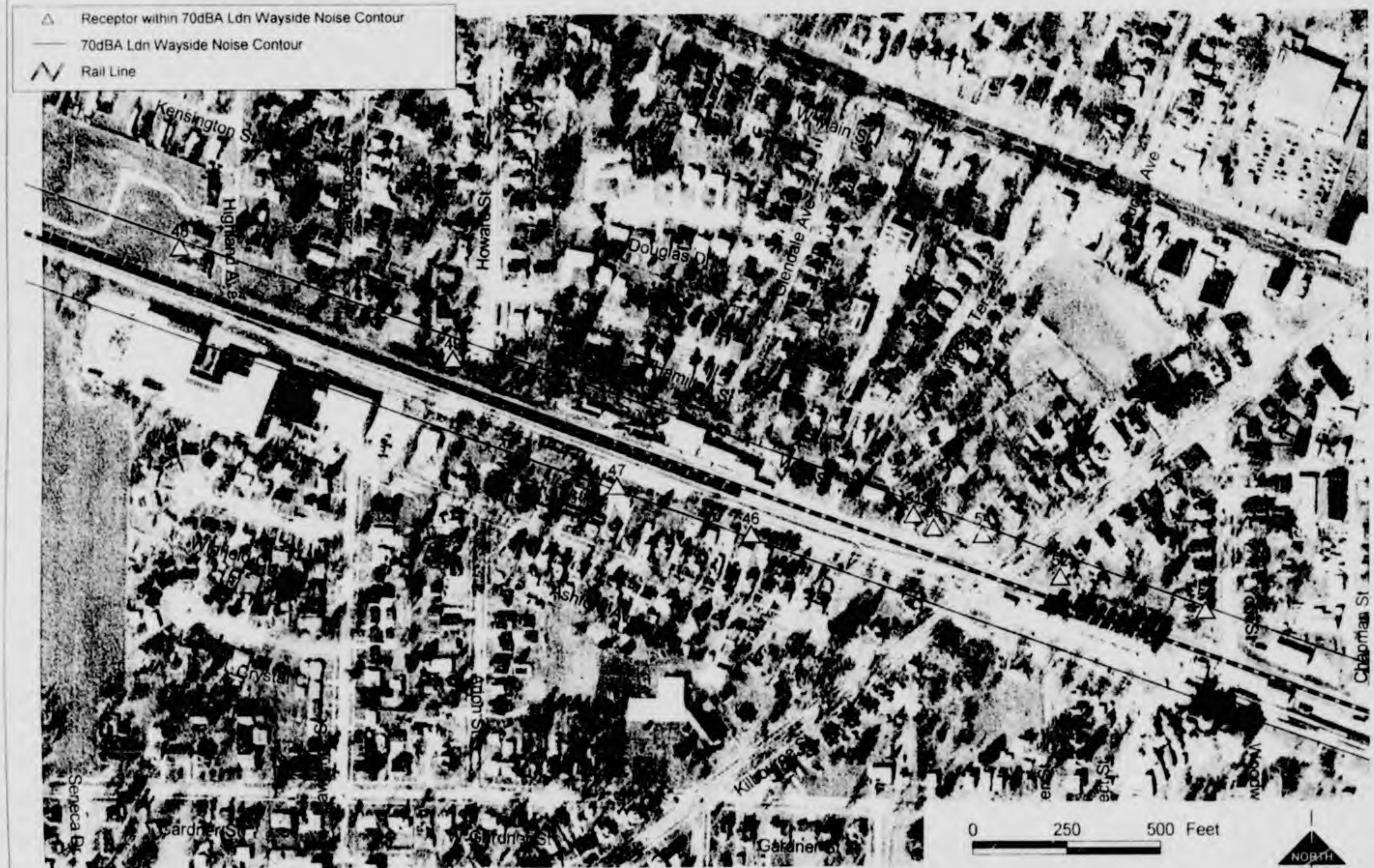

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FIGURE 111 Area 14

OAK HARBOR-TO-BELLEVUE, N-079 Receptors Within 70dBA Ldn Wayside Noise Contour

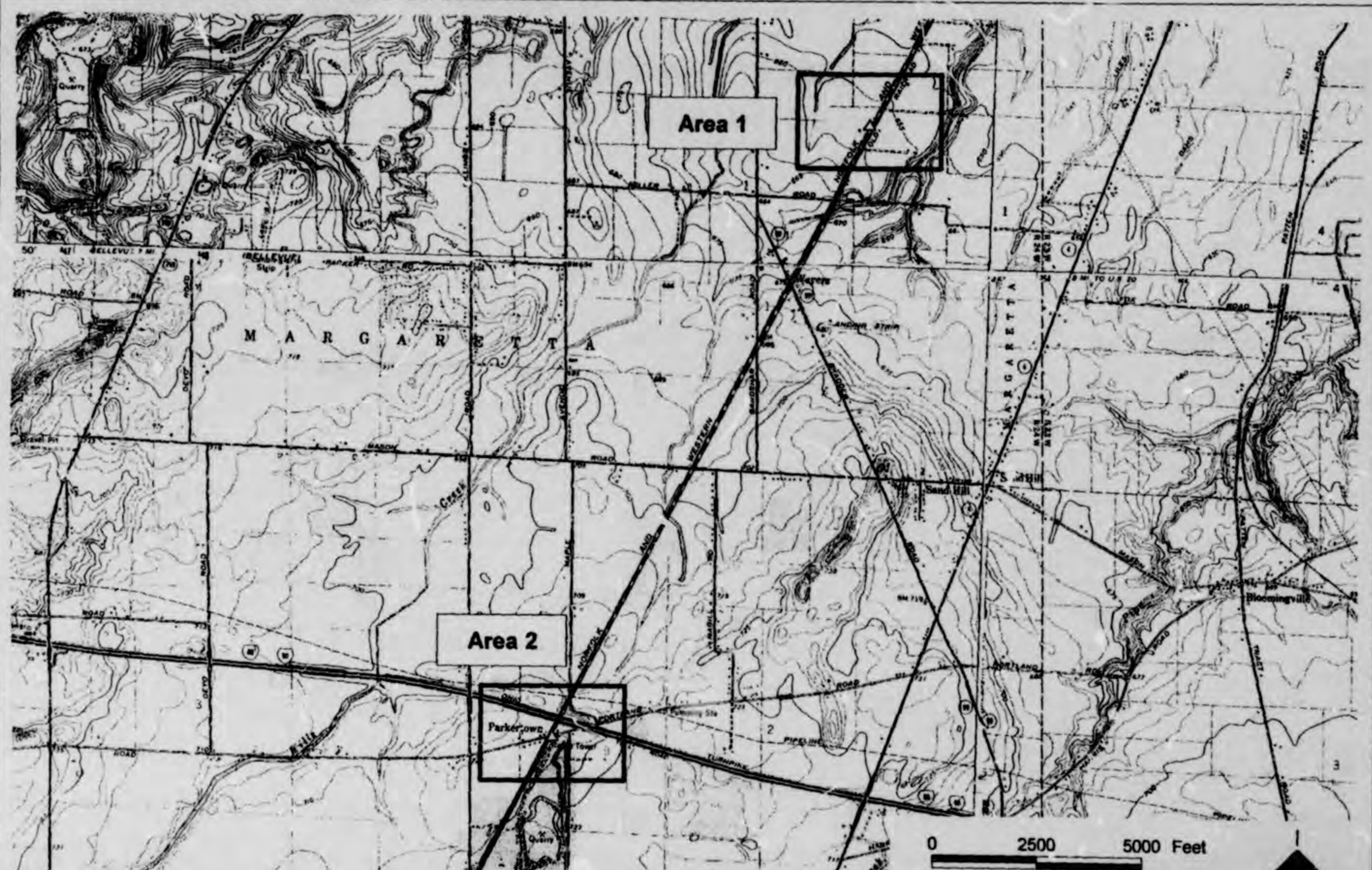

FIGURE 112 Key Map

BELLEVUE-TO-SANDUSKY DOCK, N-085 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

FIGURE 113 Area 1

BELLEVUE-TO-SANDUSKY DOCK, N-085 Receptors Within 70dBA Ldn Wayside Noise Contour

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FIGURE 114 Area 2

BELLEVUE-TO-SANDUSKY DOCK, N-085 Receptors Within 70dBA Ldn Wayside Noise Contour

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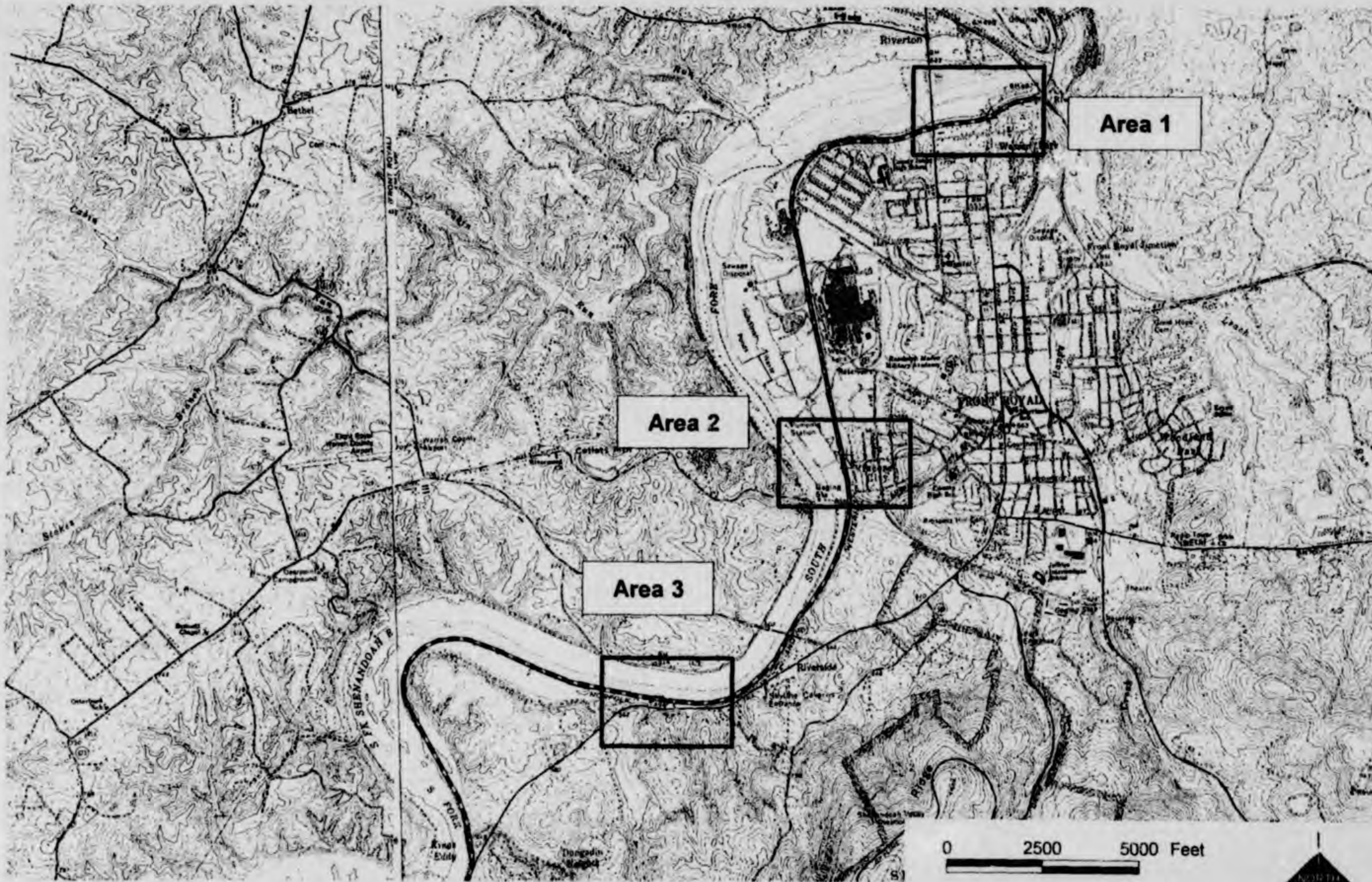

FIGURE 115A Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

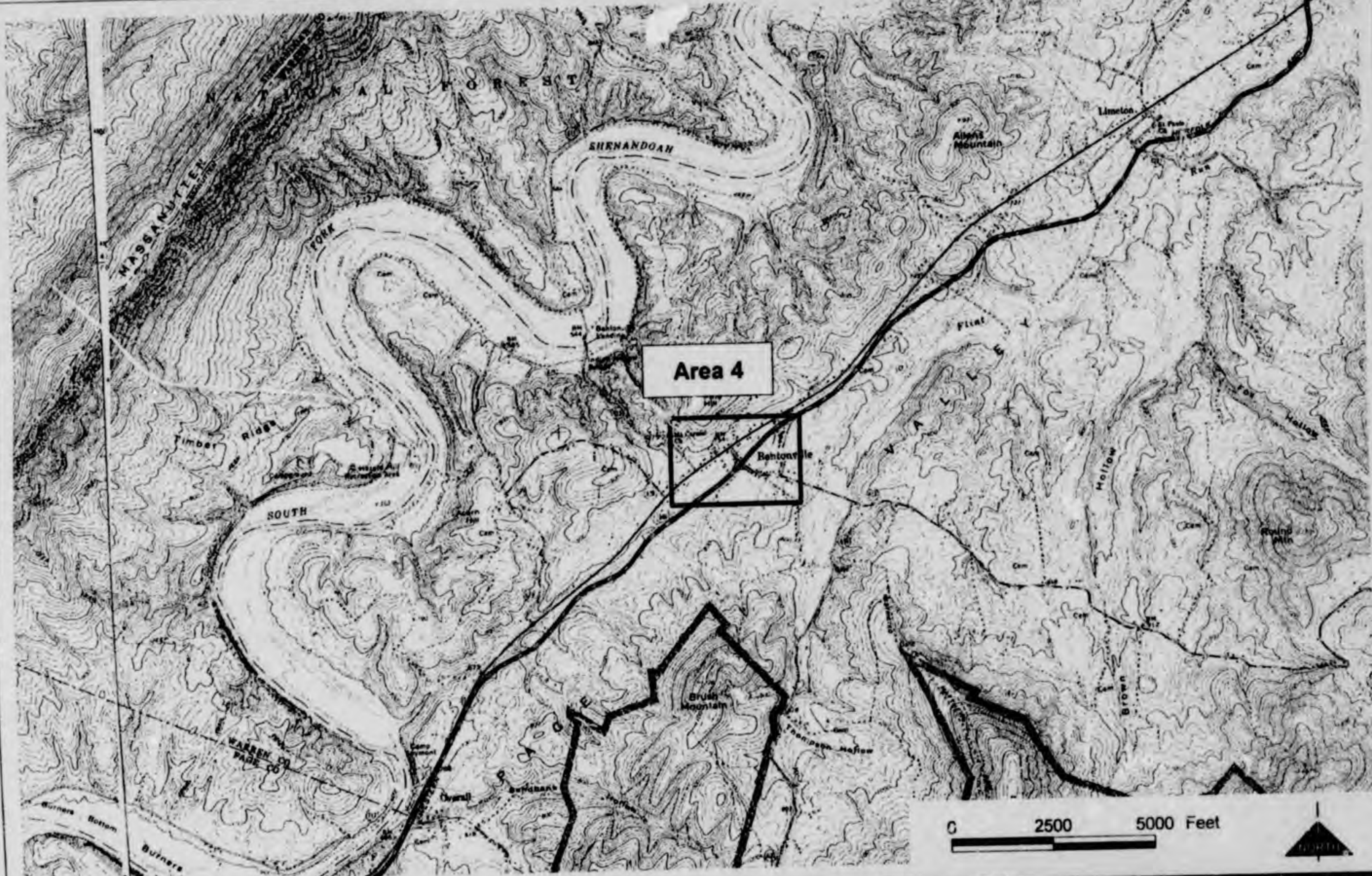

FIGURE 115B Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

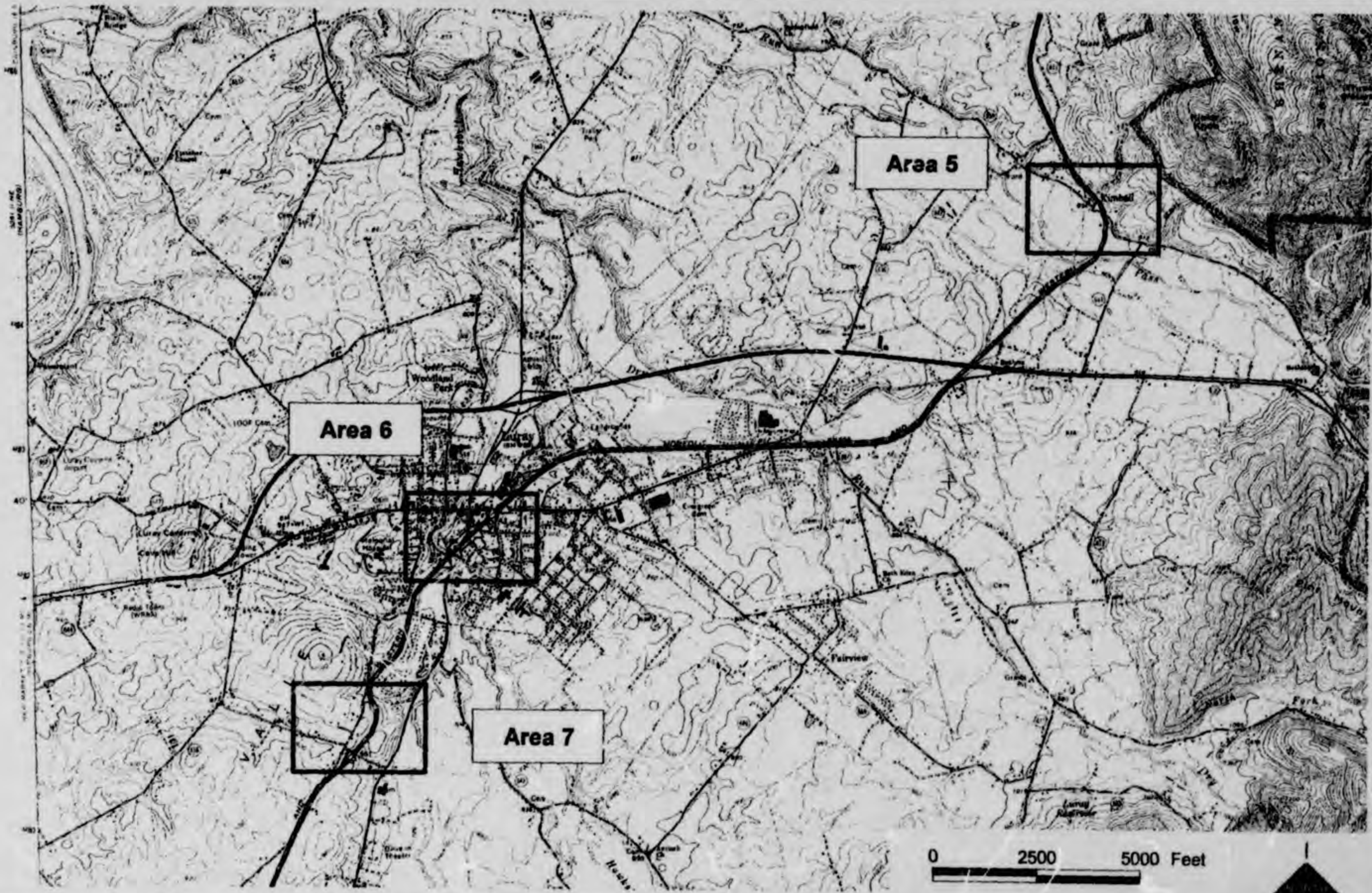

FIGURE 115C Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

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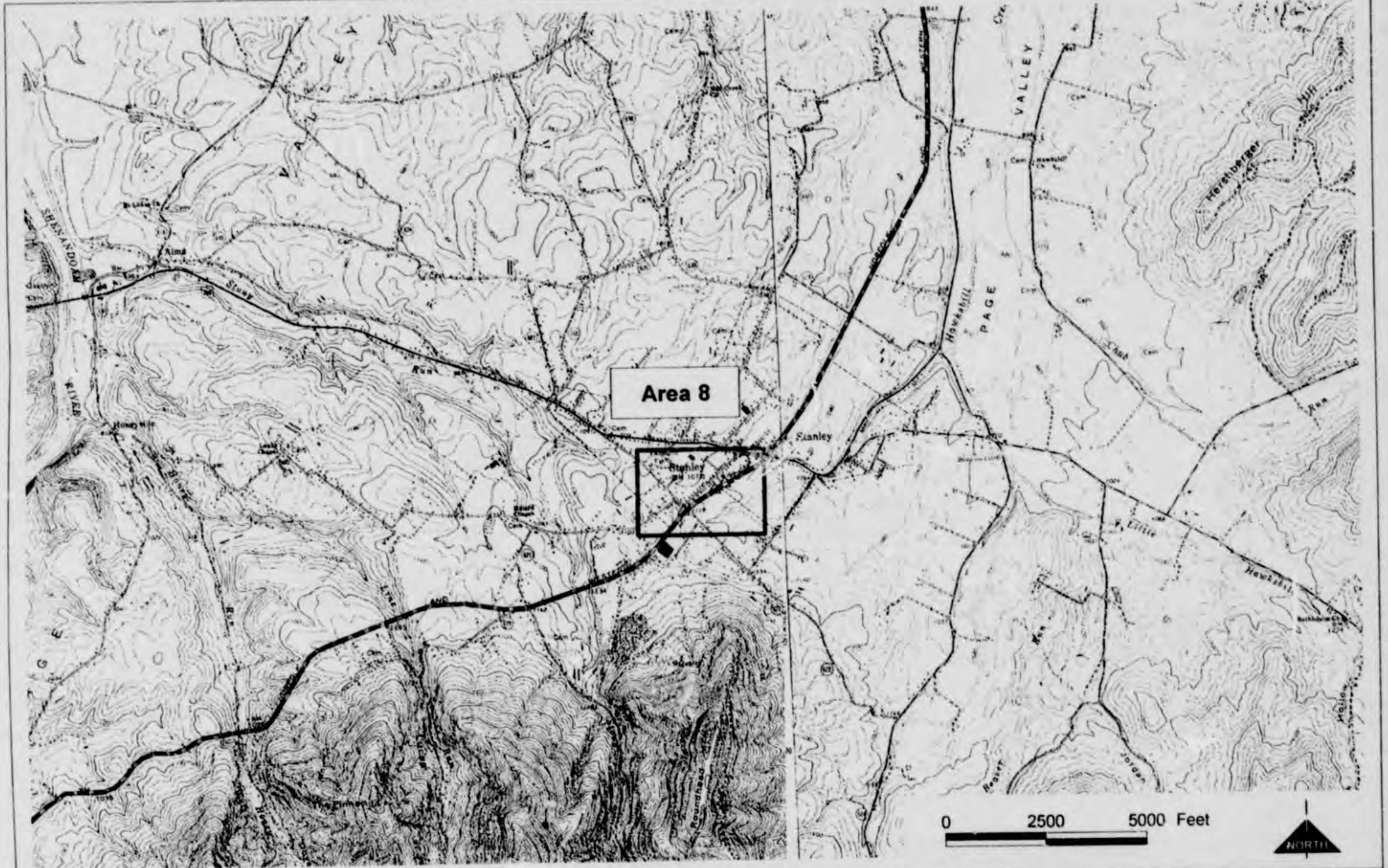

FIGURE 115D Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

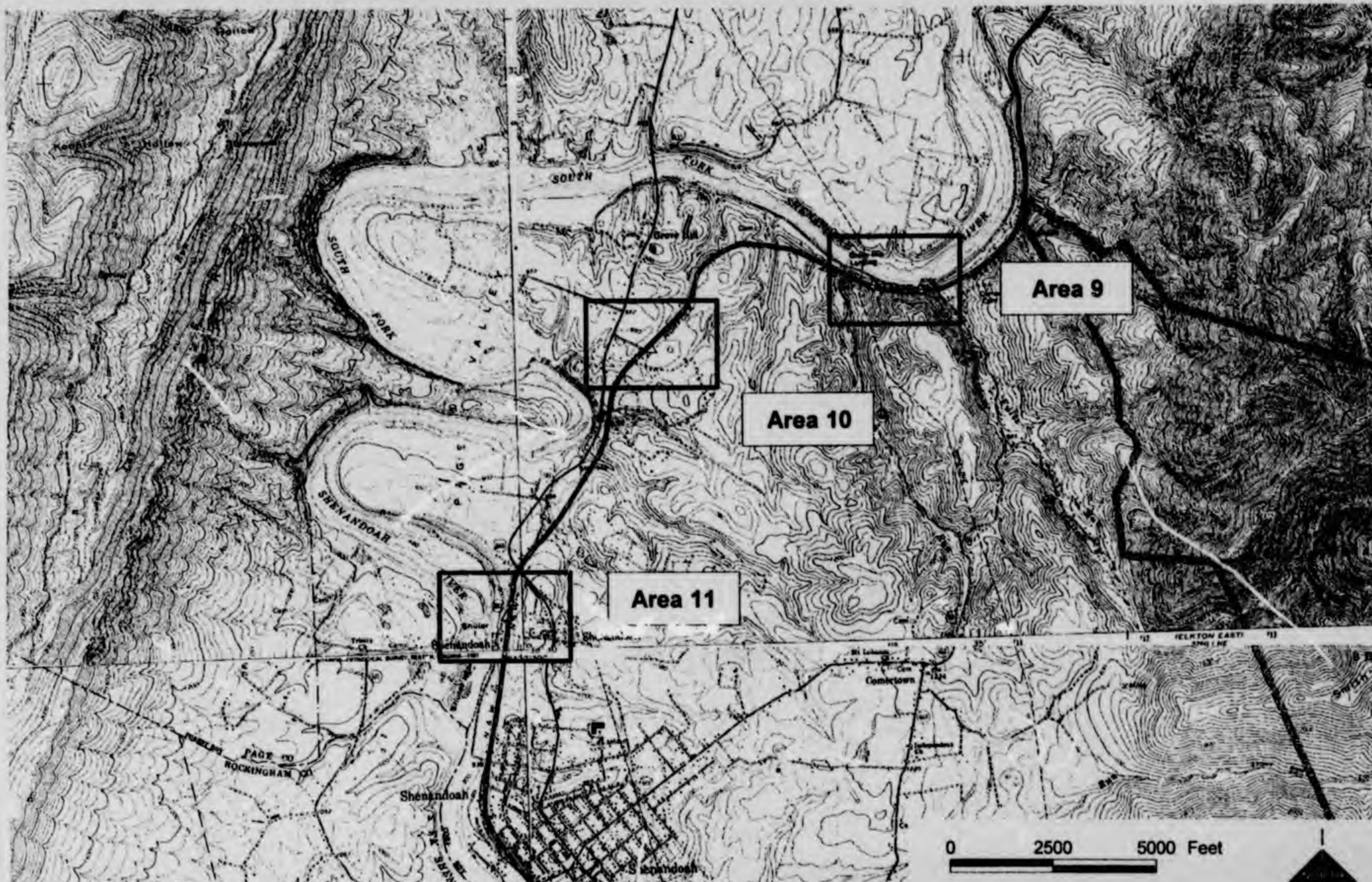

FIGURE 115E Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

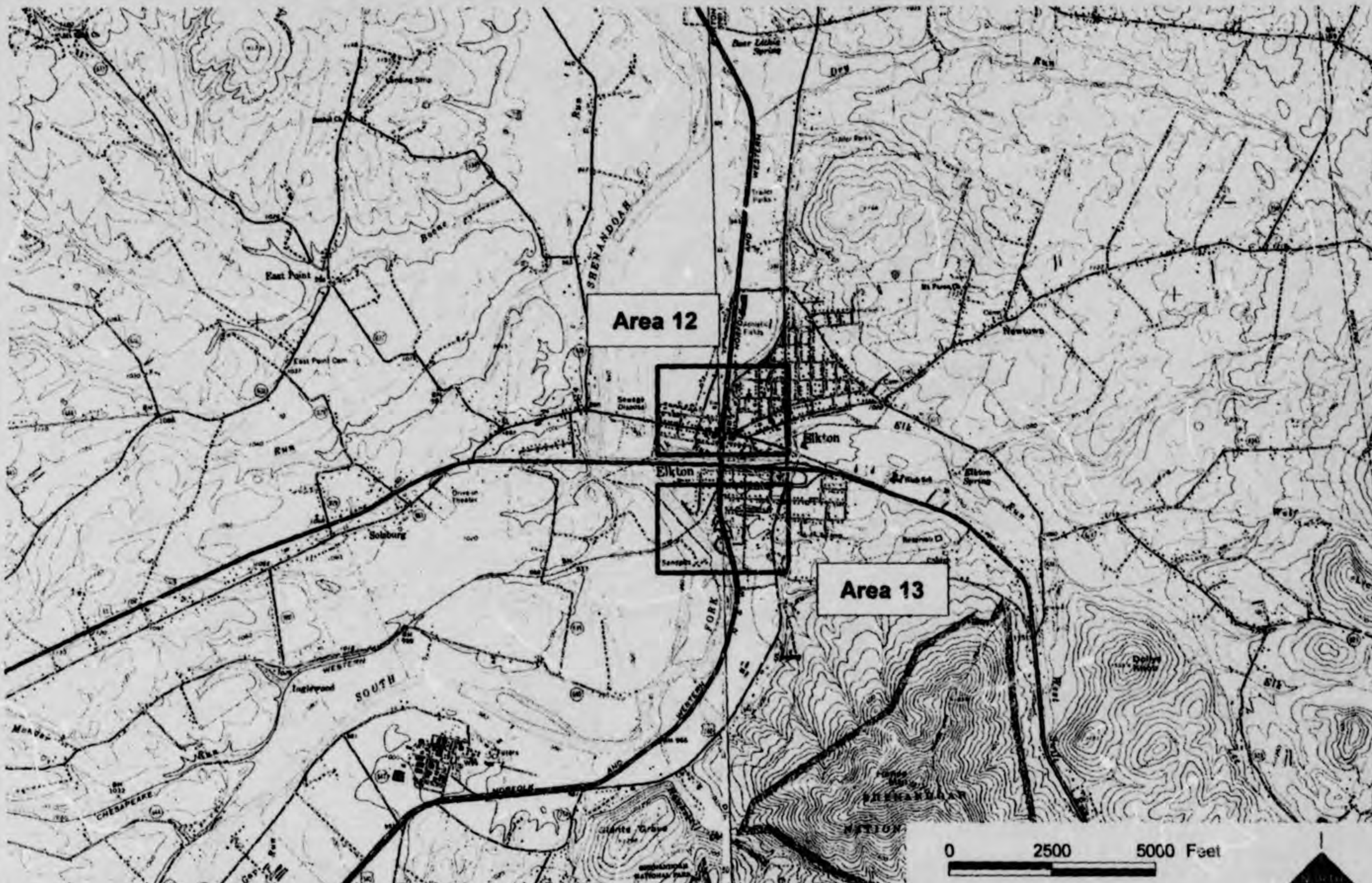

FIGURE 115F Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

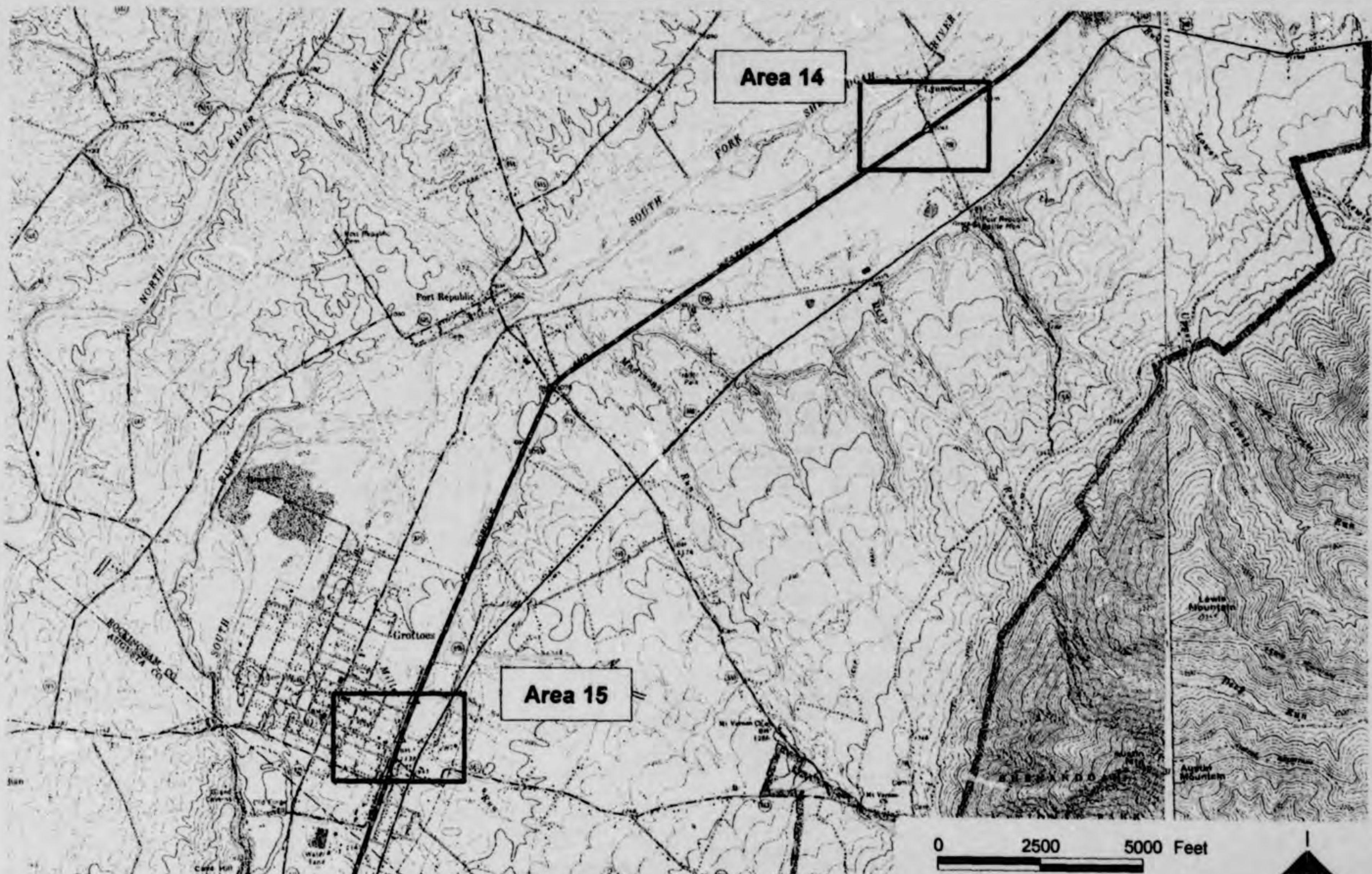

FIGURE 115G Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

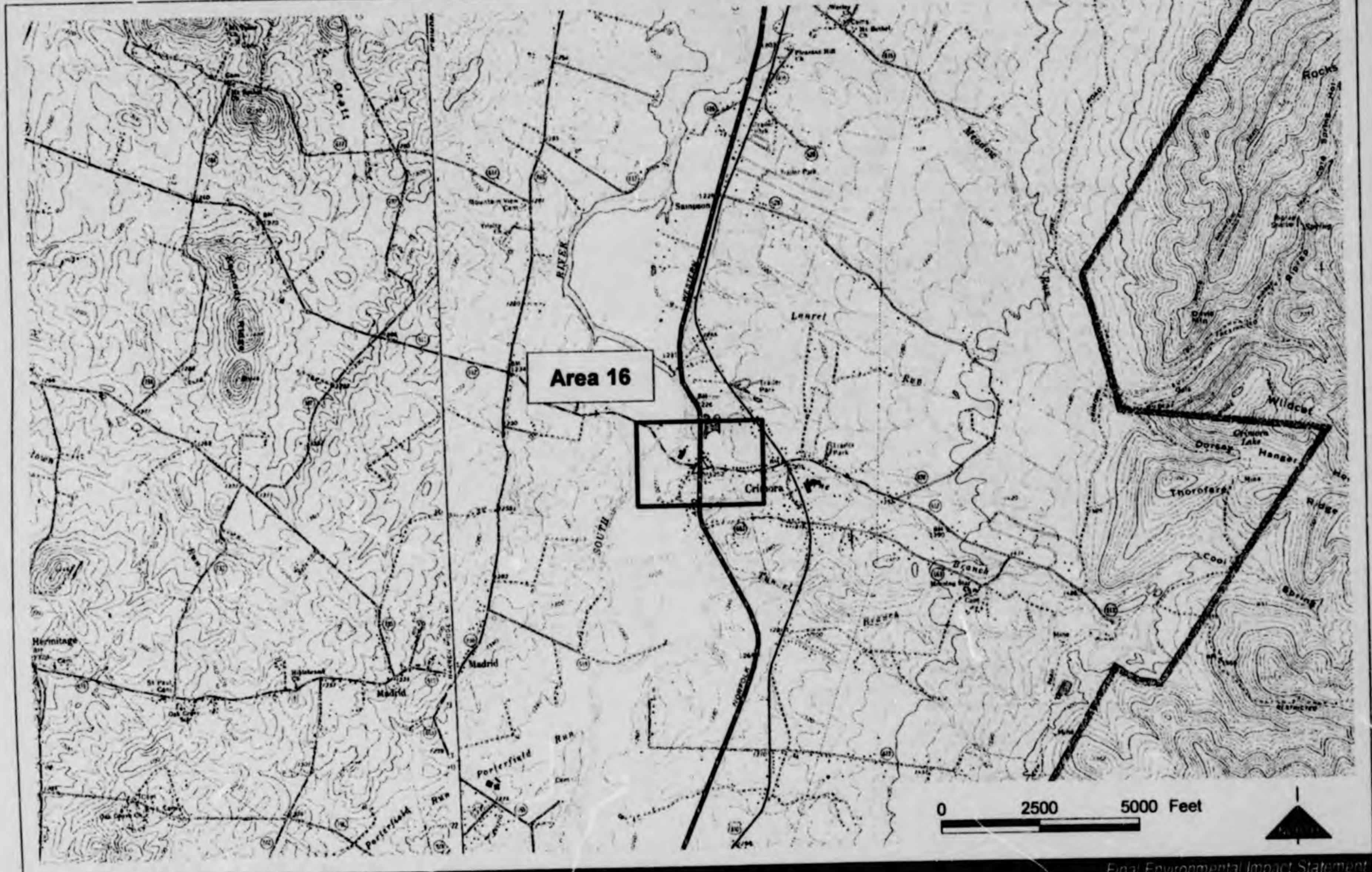

FIGURE 115H Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

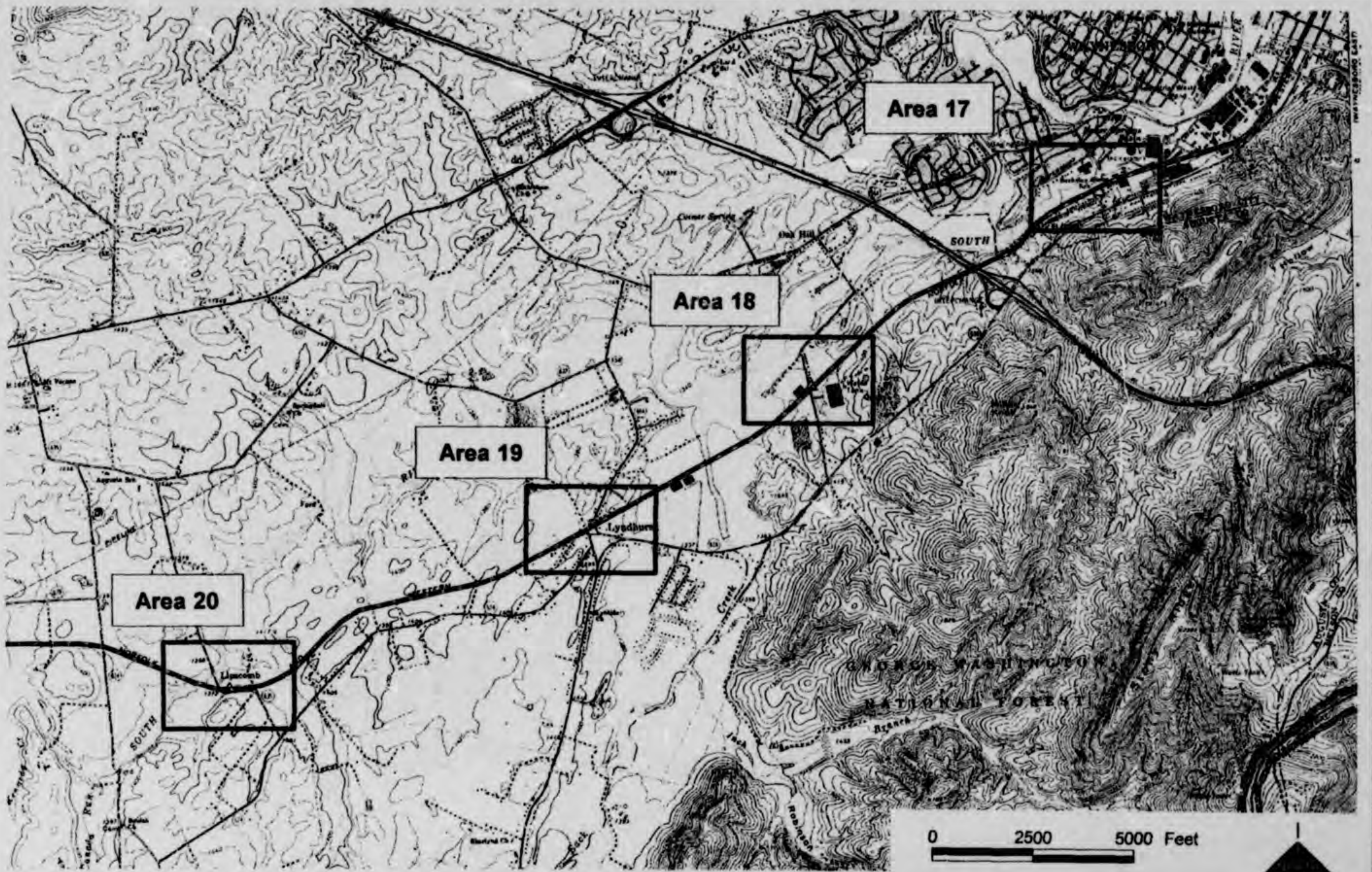

FIGURE 115I Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

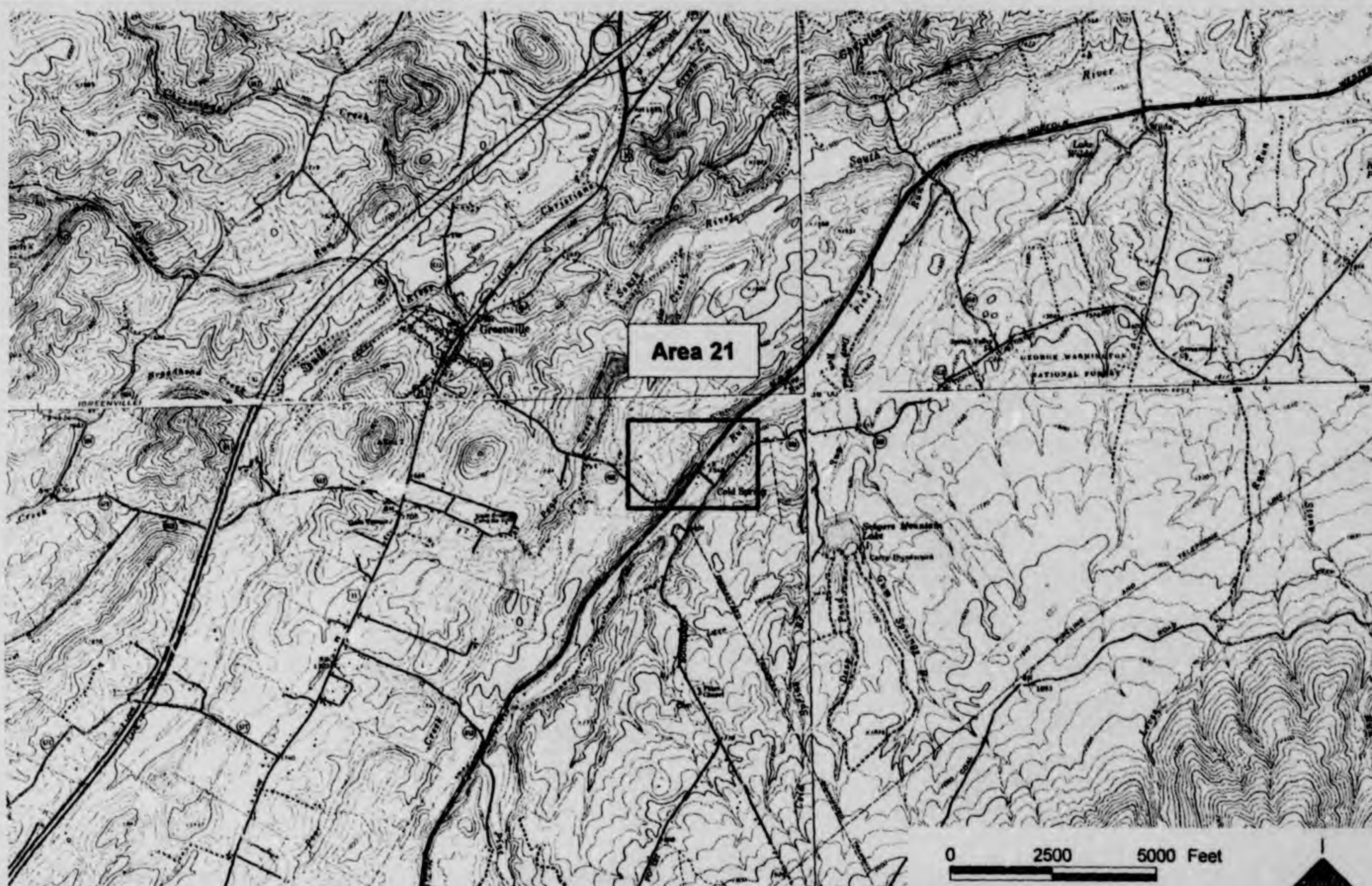

FIGURE 115J Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

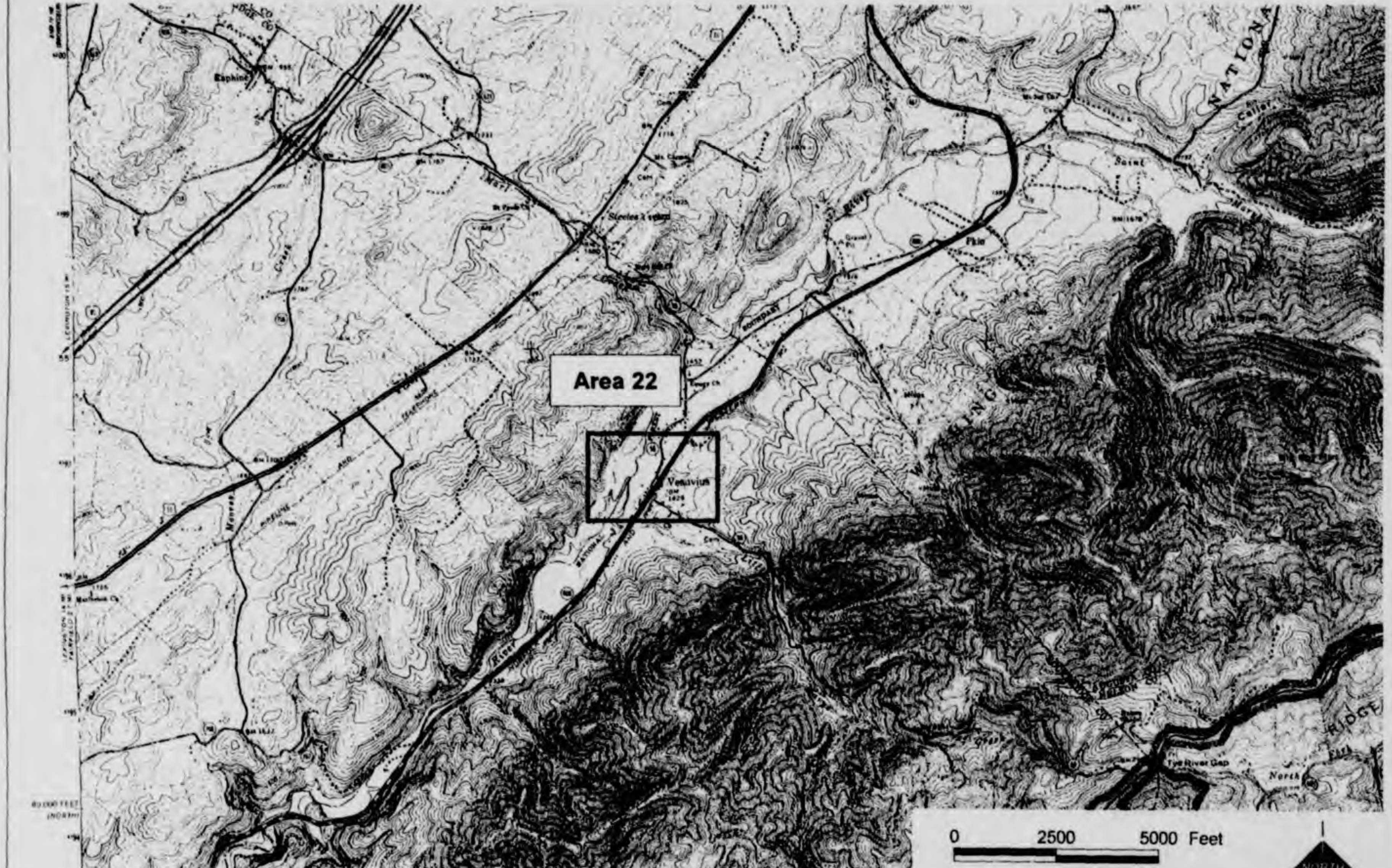

FIGURE 115K Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

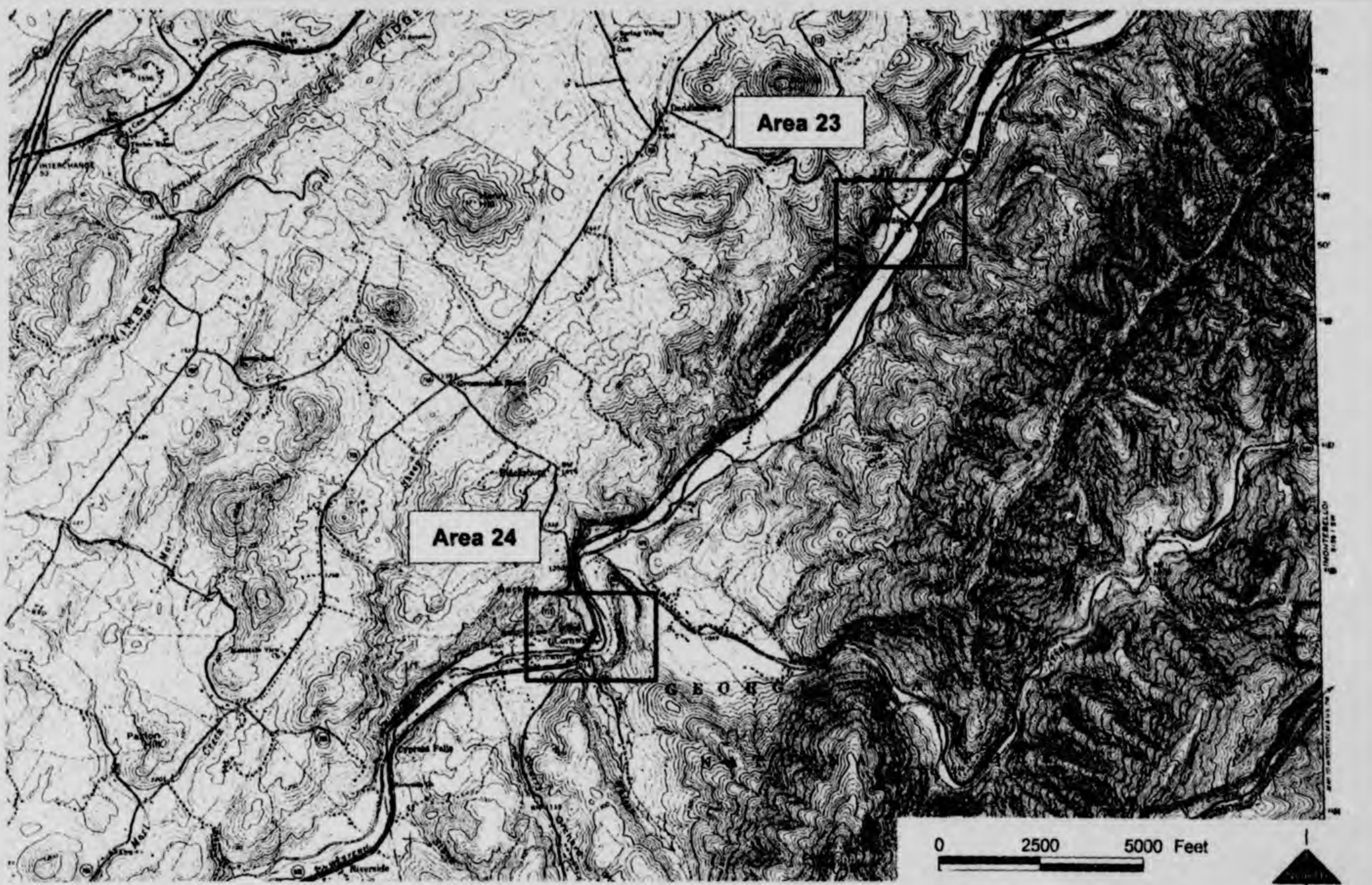

FIGURE 115L Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

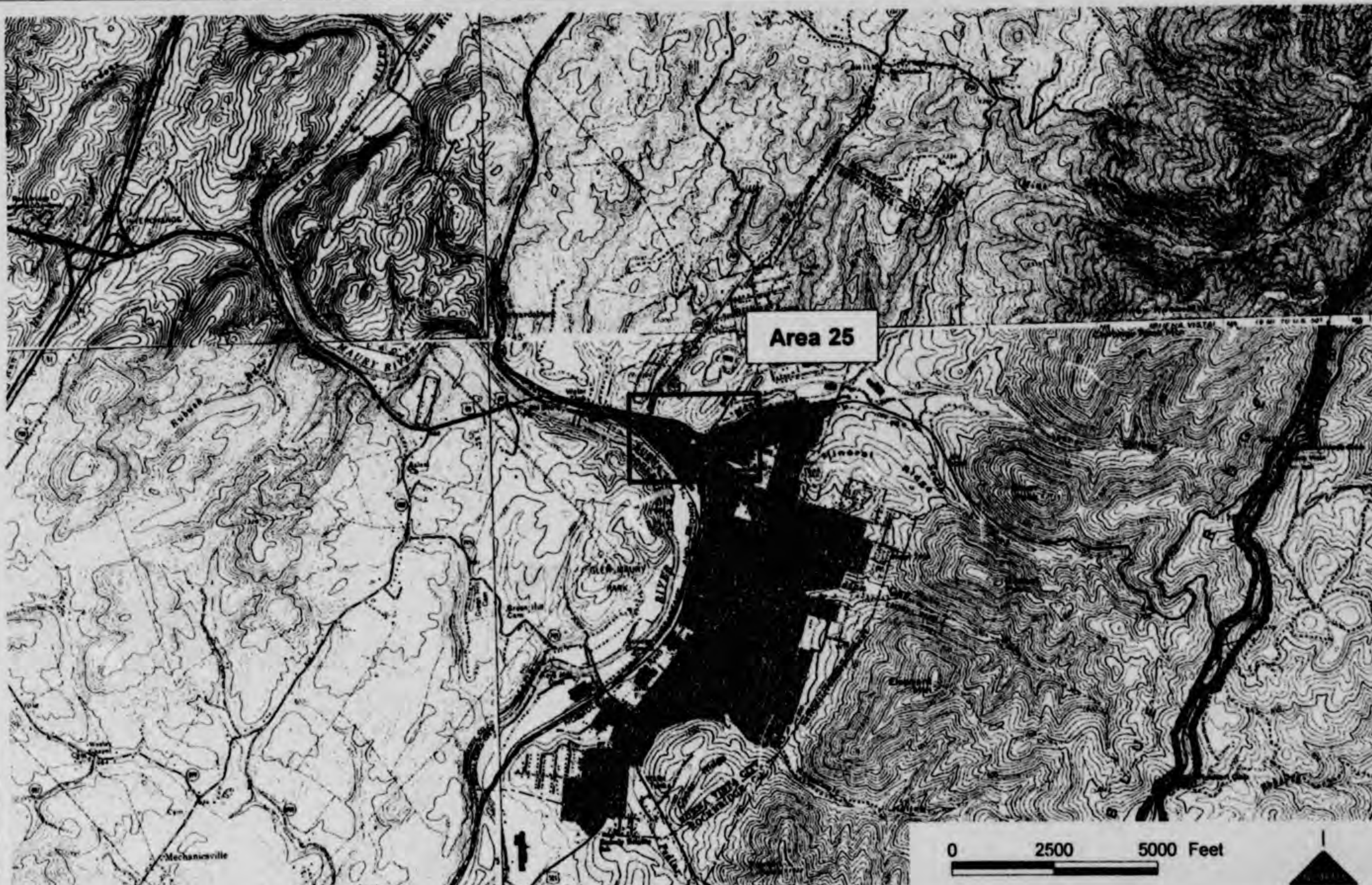

FIGURE 115M Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

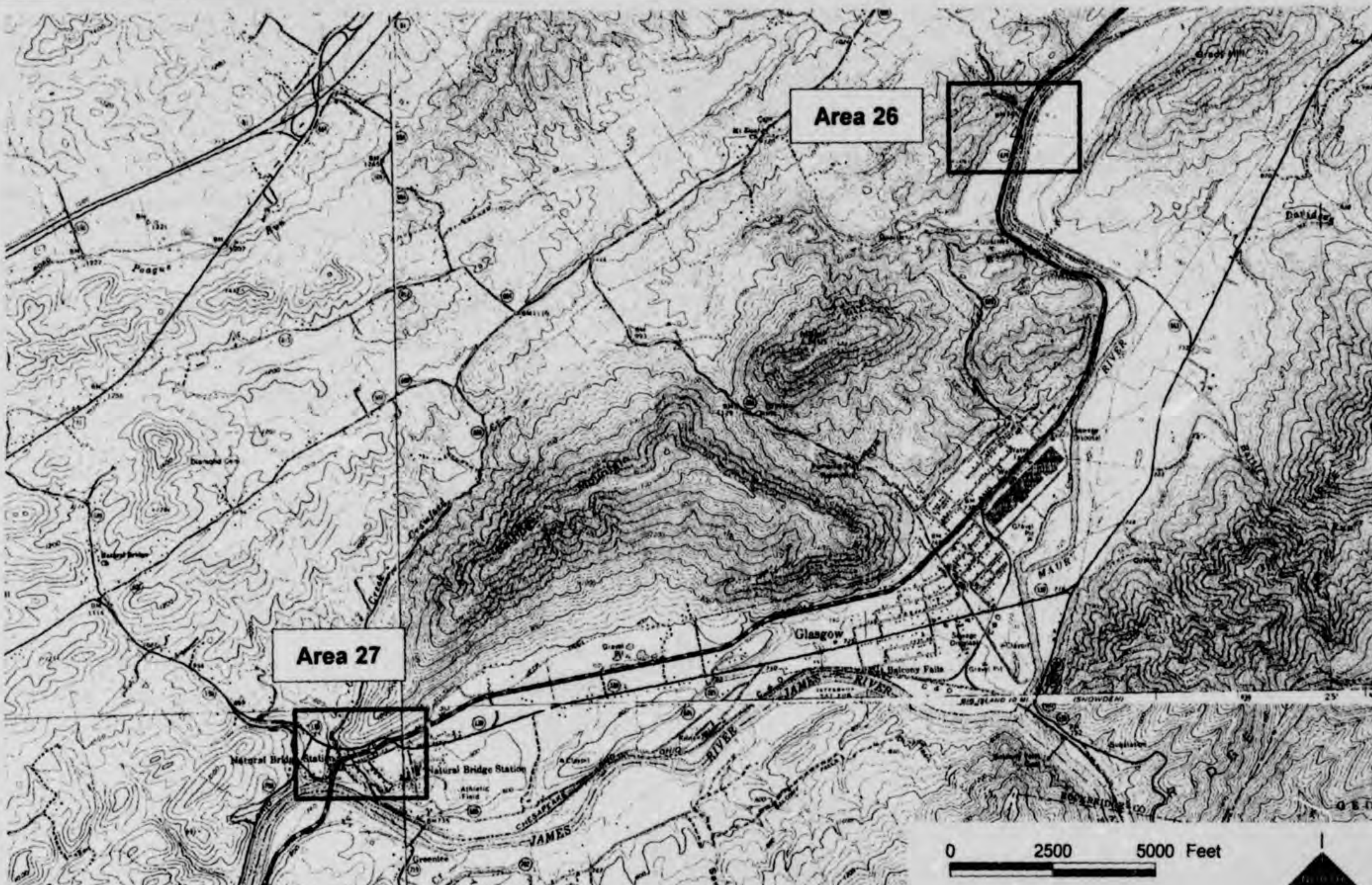

FIGURE 115N Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

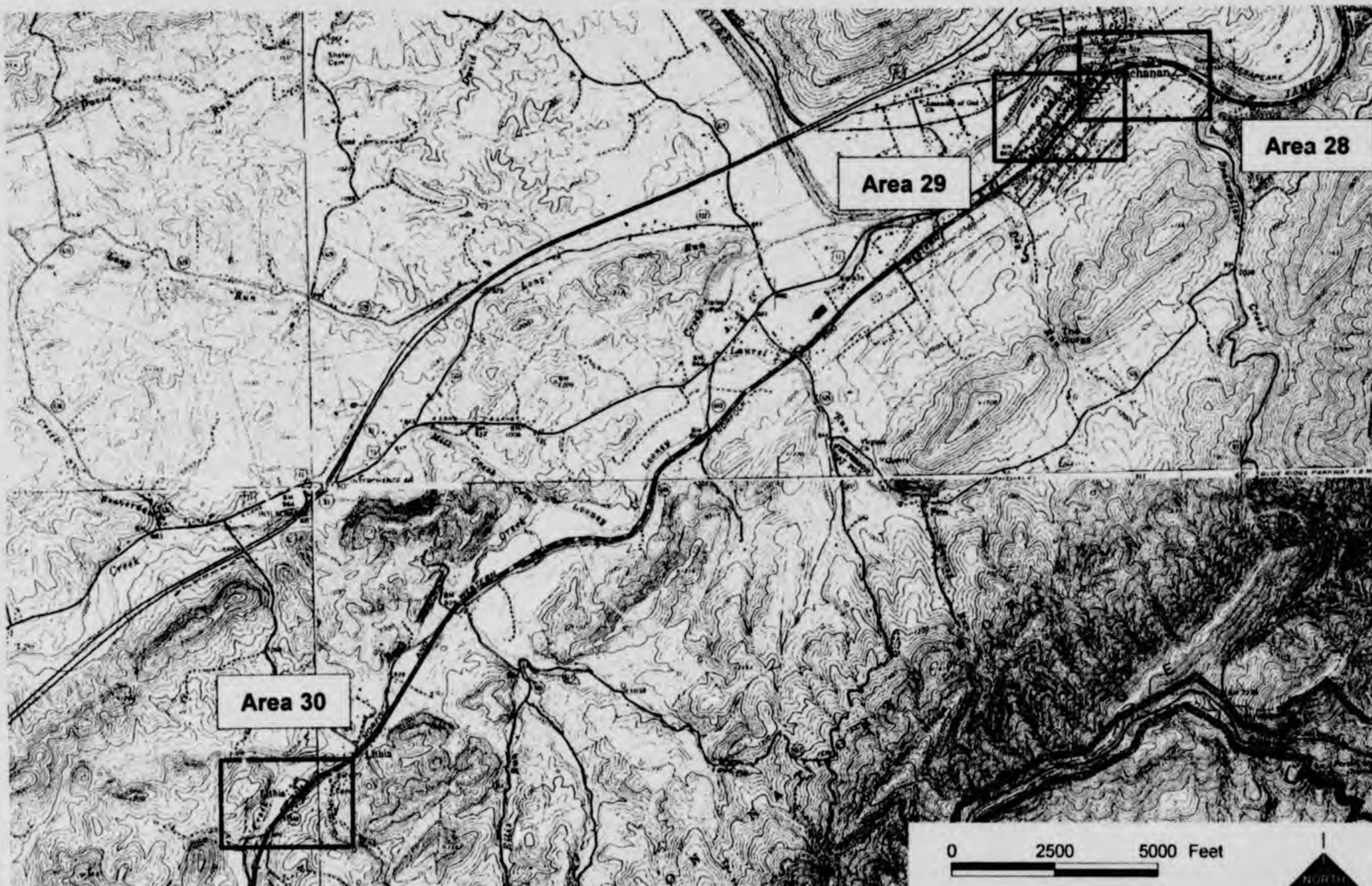

FIGURE 115O Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

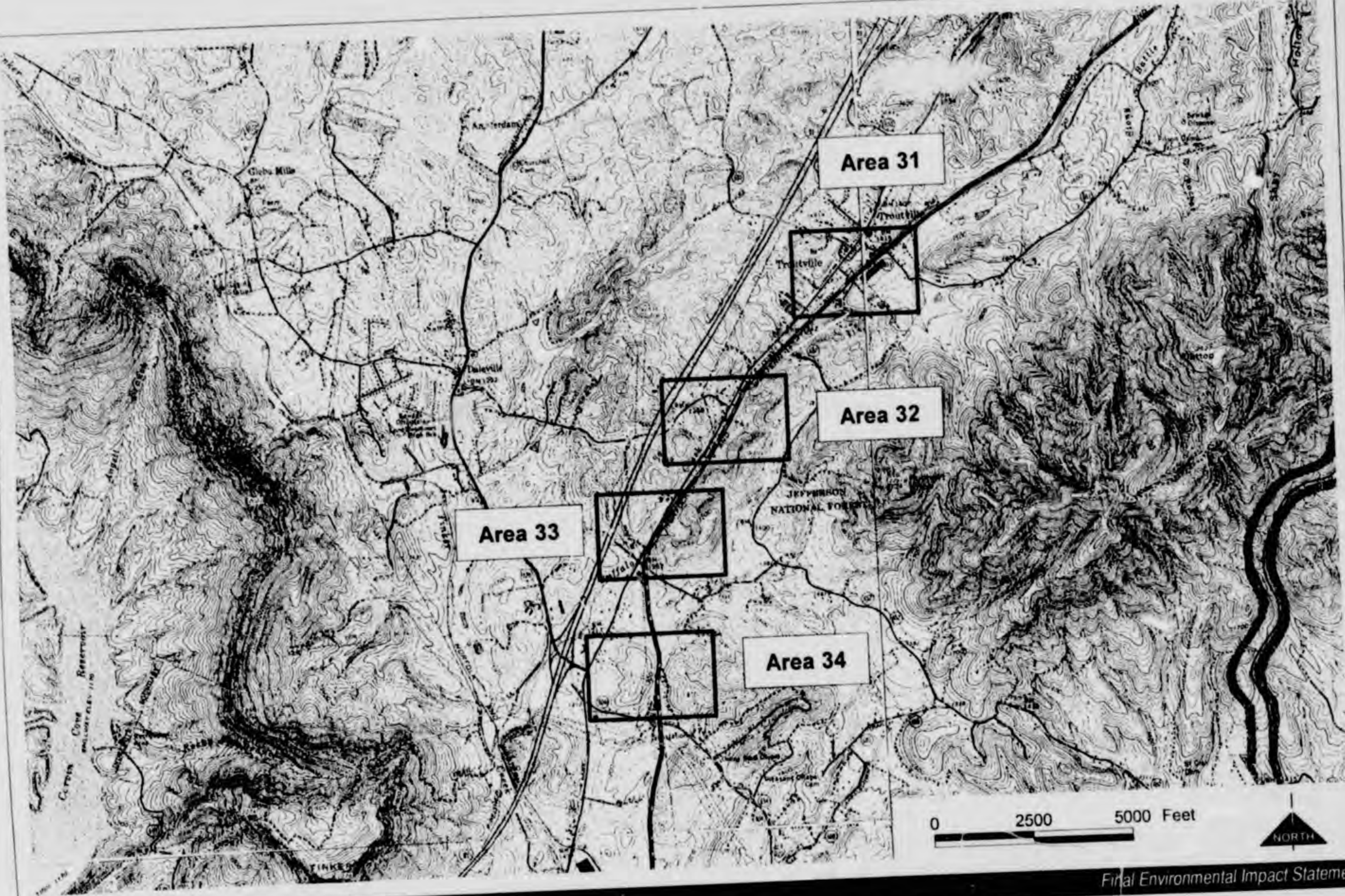

FIGURE 115P Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

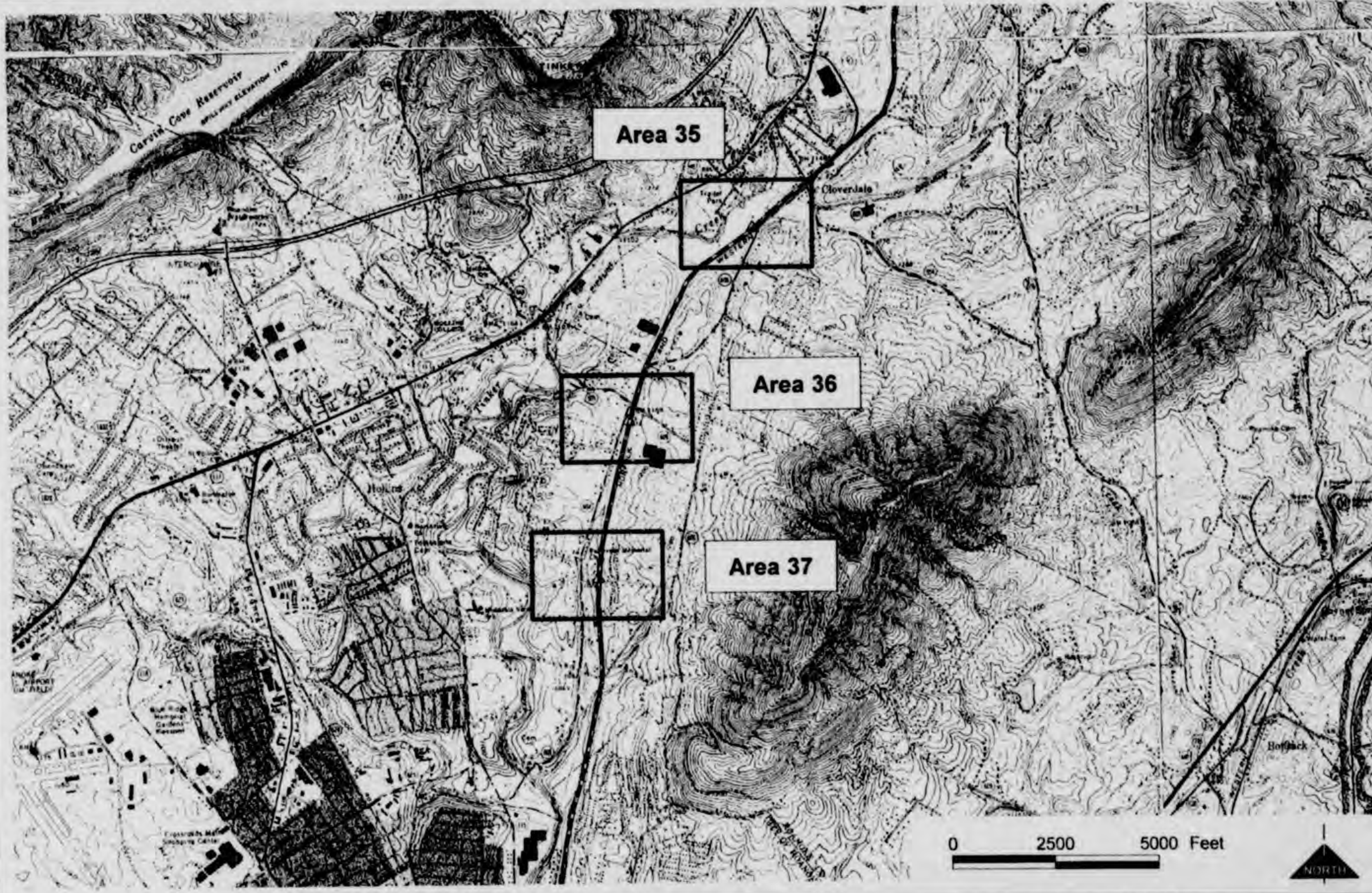

FIGURE 115Q Key Map

RIVERTON JCT.-TO-ROANOKE, N-100 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

FIGURE 116 Area 1

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 117 Area 2

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

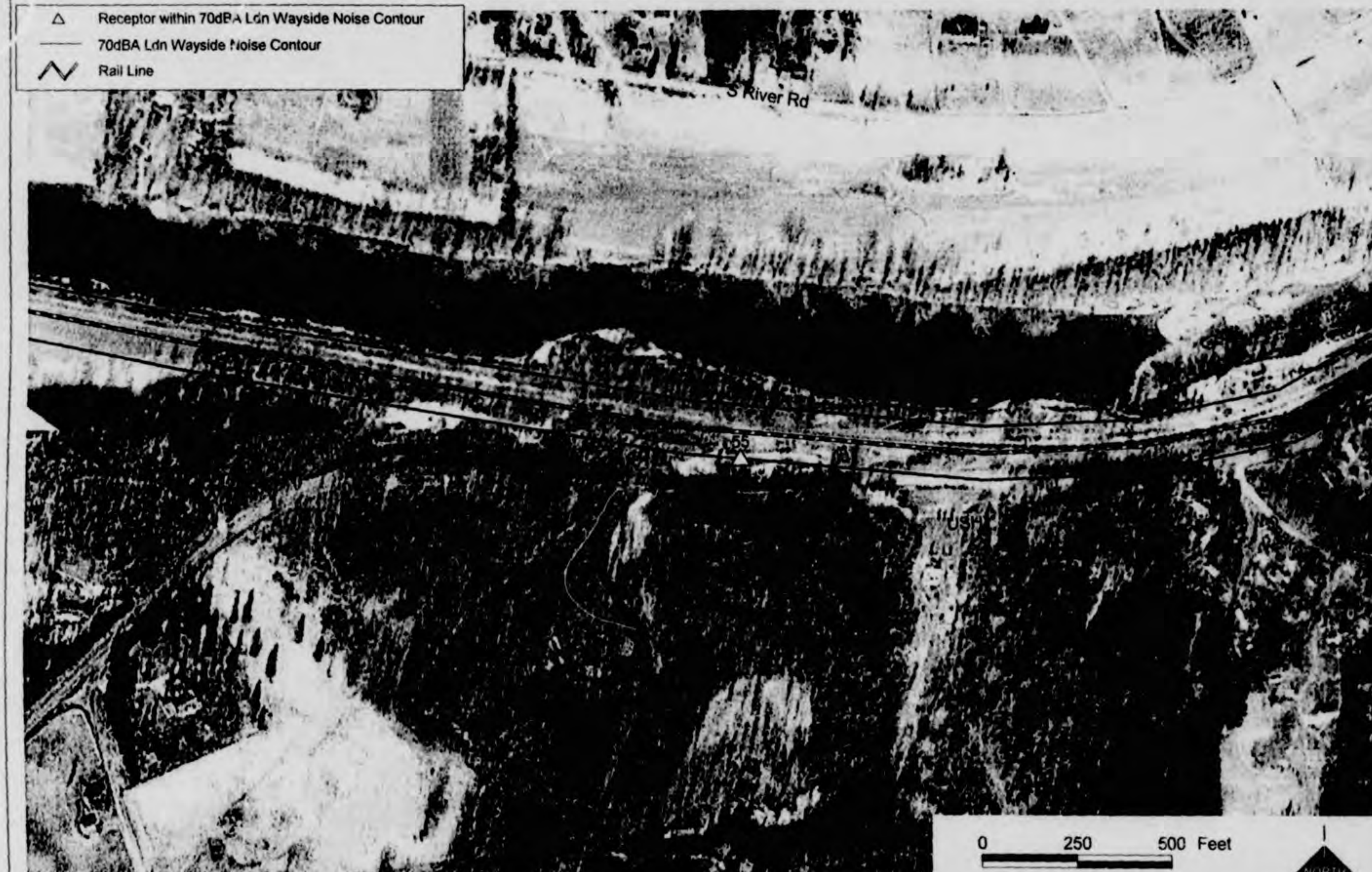

FIGURE 118 Area 3

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

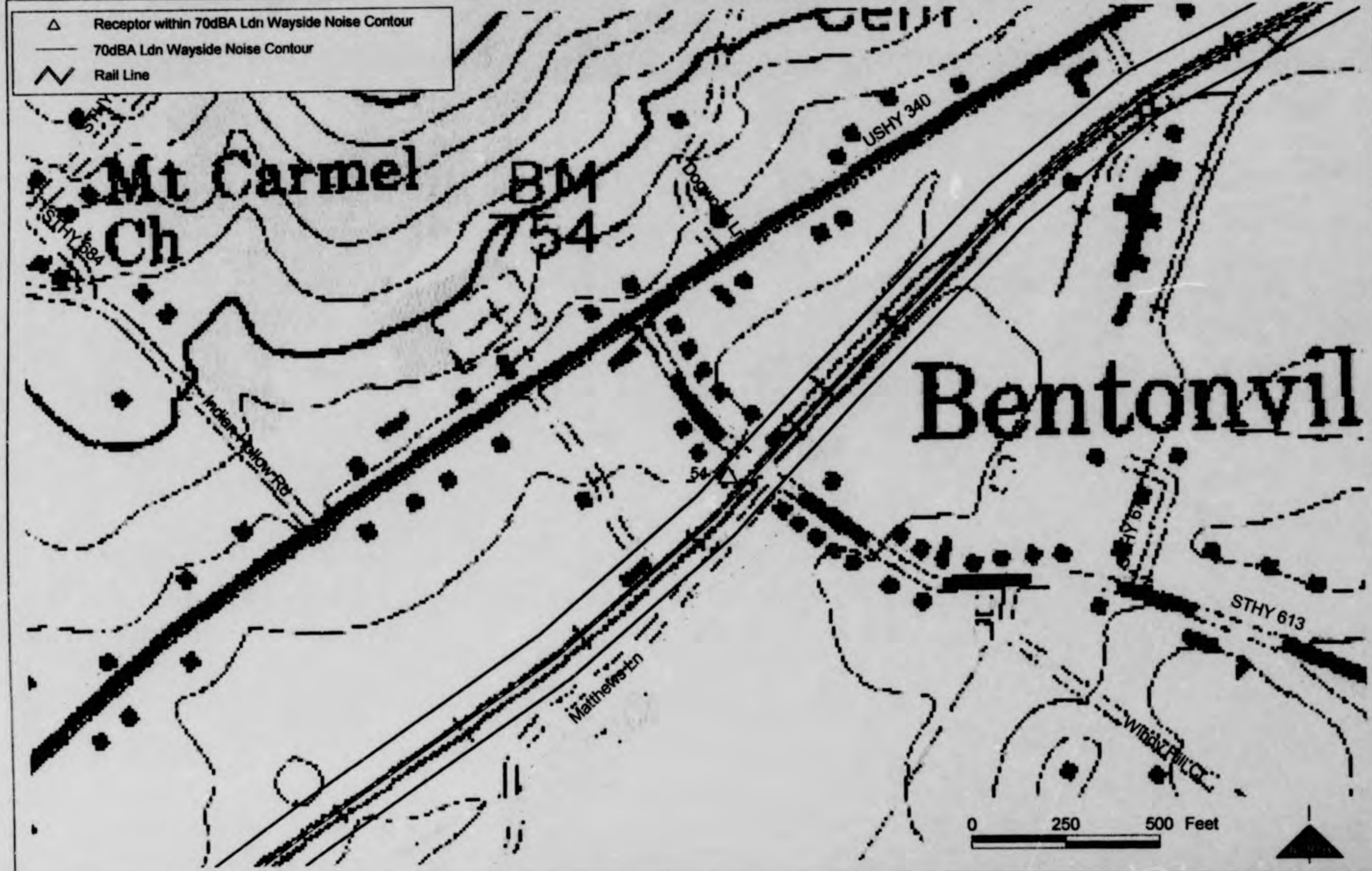

FIGURE 119 Area 4

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

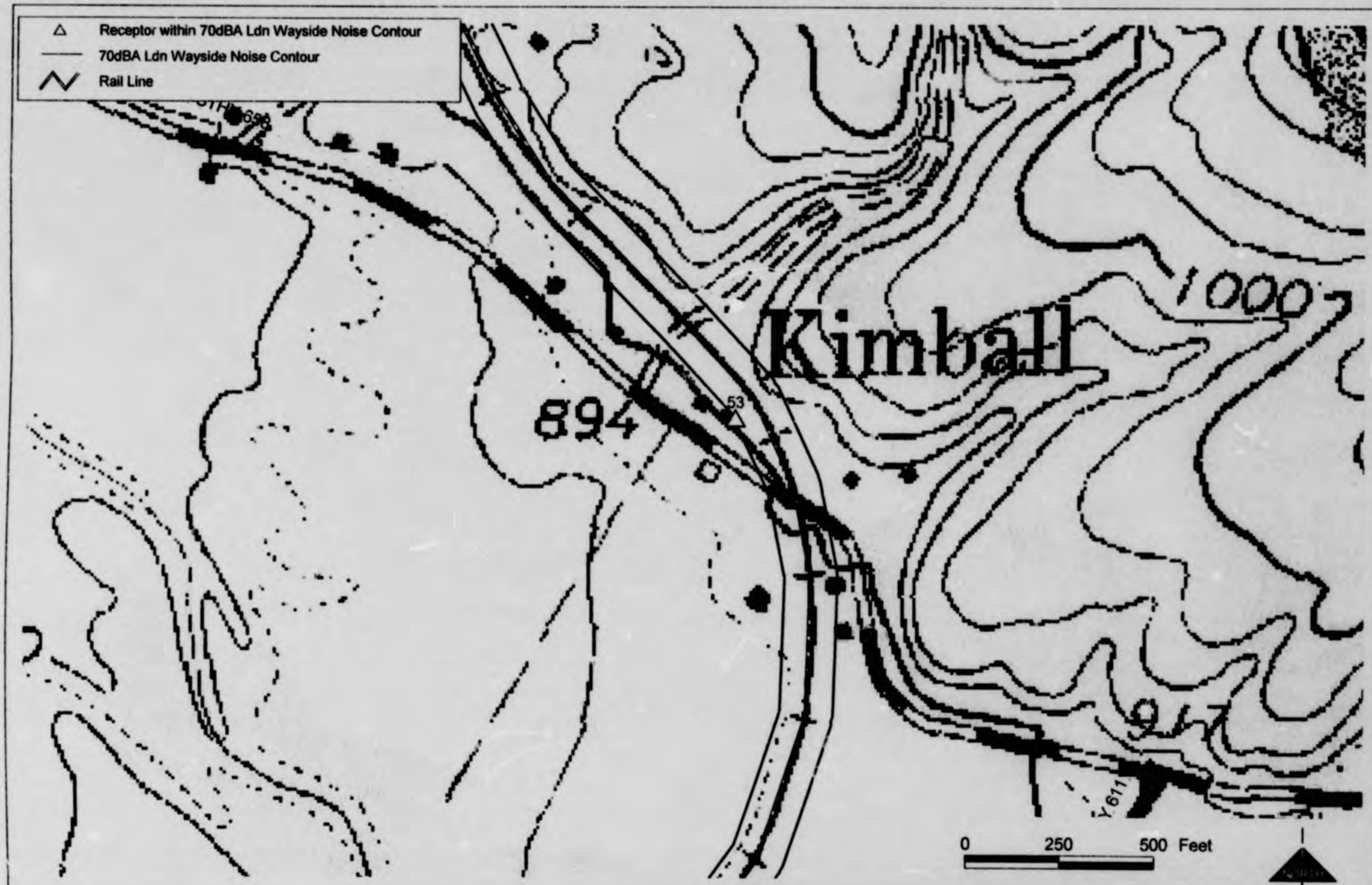

FIGURE 120 Area 5

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

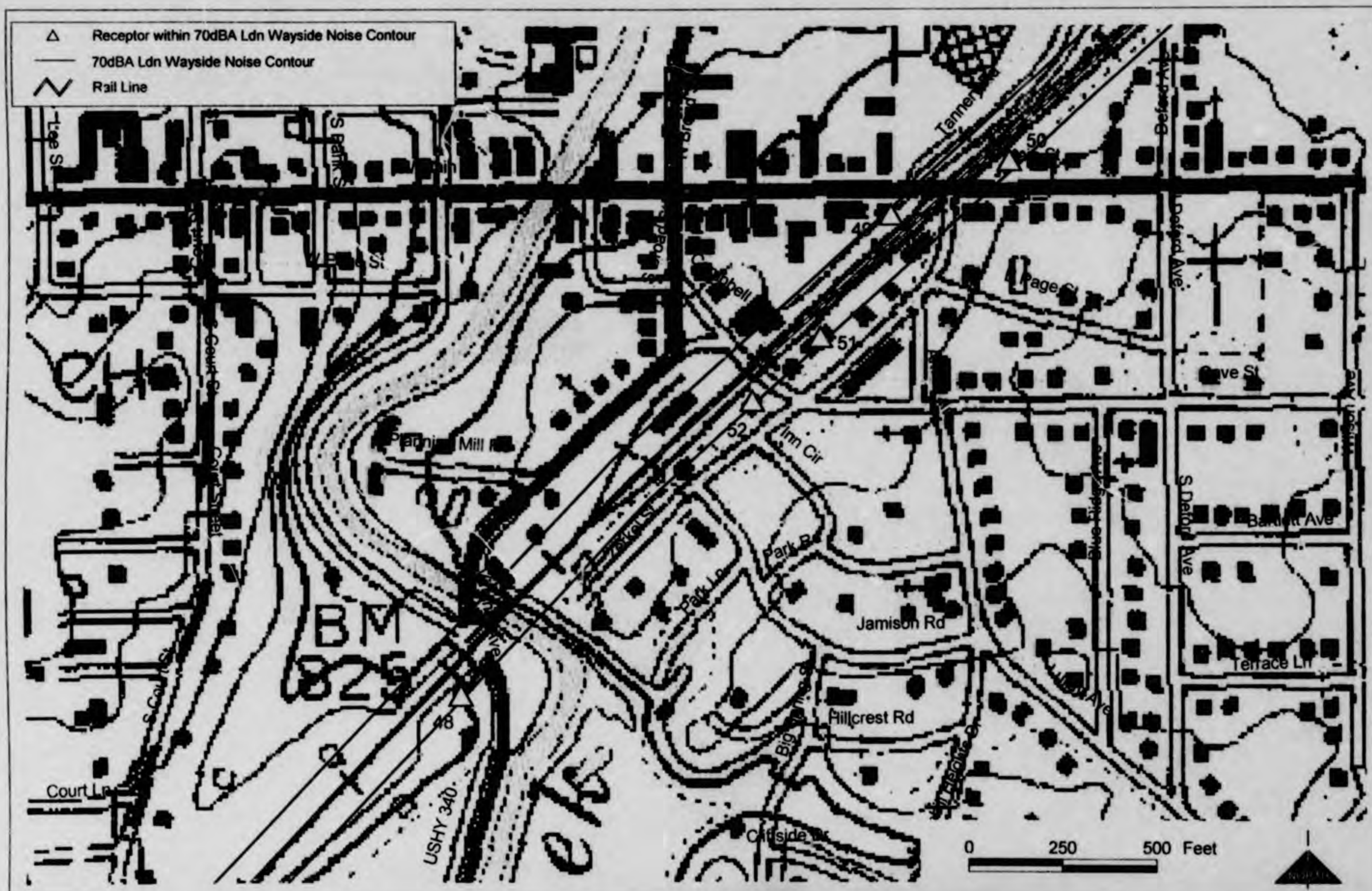

FIGURE 121 Area 6

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

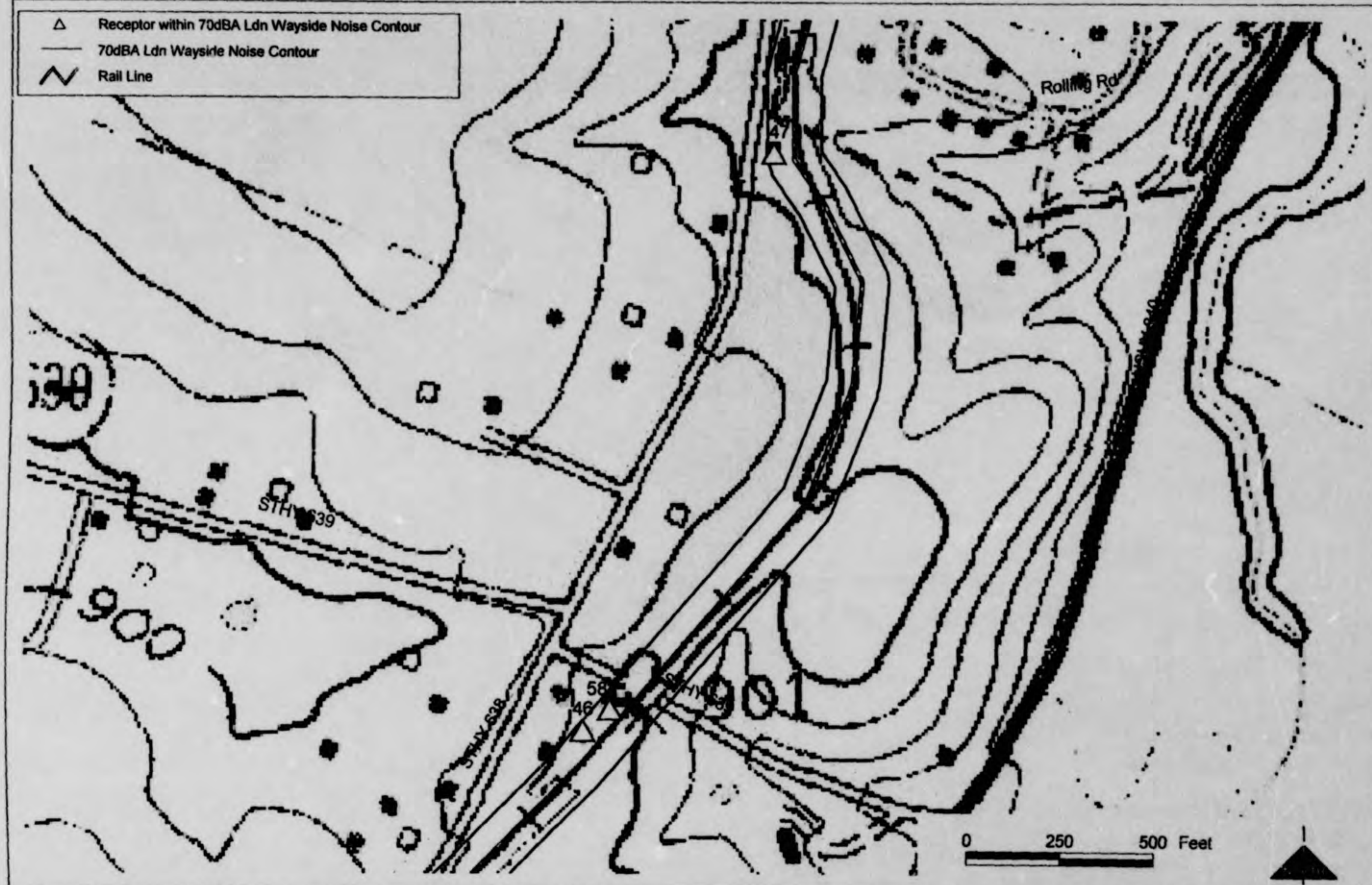

FIGURE 122 Area 7

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

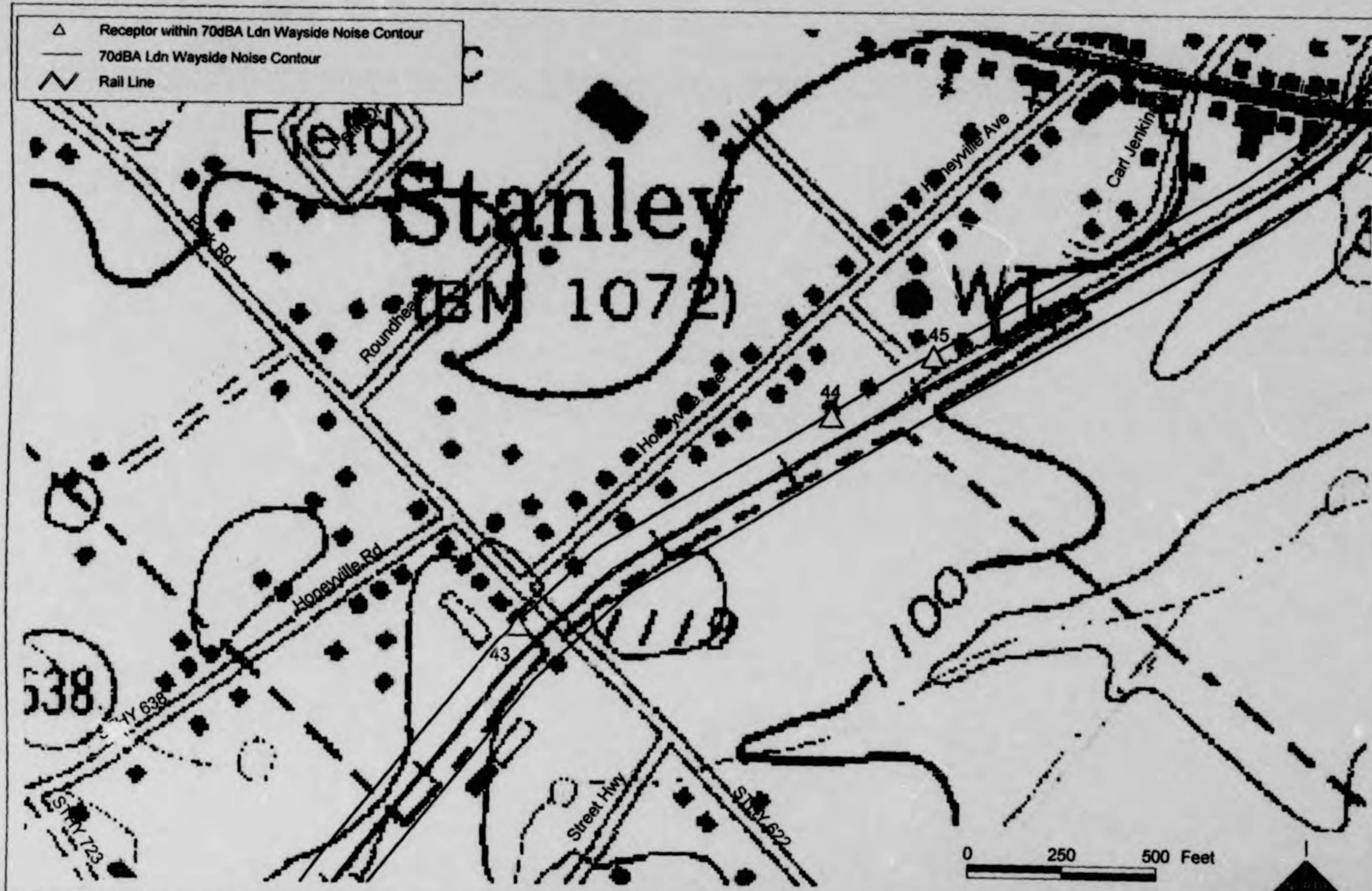

FIGURE 123 Area 8

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

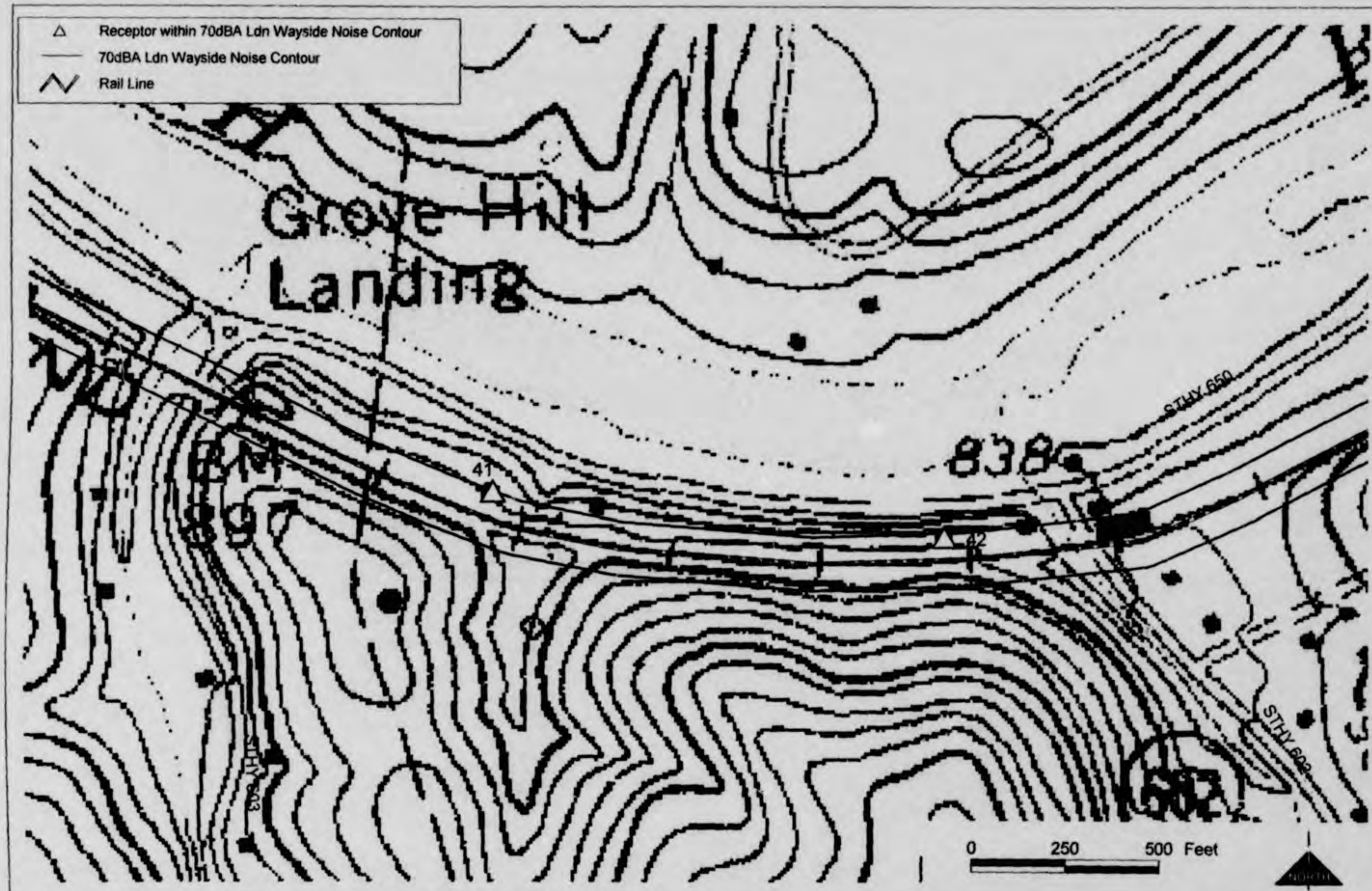

FIGURE 124 Area 9

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

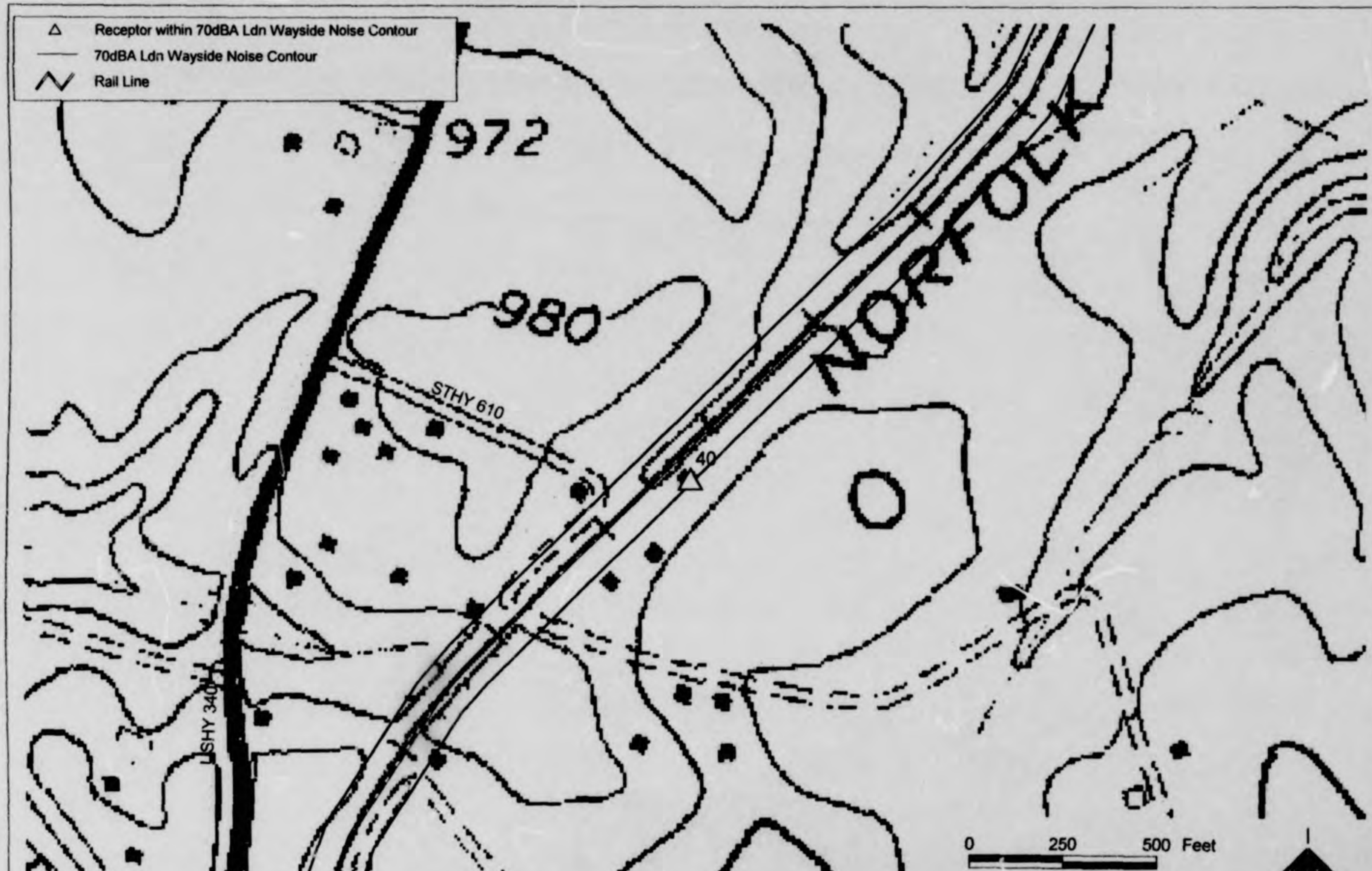

FIGURE 125 Area 10

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

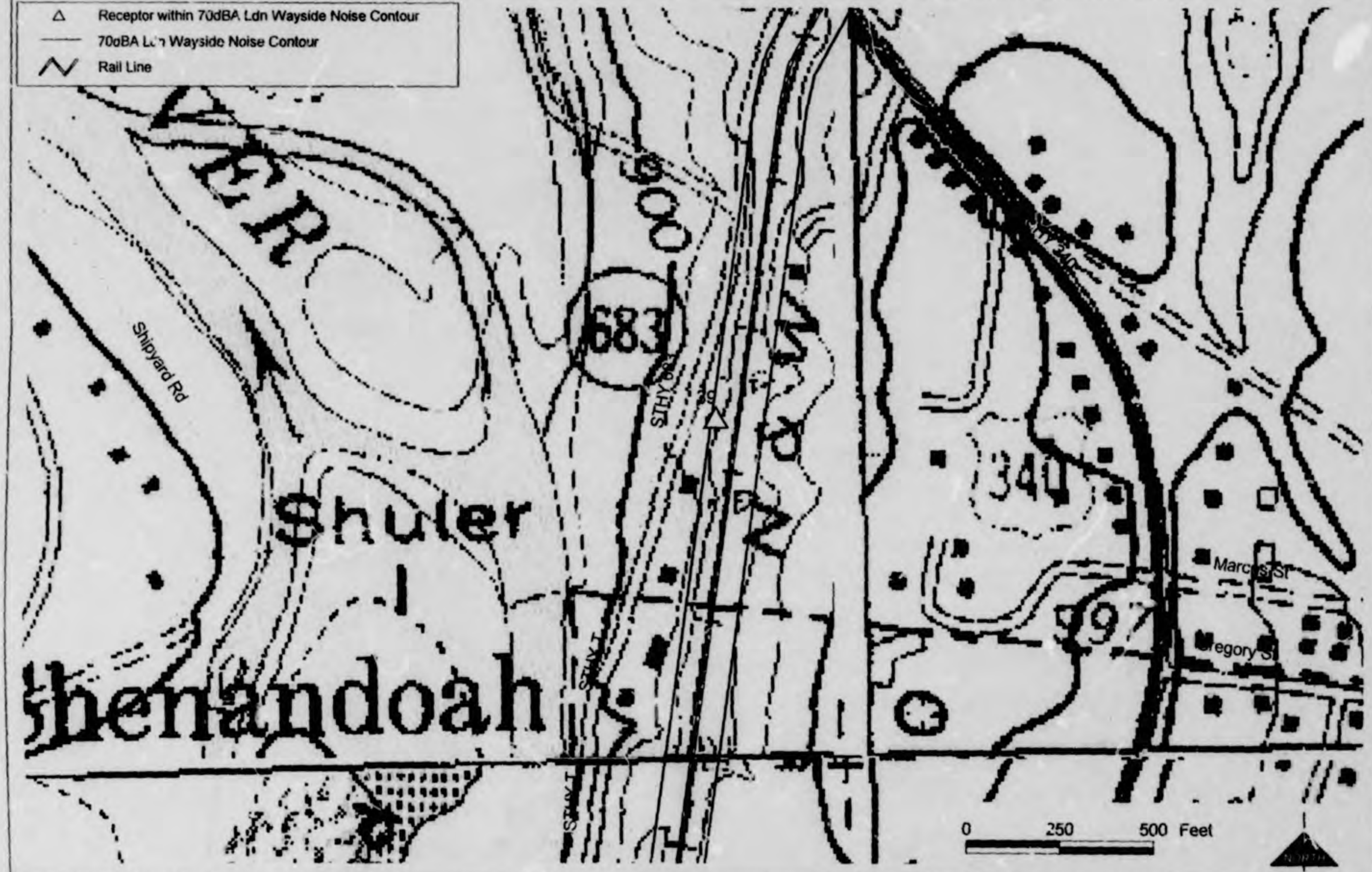

FIGURE 126 Area 11

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

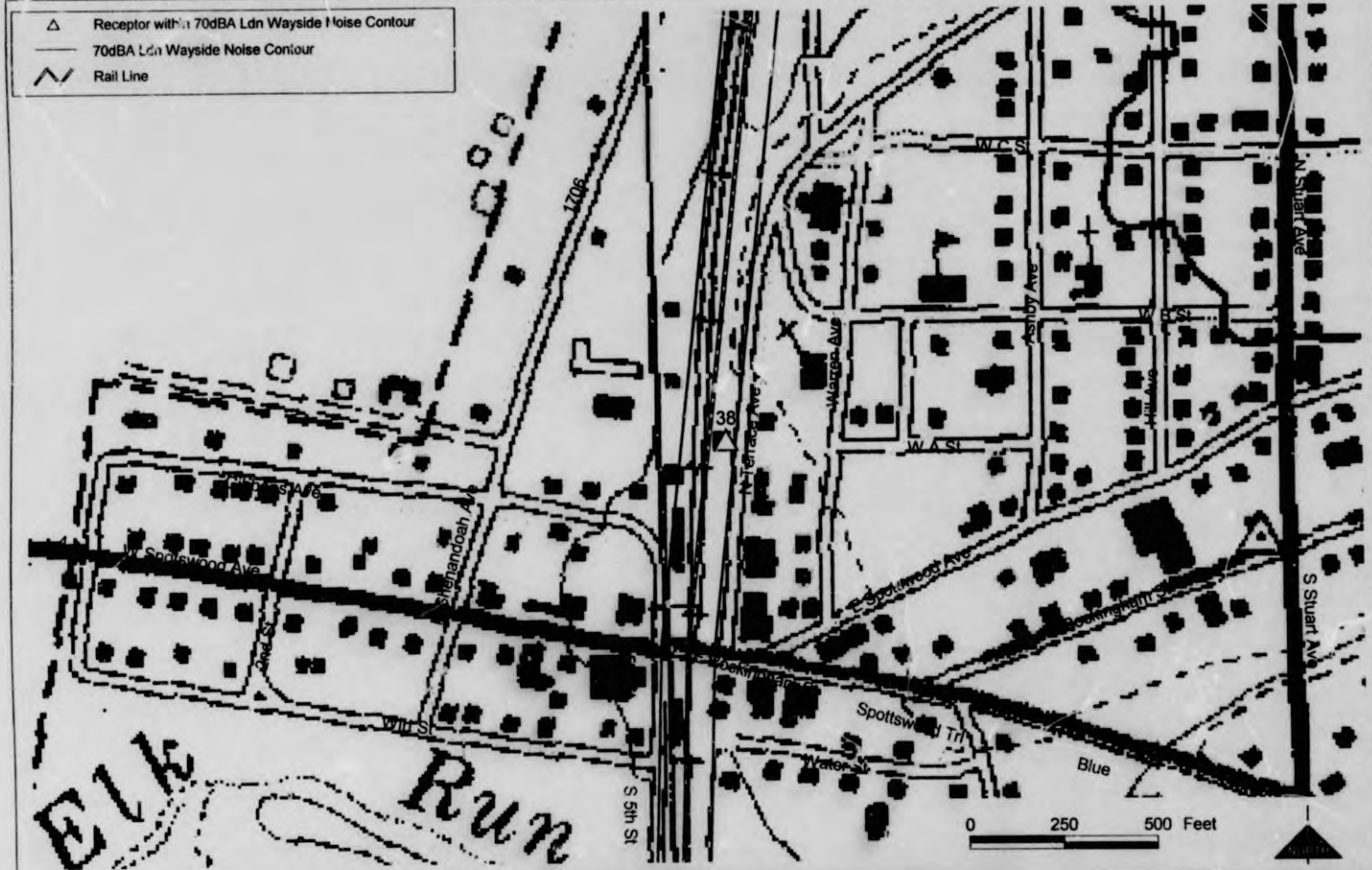

FIGURE 127 Area 12

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

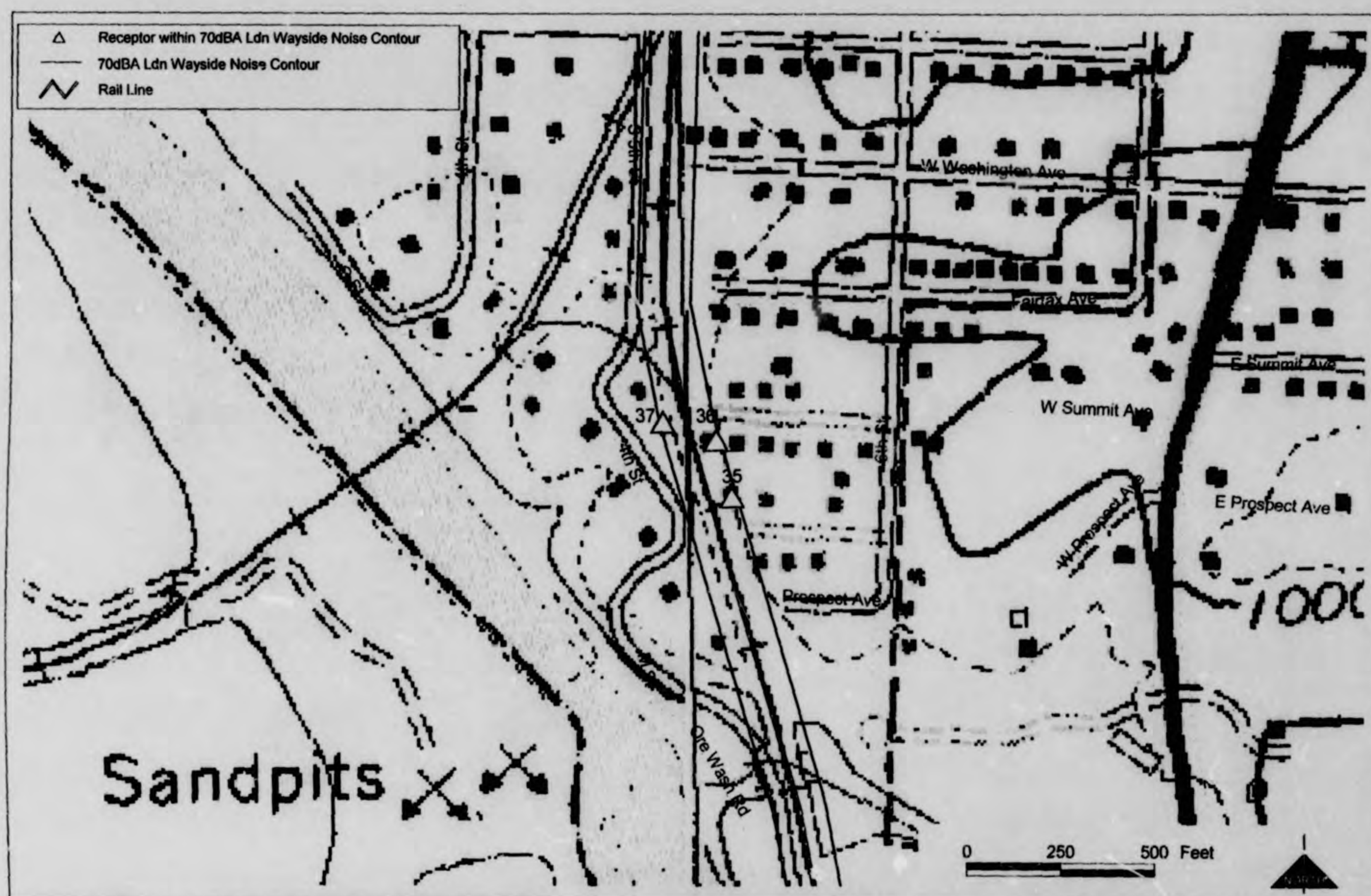

FIGURE 128 Area 13

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

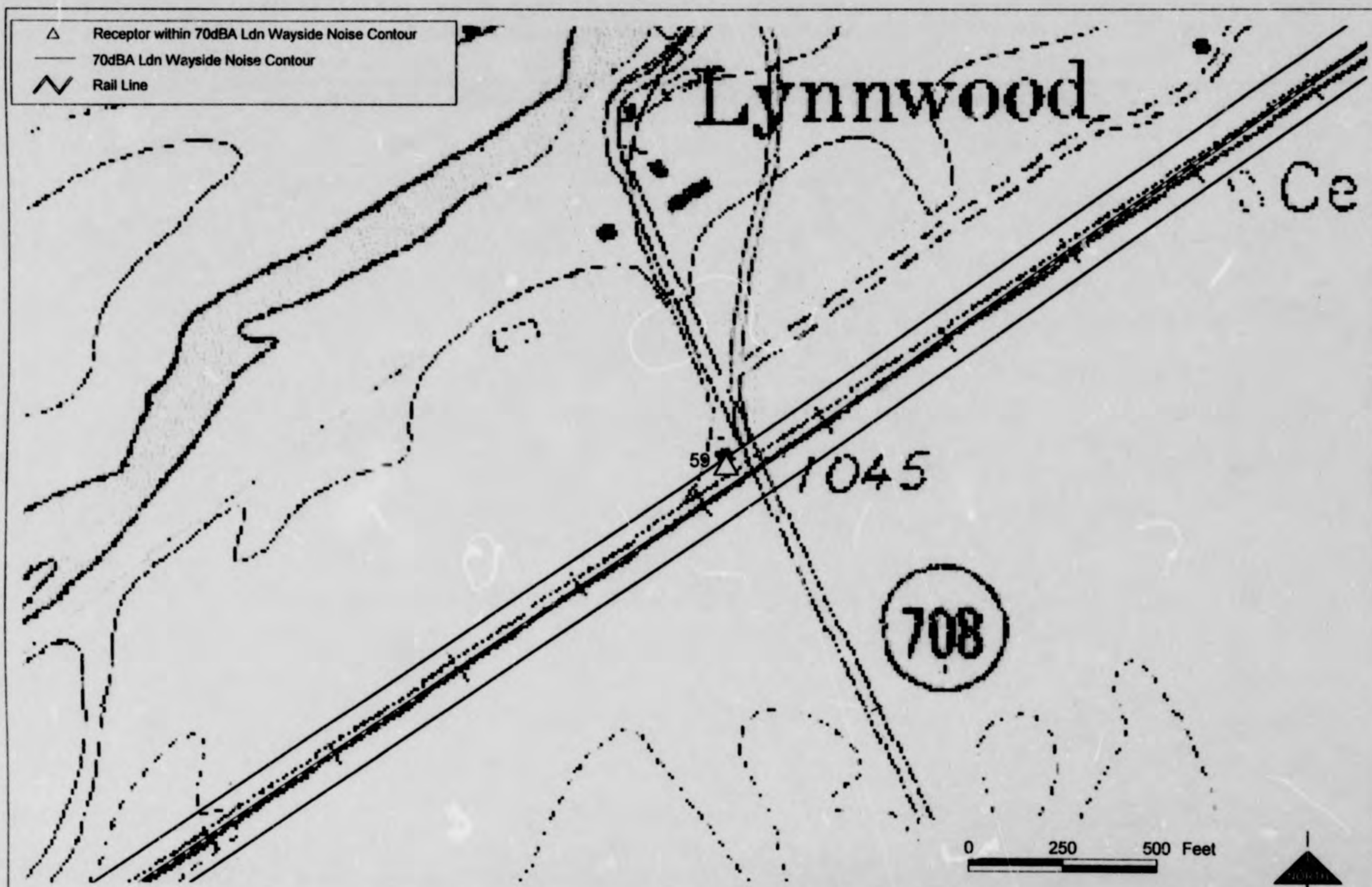

FIGURE 129 Area 14

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

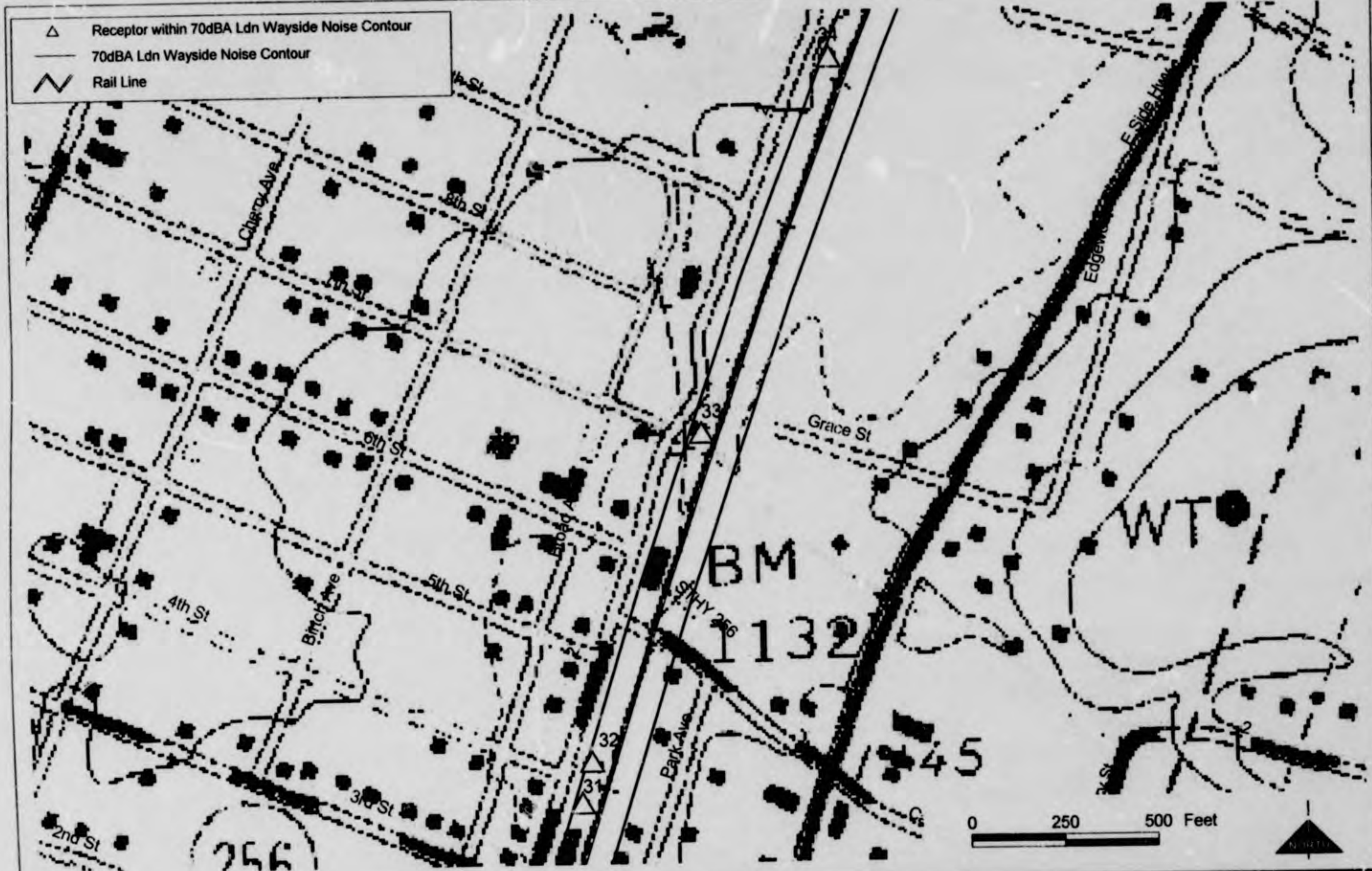

FIGURE 130 Area 15

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

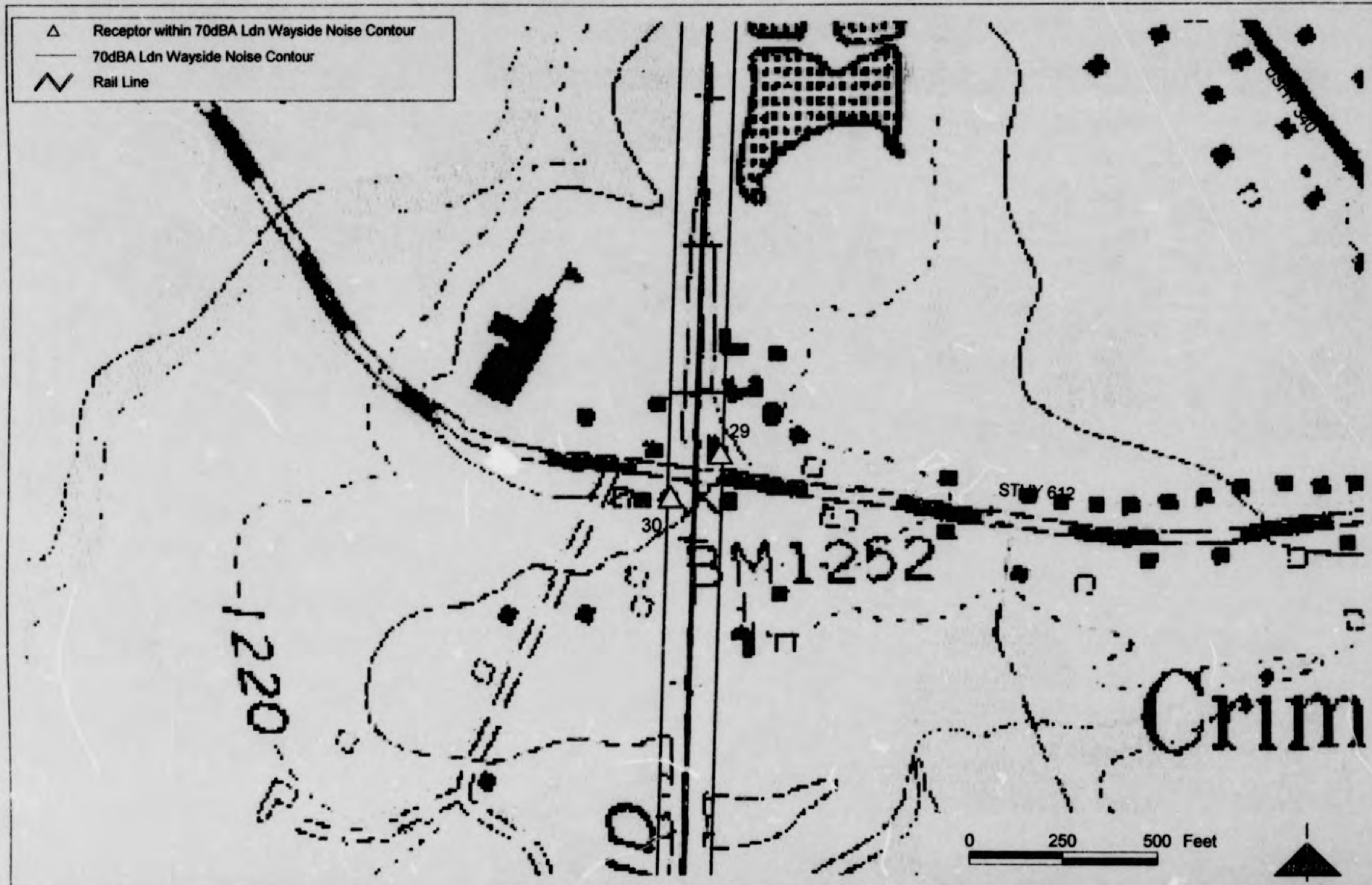

FIGURE 131 Area 16

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

STB FD 33388 5-22-98 K 29206V6C 7/15

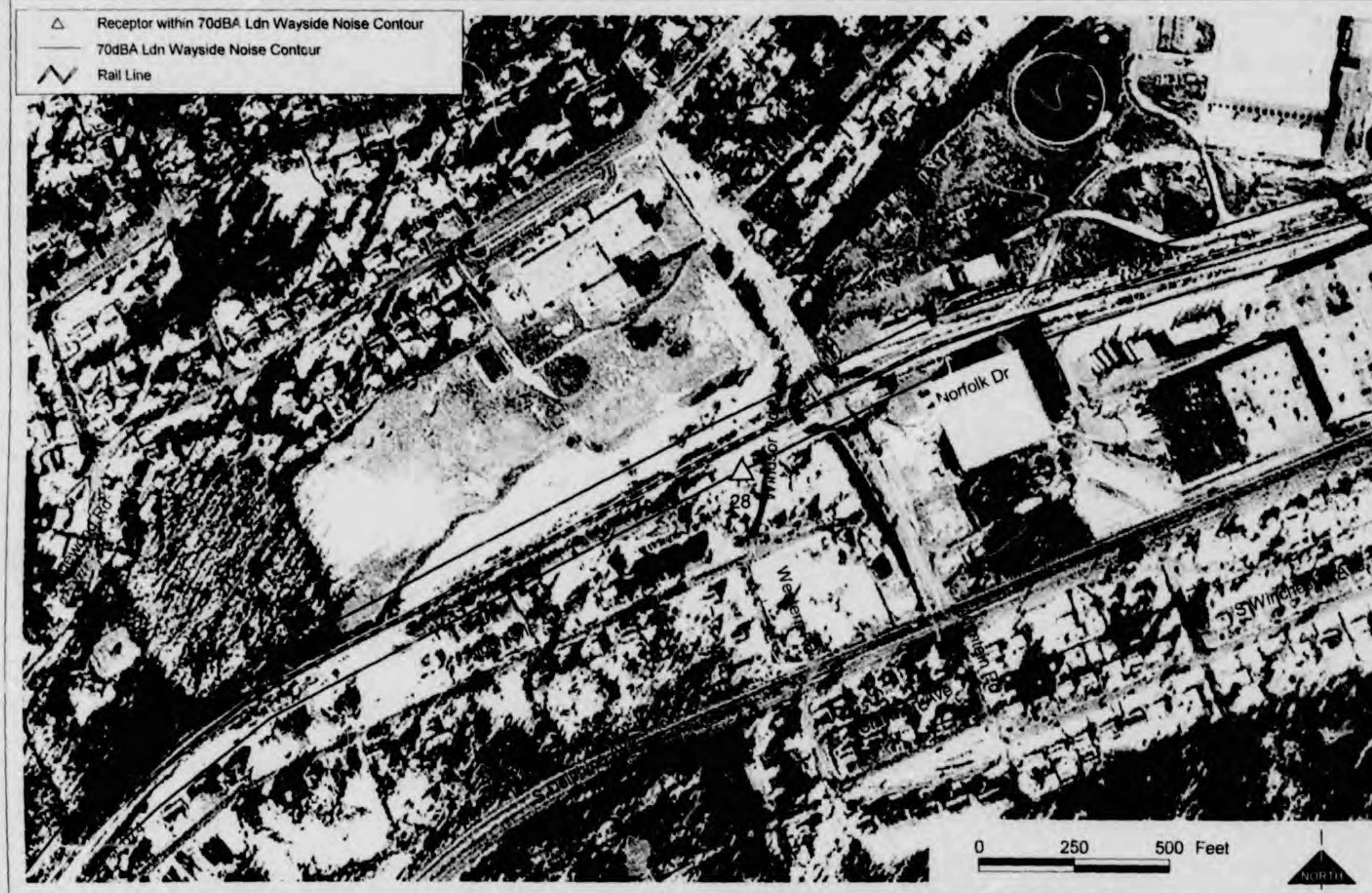

FIGURE 132 Area 17

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

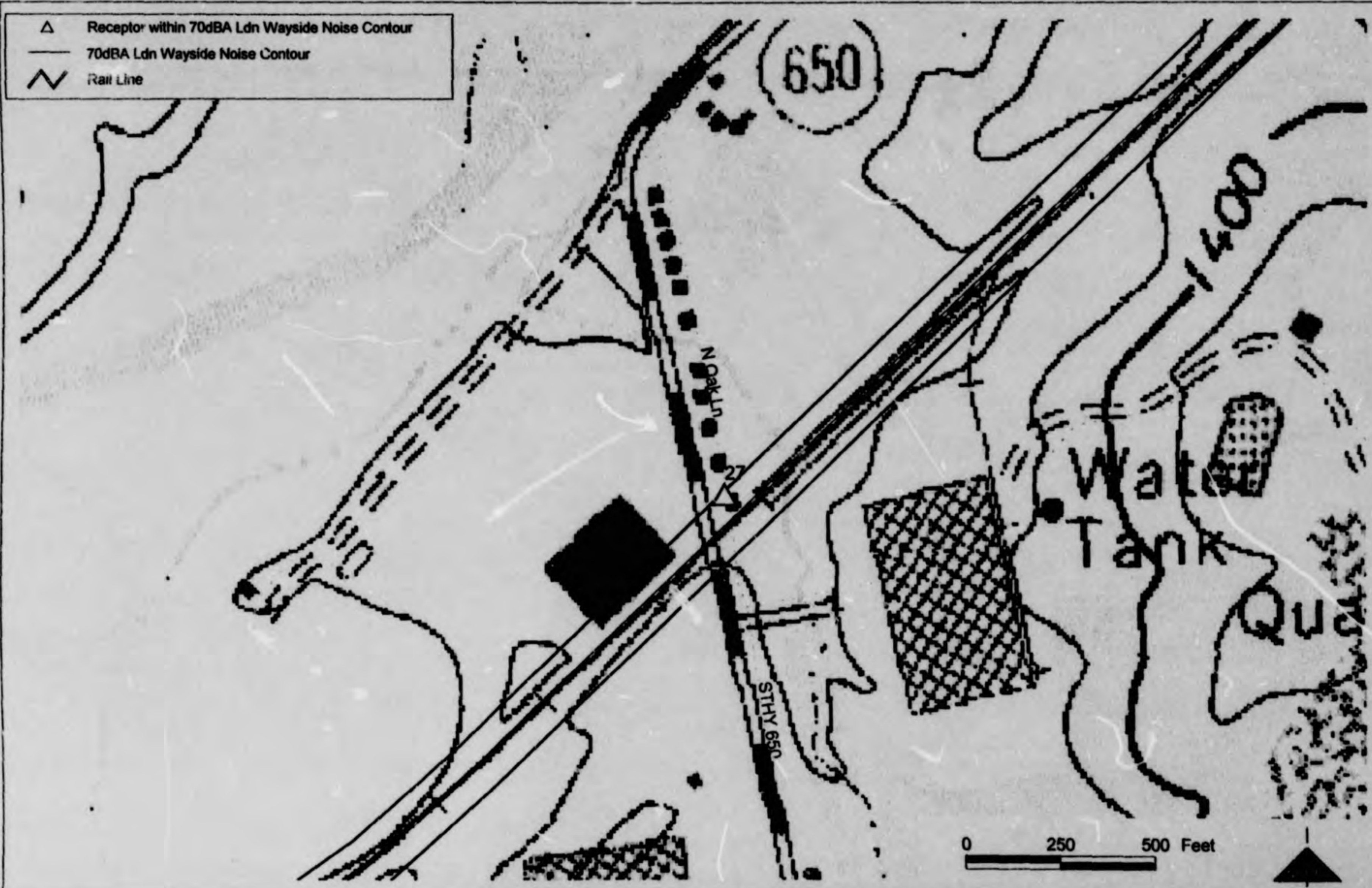

FIGURE 133 Area 18

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

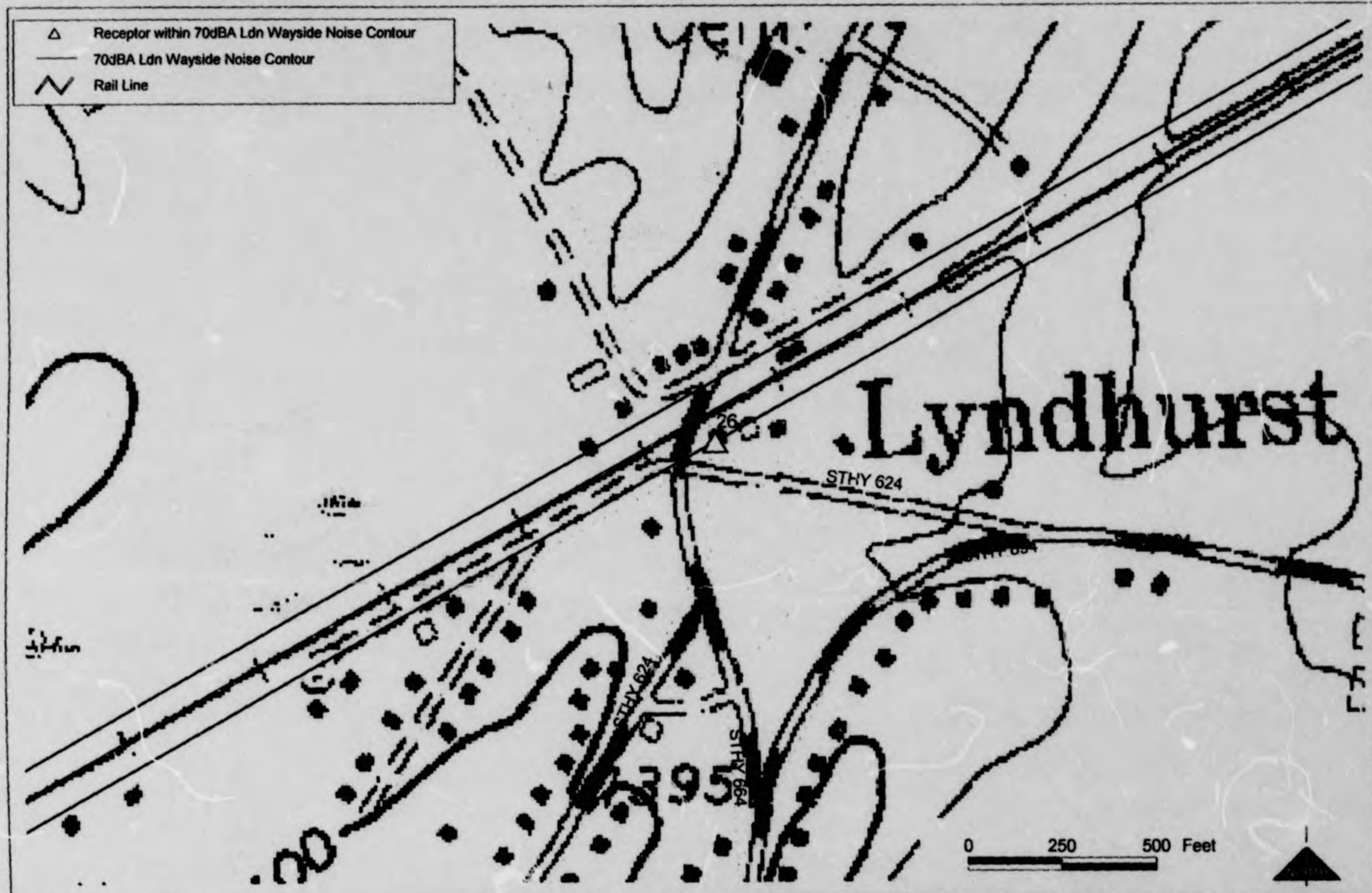

FIGURE 134 Area 19

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

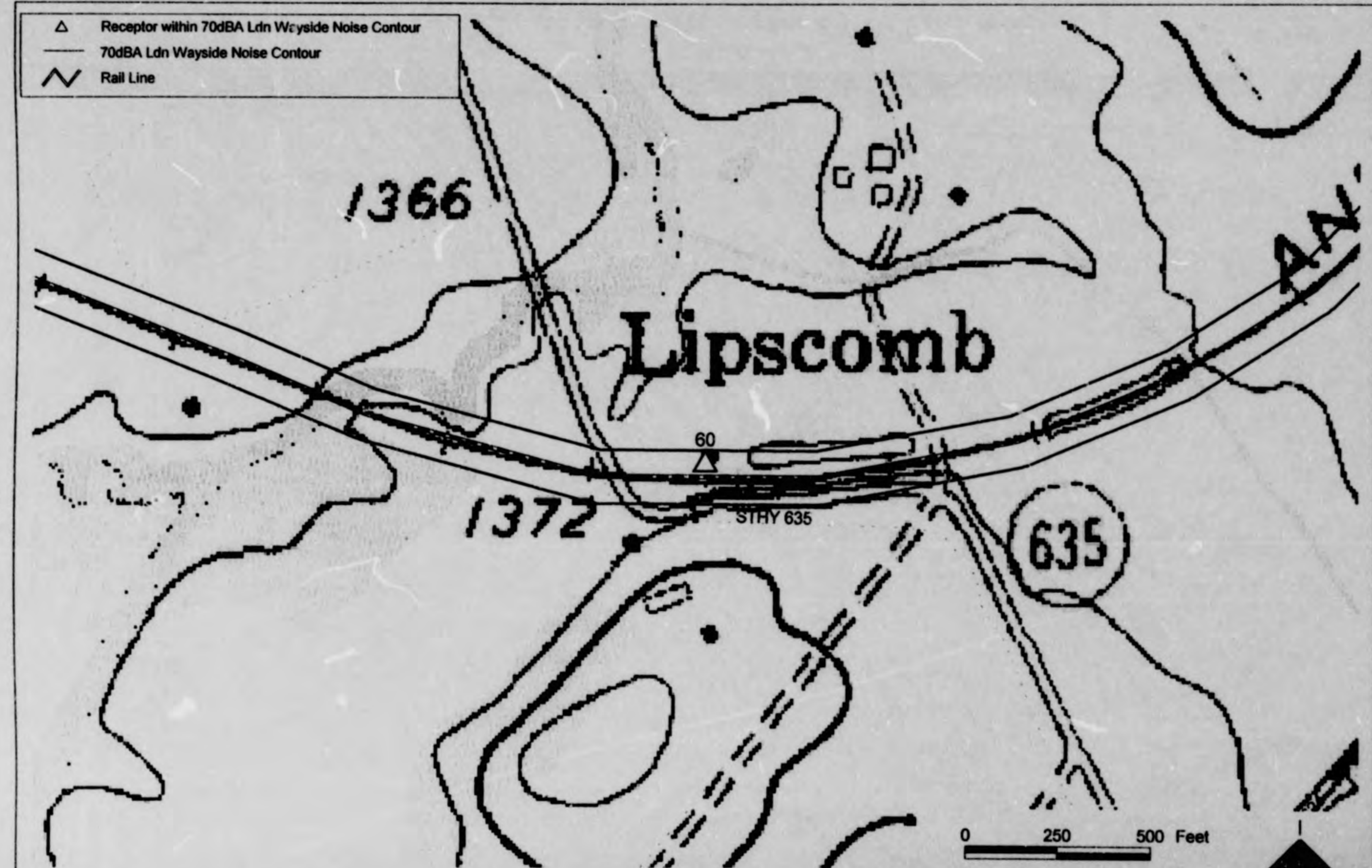

FIGURE 135 Area 20

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

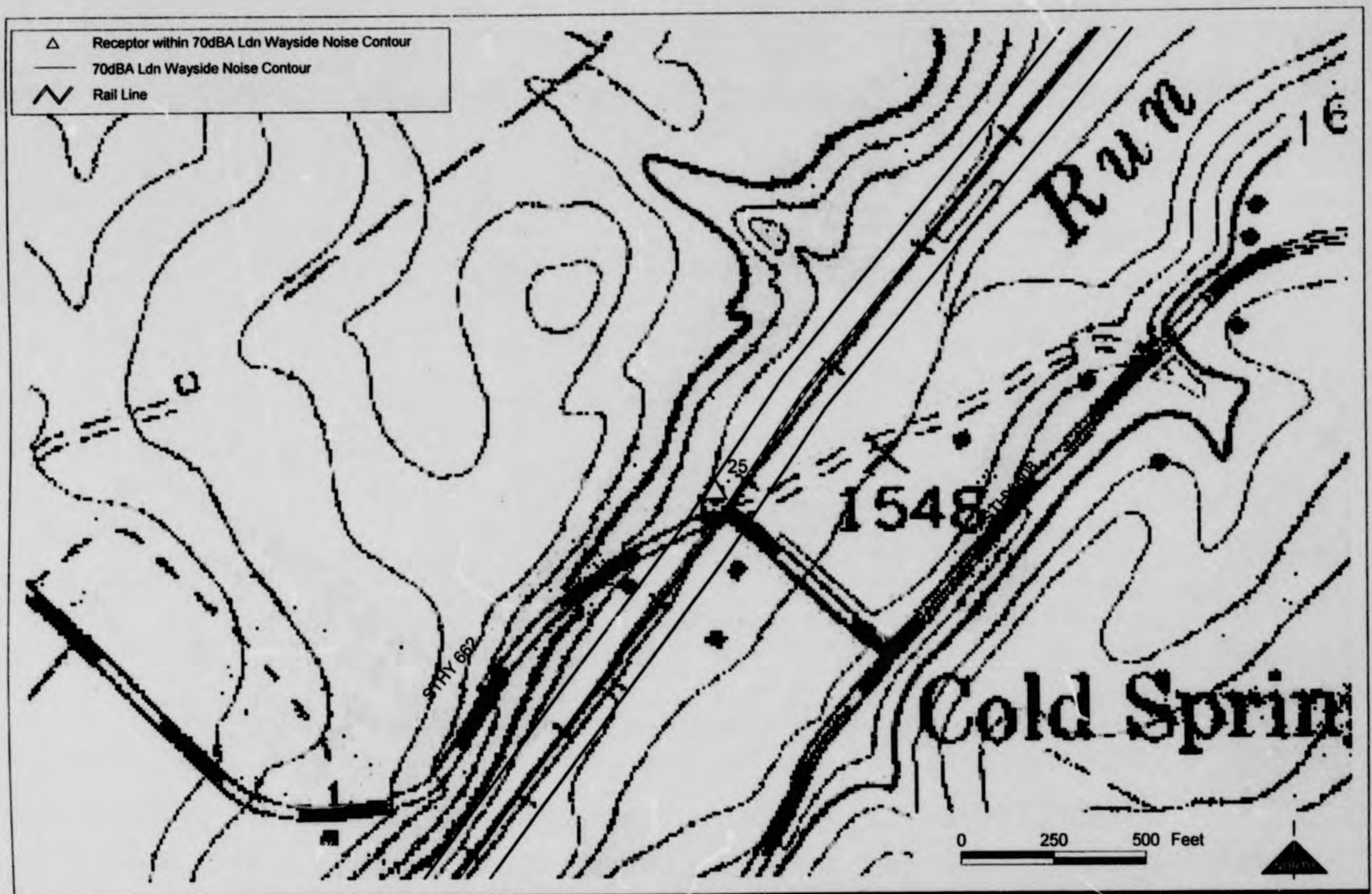

FIGURE 136 Area 21

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 137 Area 22

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

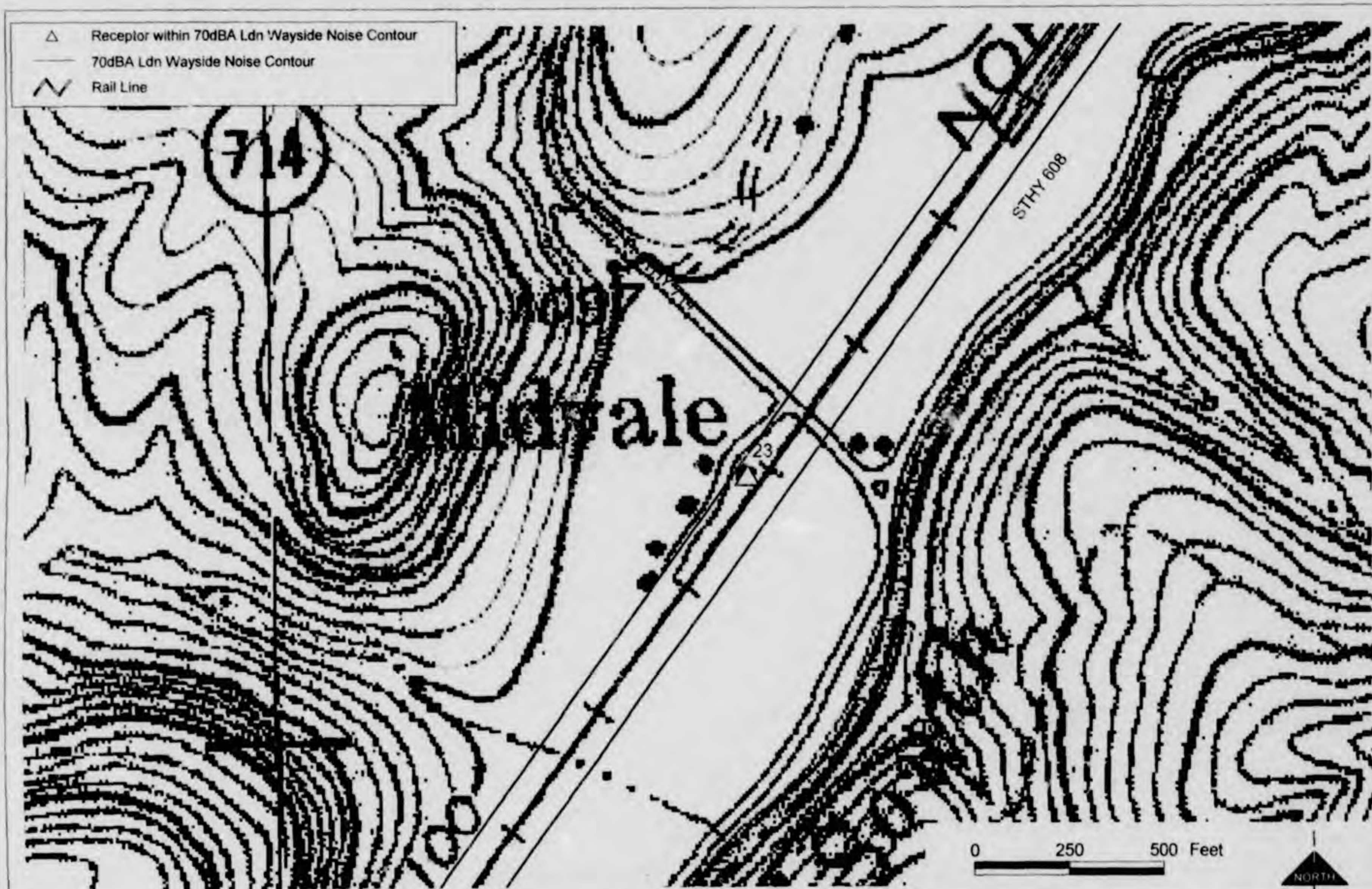

FIGURE 138 Area 23

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

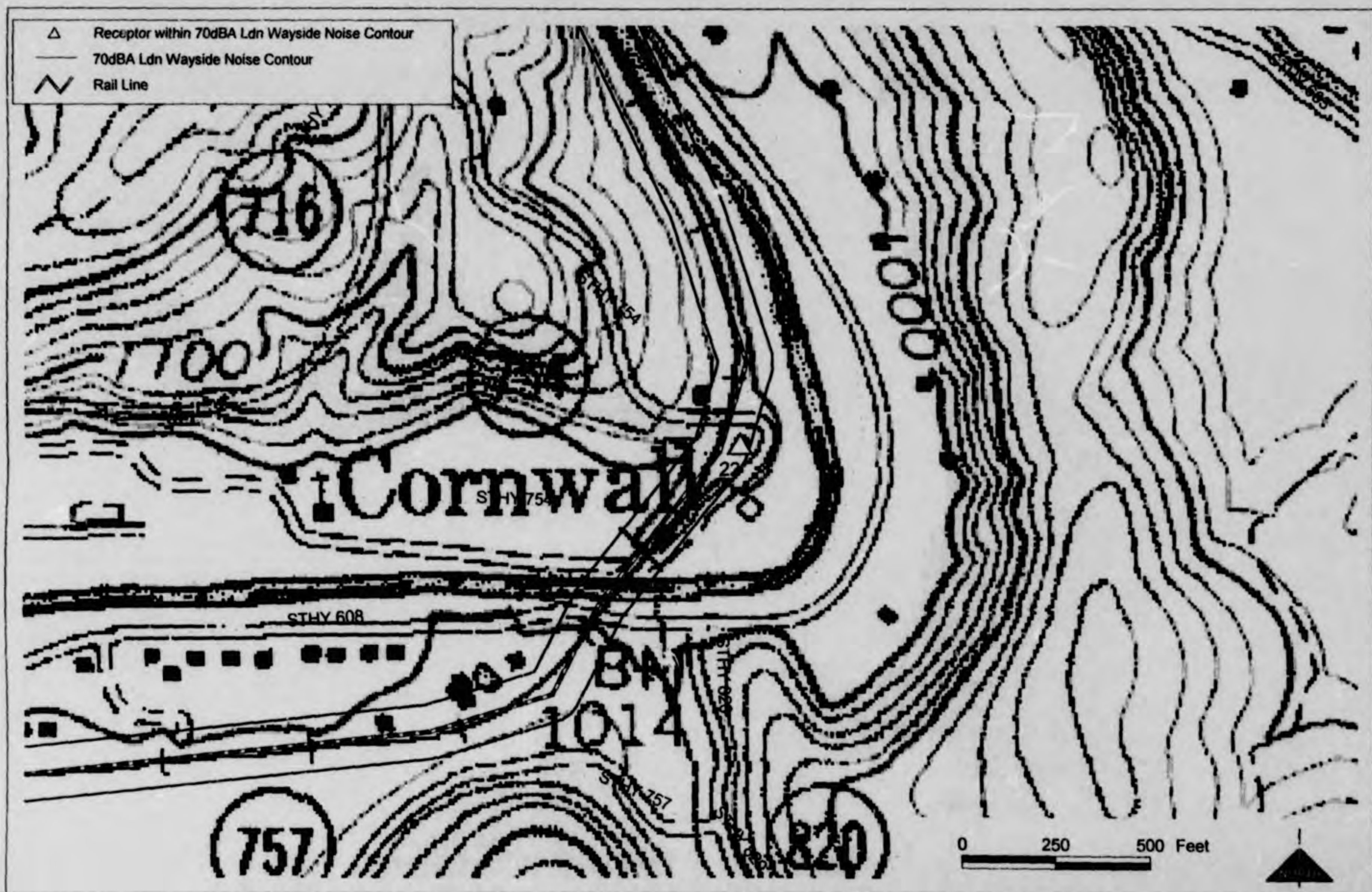

FIGURE 139 Area 24

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

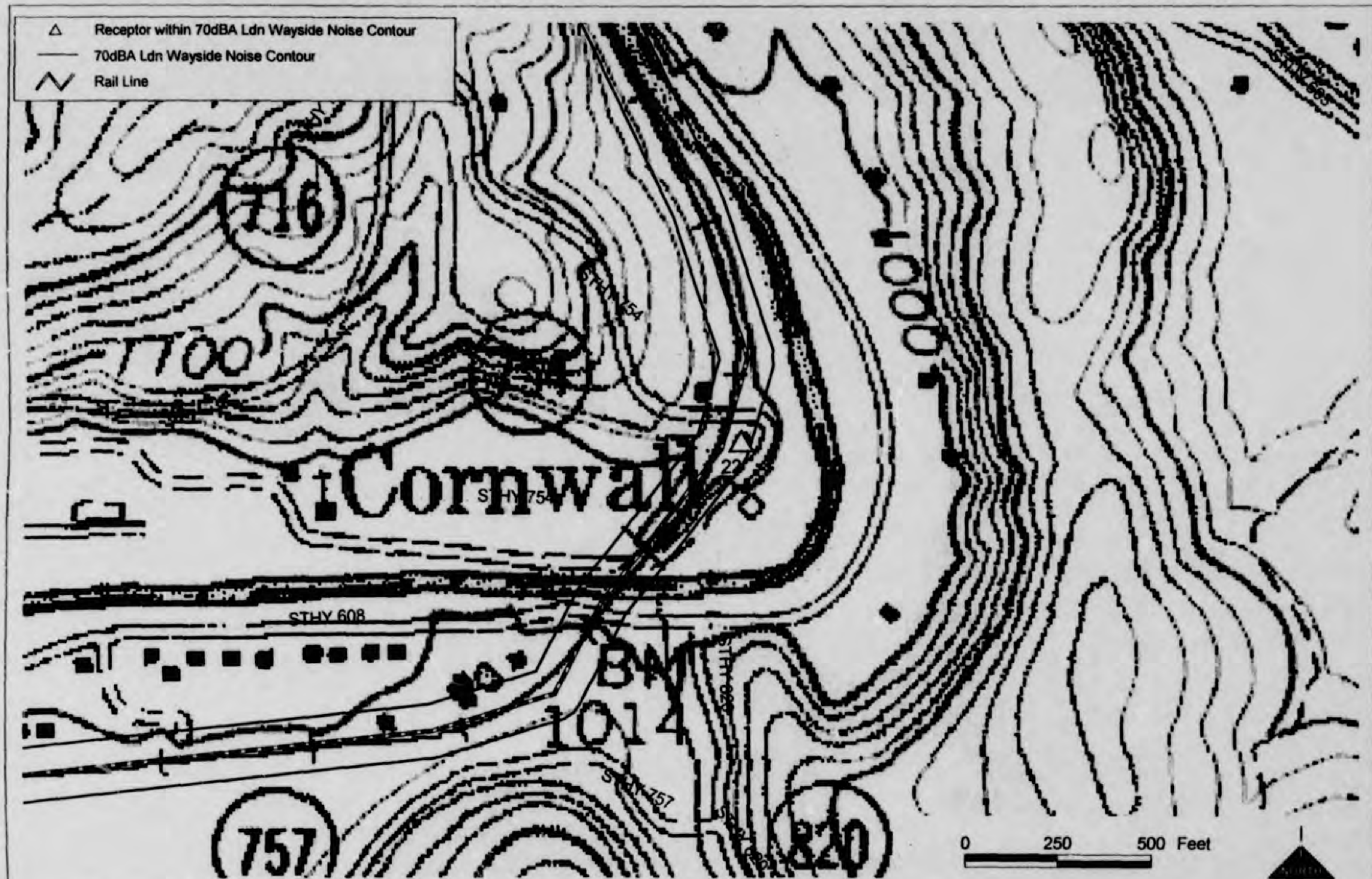

FIGURE 140 Area 25

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

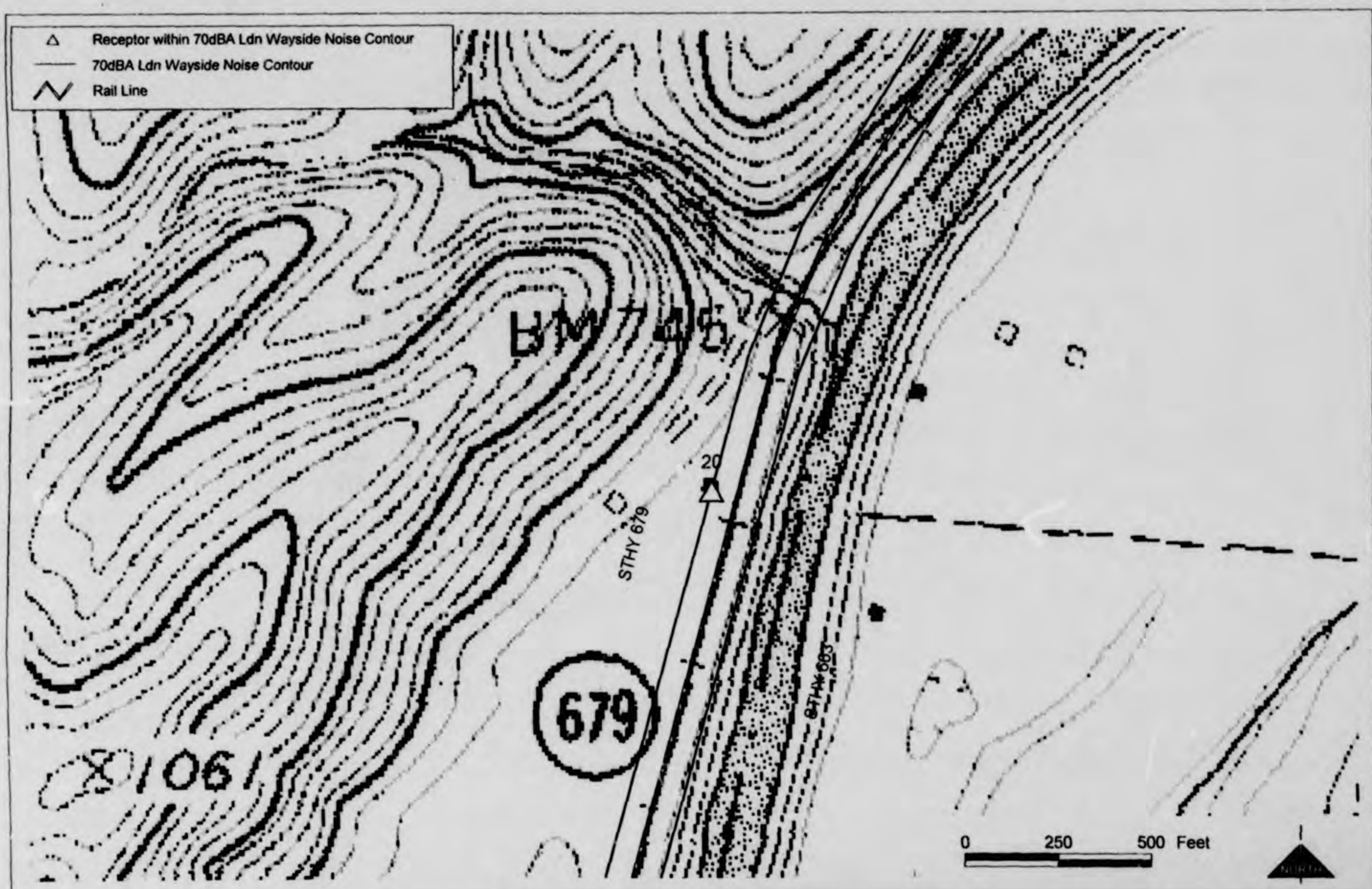

FIGURE 141 Area 26

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

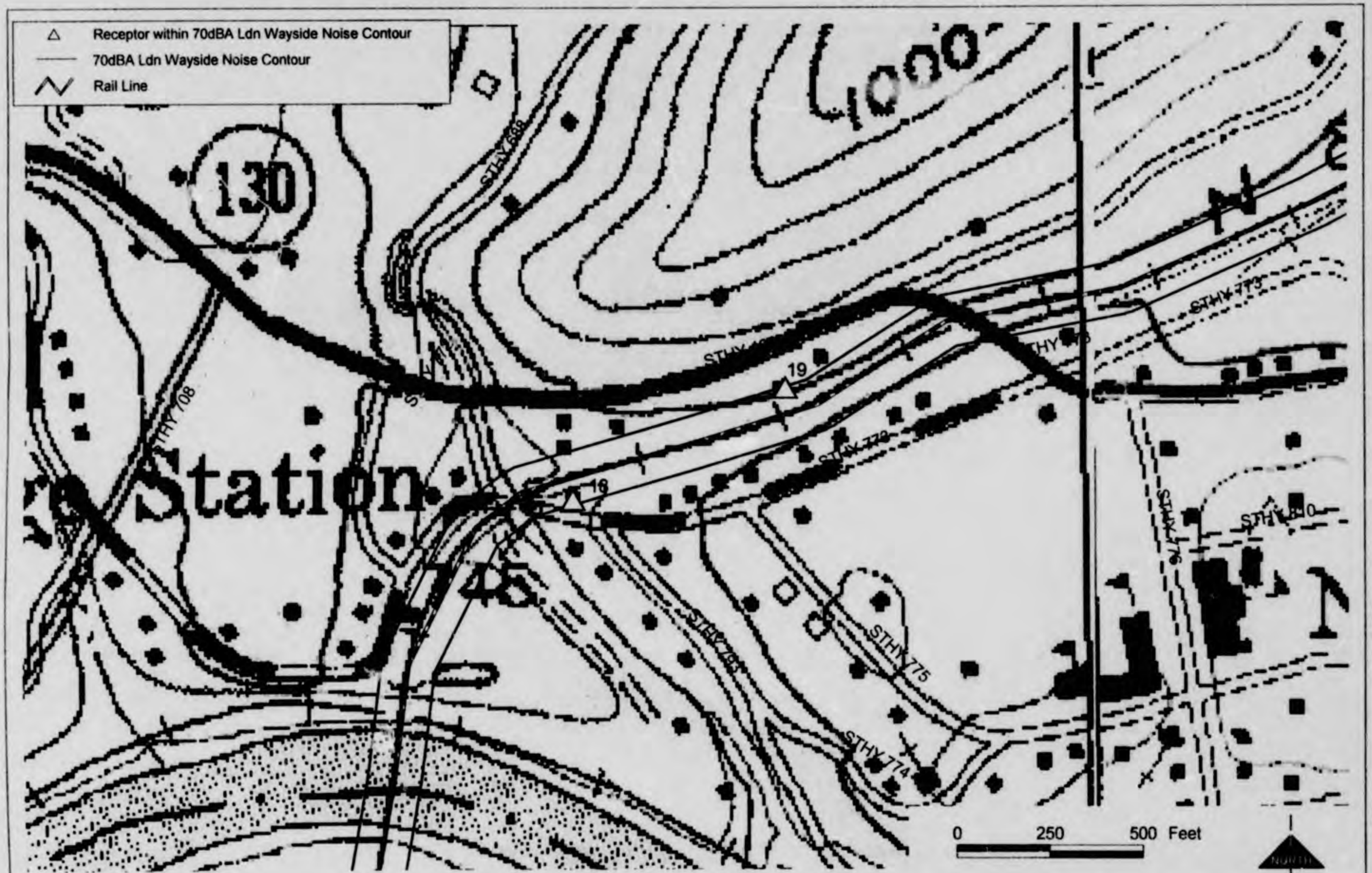

FIGURE 142 Area 27

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

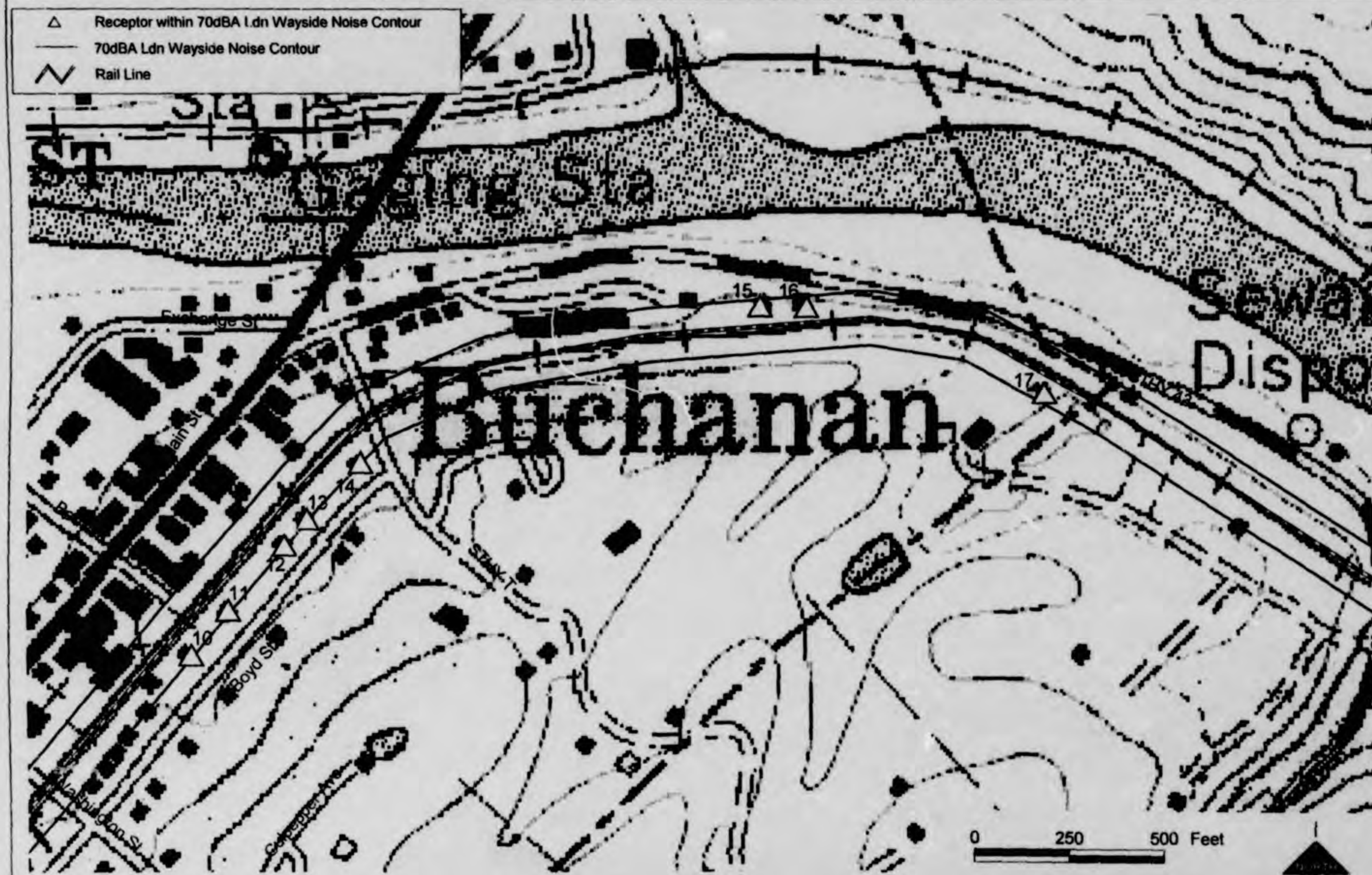

FIGURE 143 Area 28

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

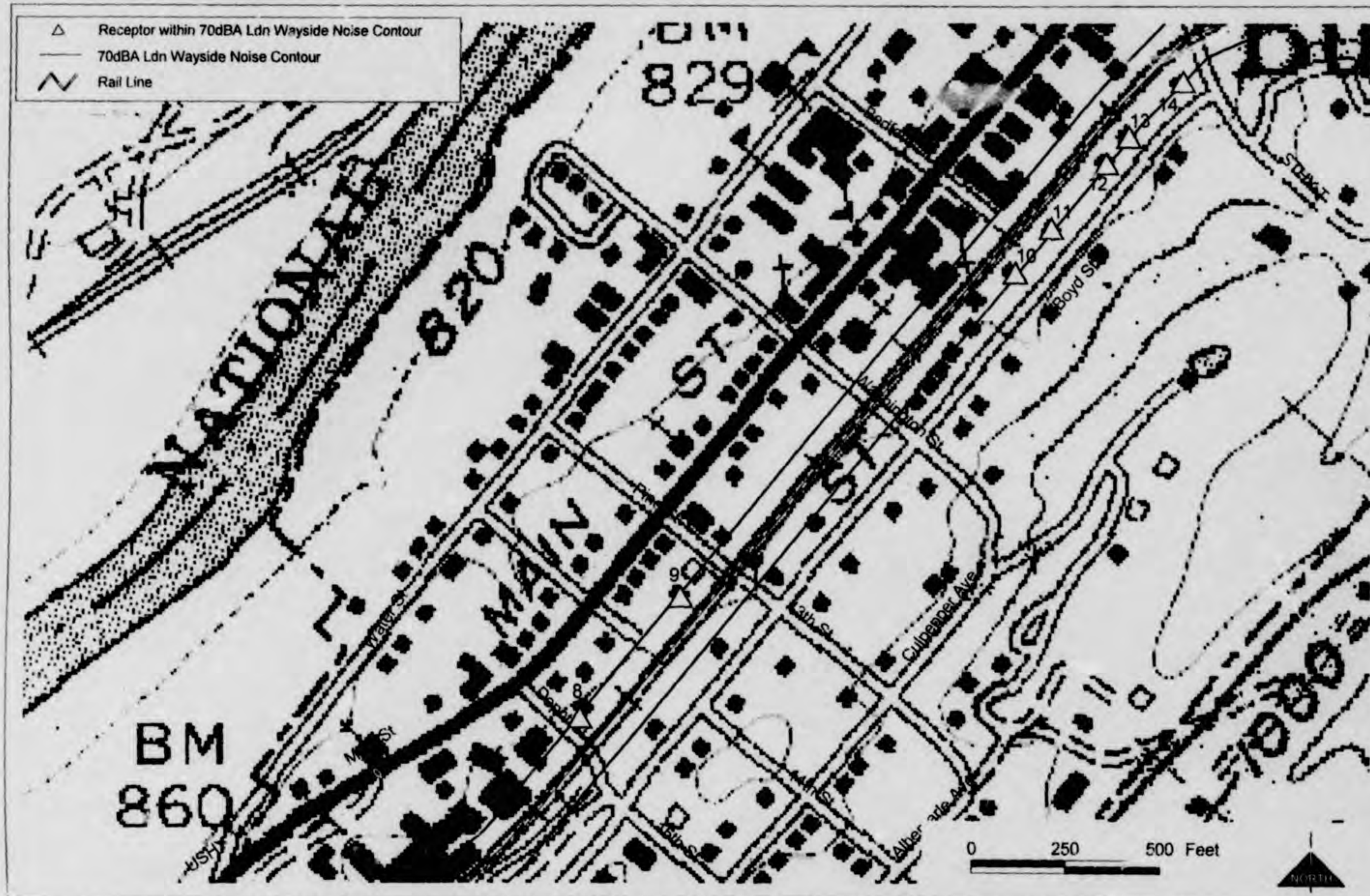

FIGURE 144 Area 29

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

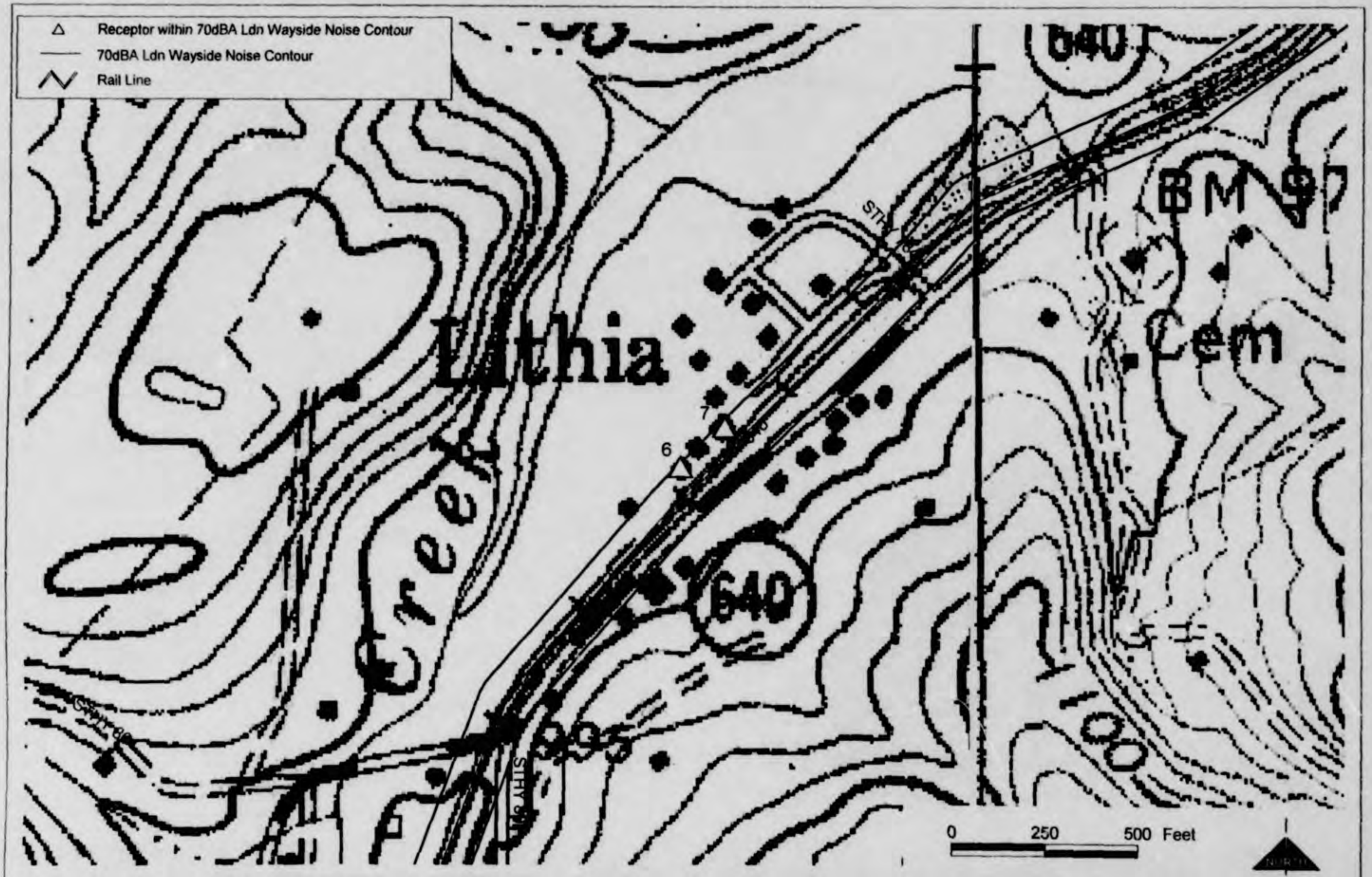

FIGURE 145 Area 30

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

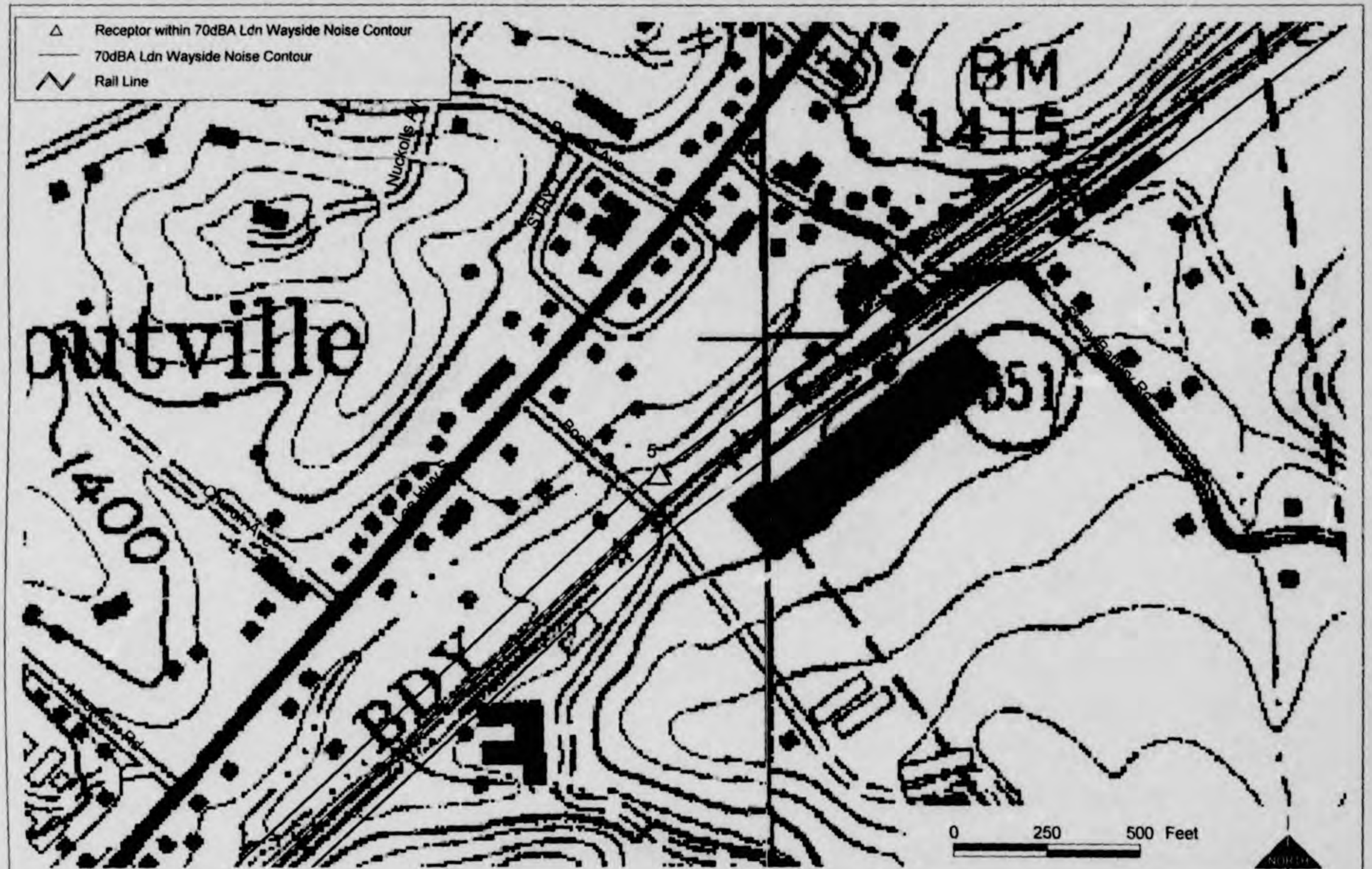

FIGURE 146 Area 31

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

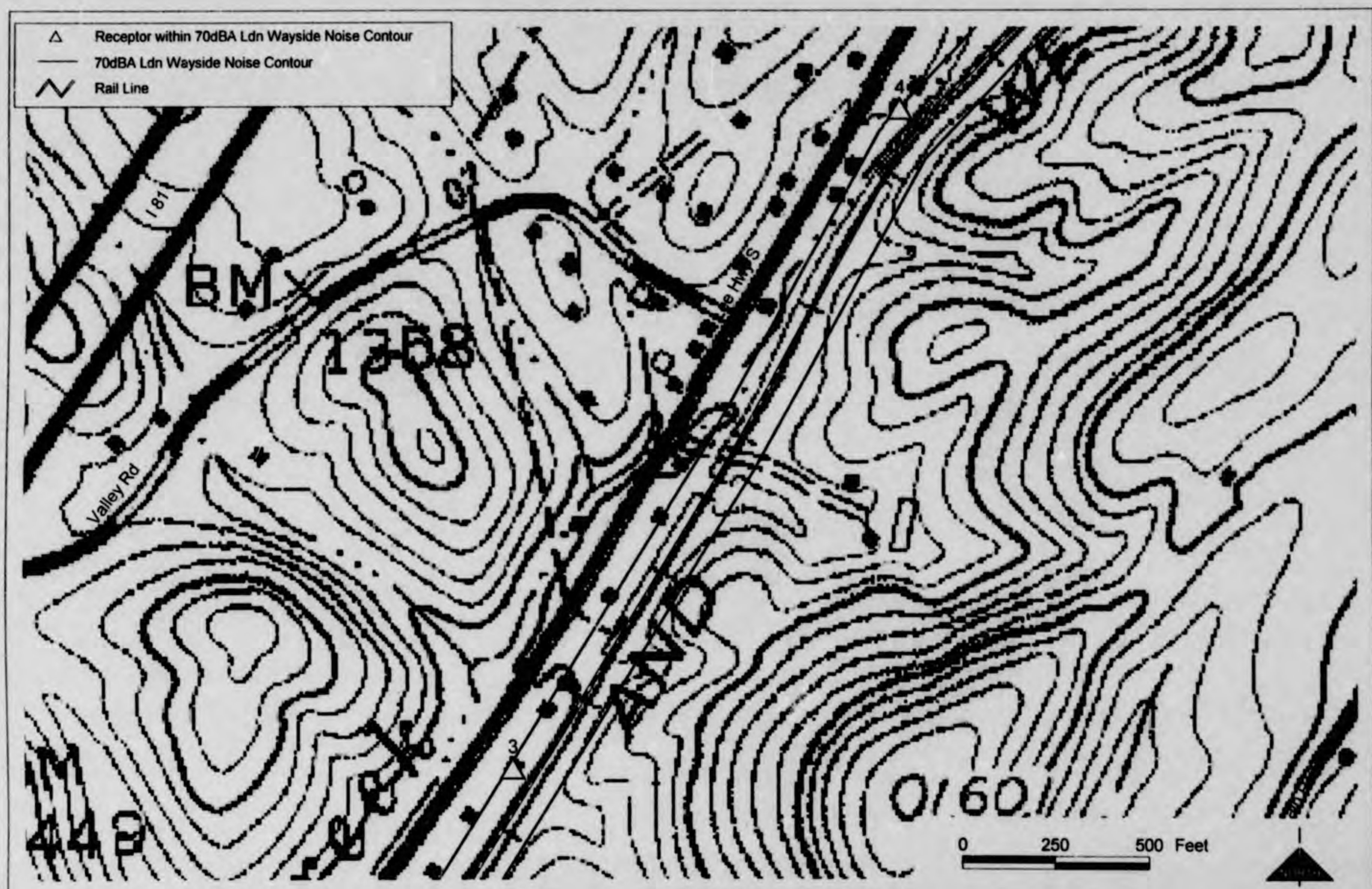

FIGURE 147 Area 32

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

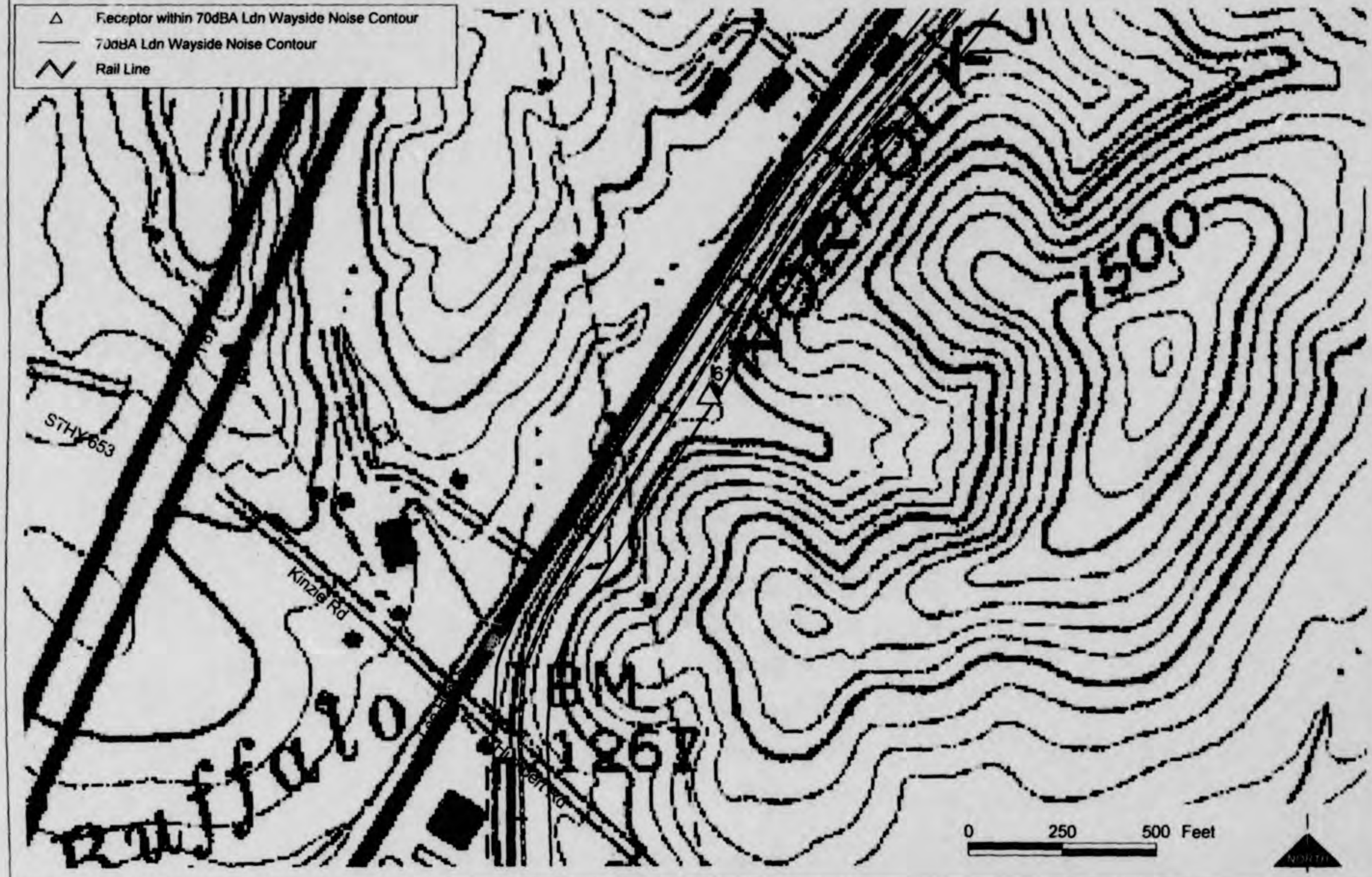

FIGURE 148 Area 33

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

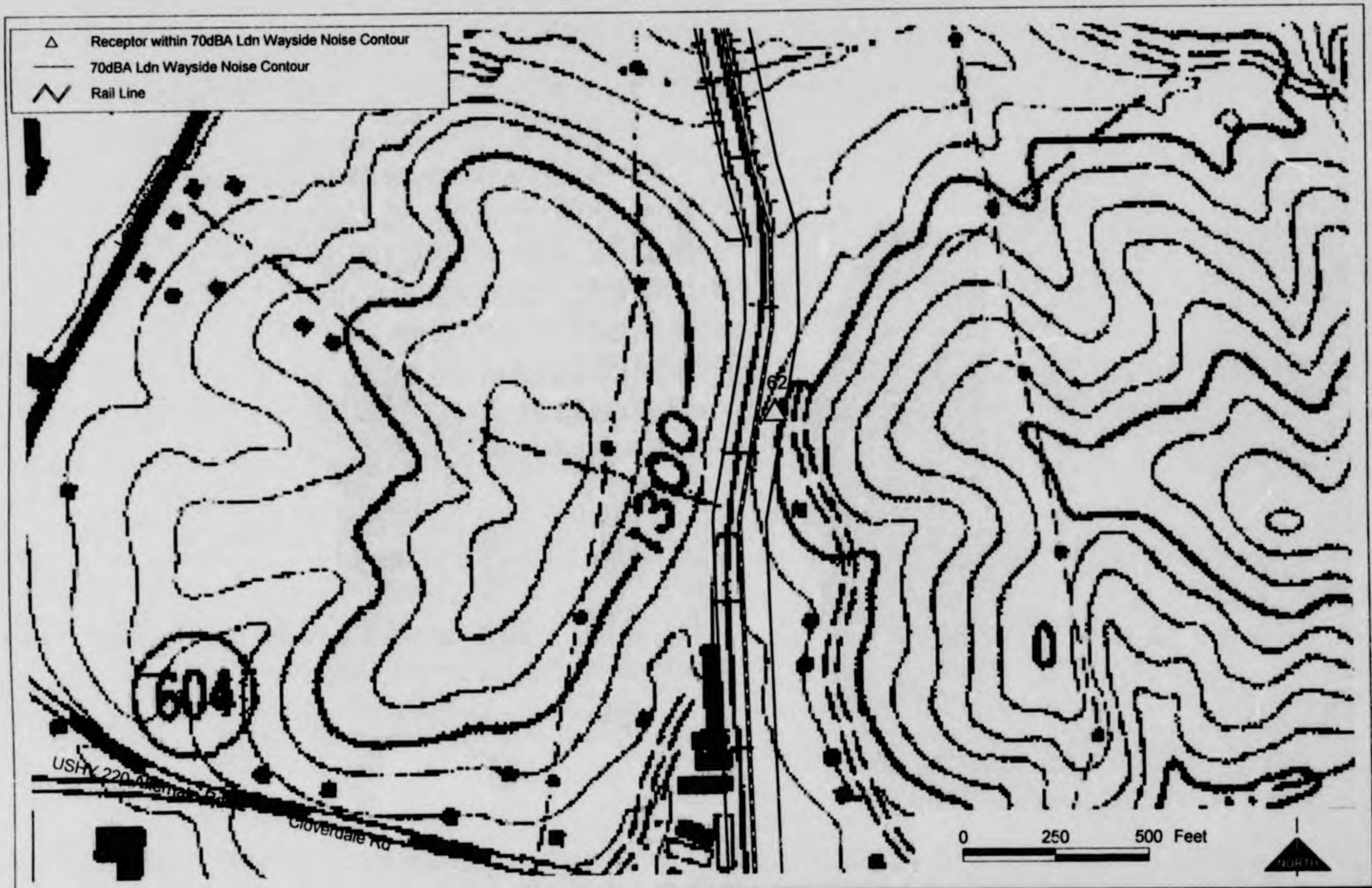

FIGURE 149 Area 34

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

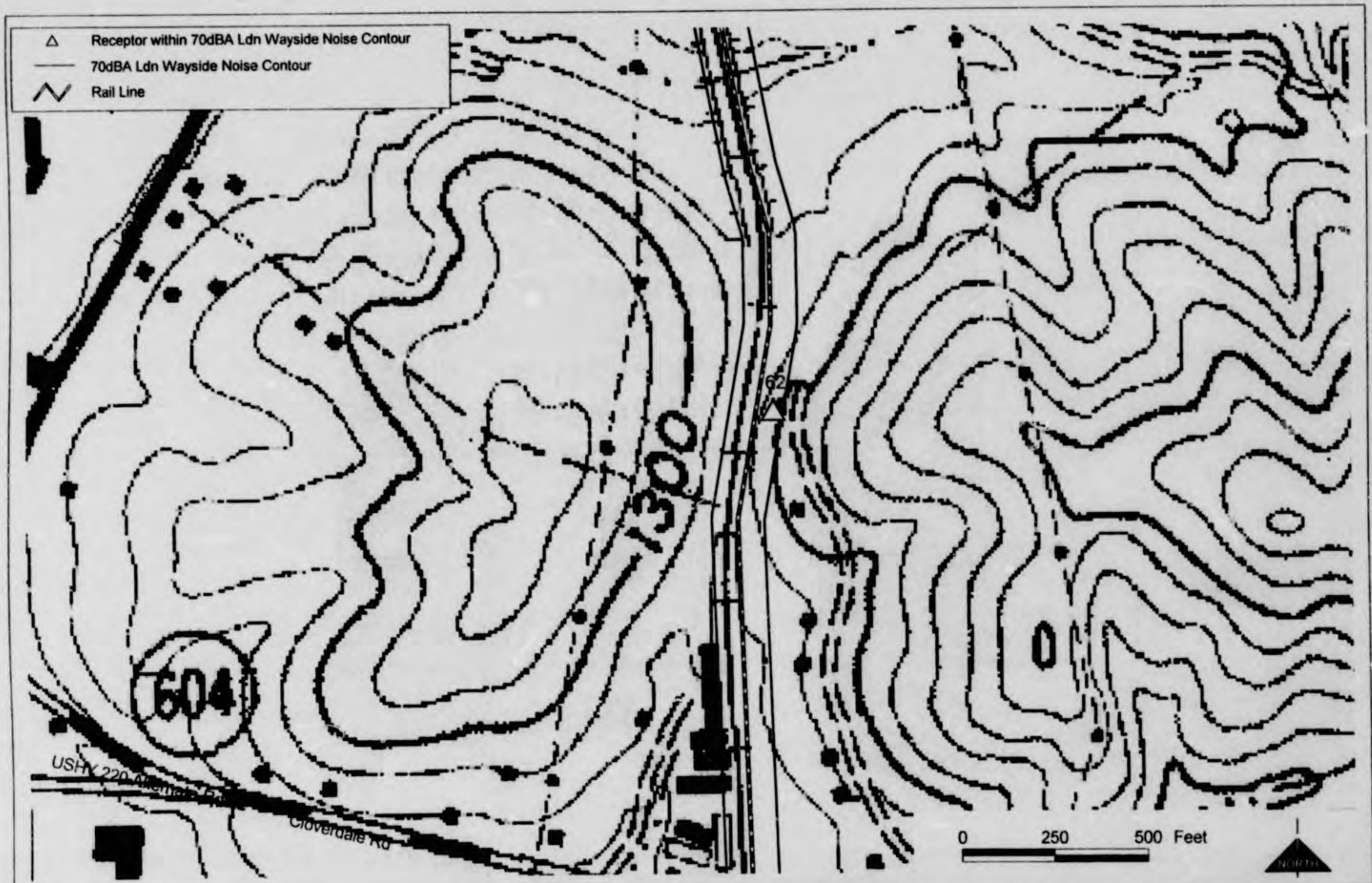

FIGURE 149 Area 34

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

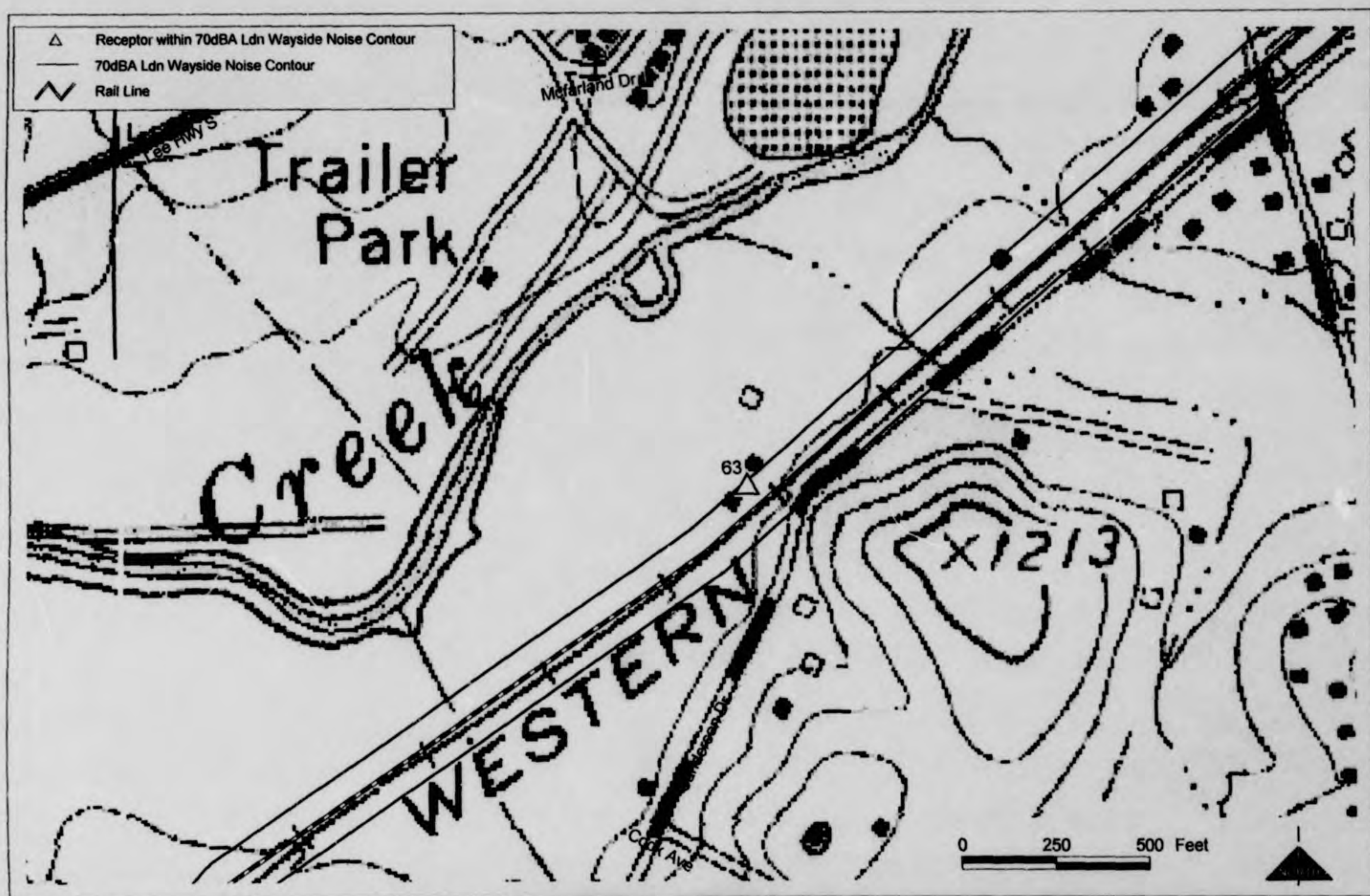

FIGURE 150 Area 35

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

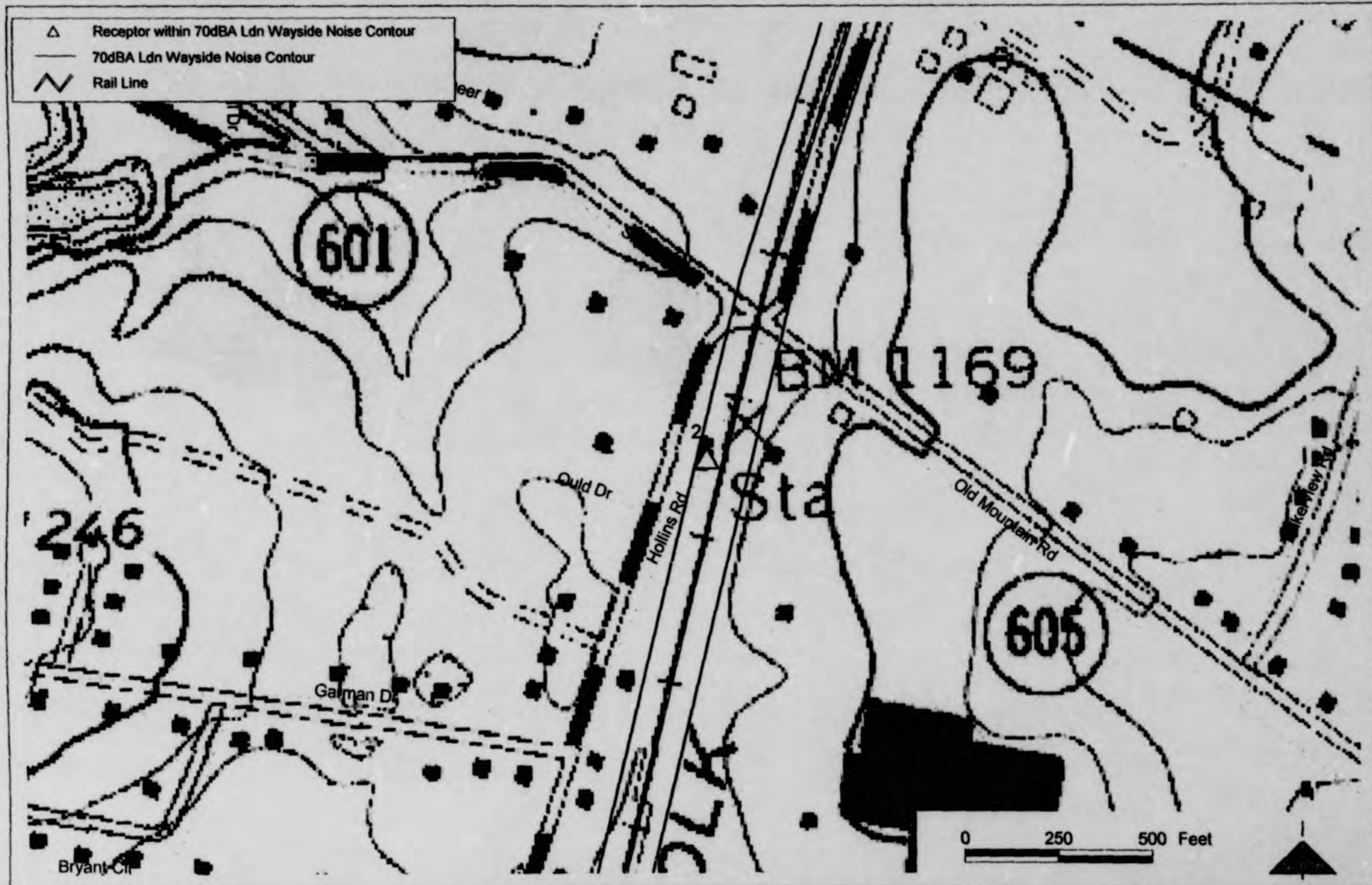

FIGURE 151 Area 36

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 152 Area 37

RIVERTON JCT.-TO-ROANOKE, N-100 Receptors Within 70dBA Ldn Wayside Noise Contour

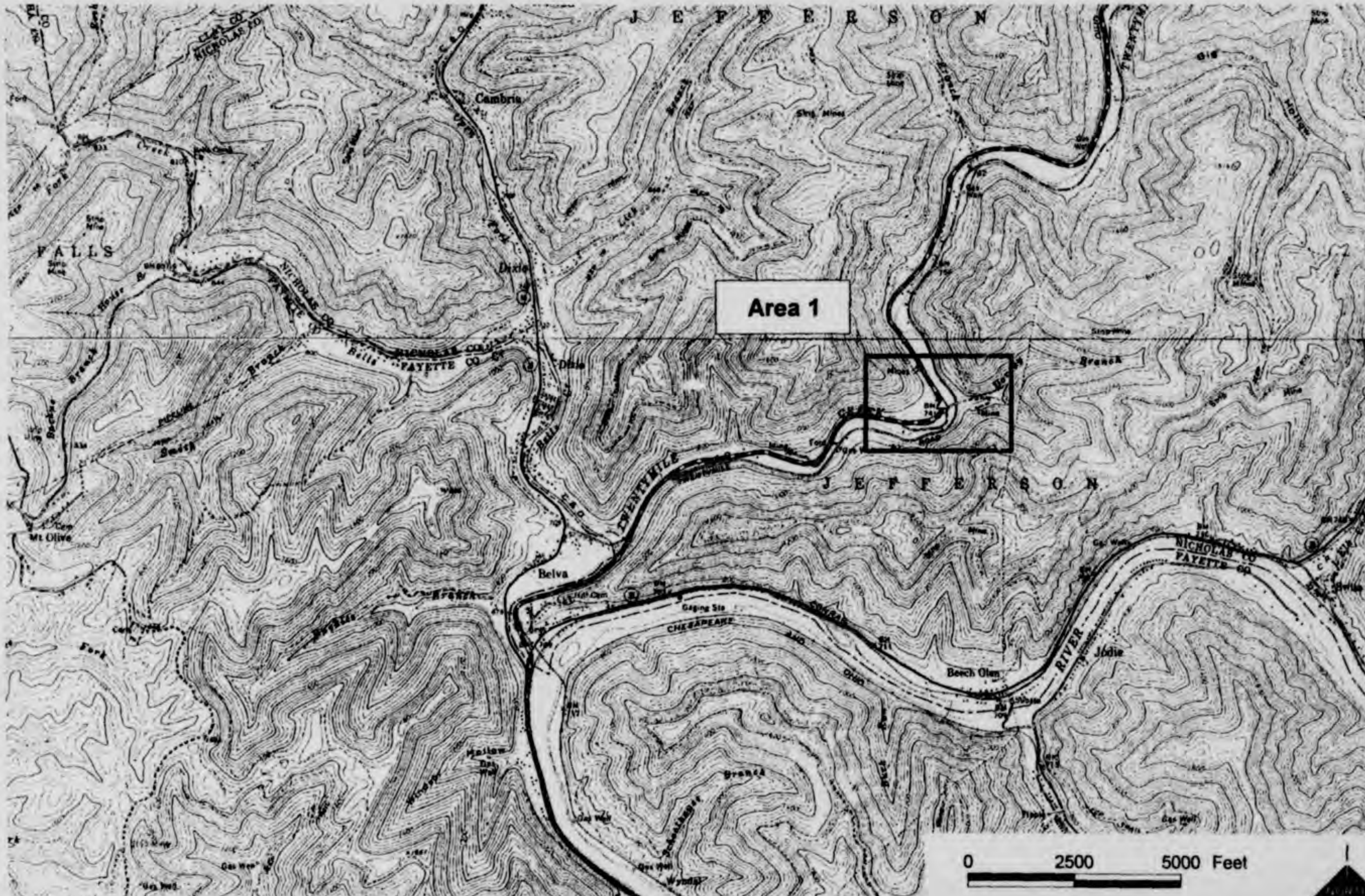

FIGURE 153A Key Map

FOLA MINE-TO-DEEPWATER, N-111 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

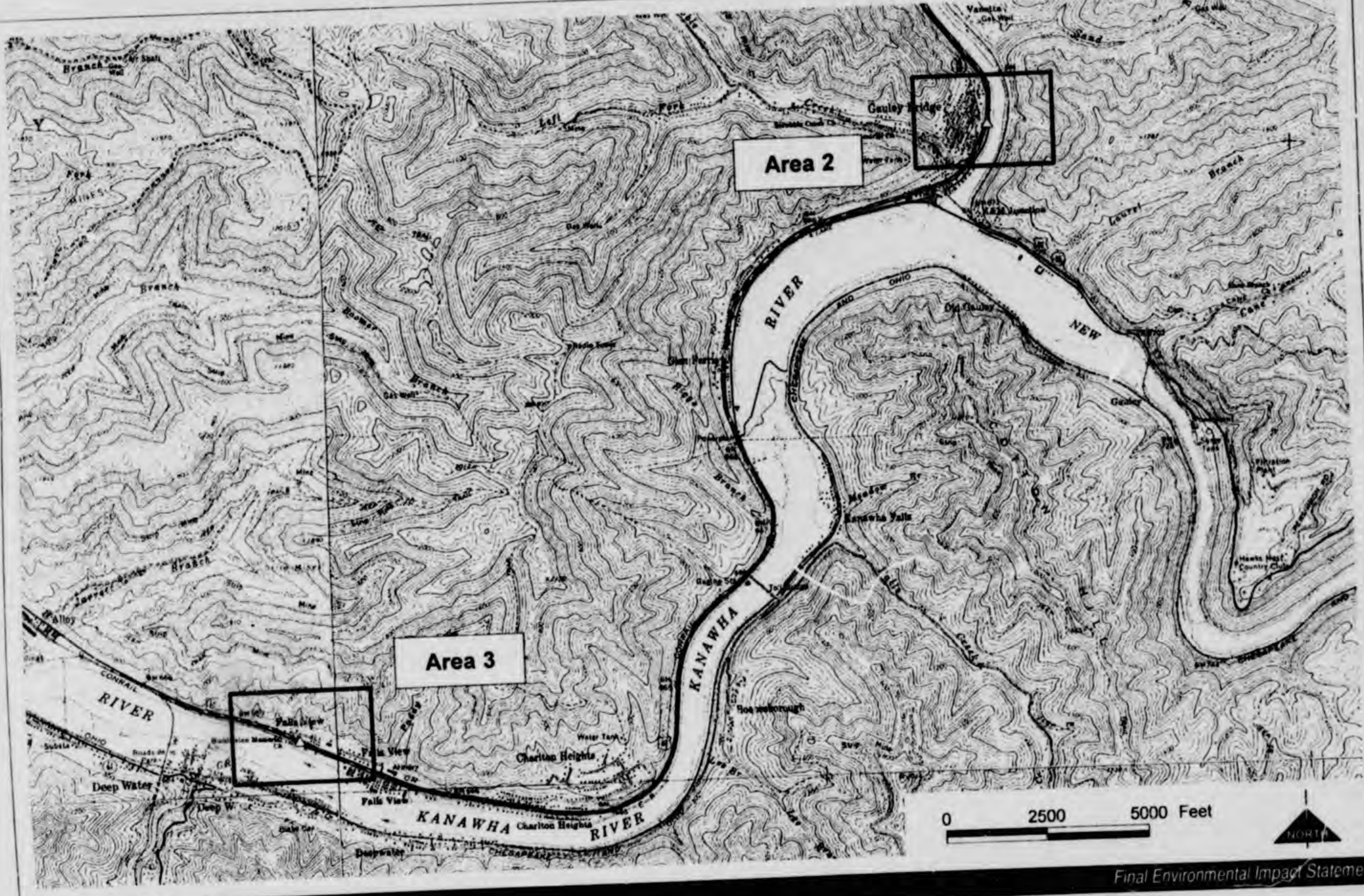

FIGURE 153B Key Map

FOLA MINE-TO-DEEPWATER, N-111 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

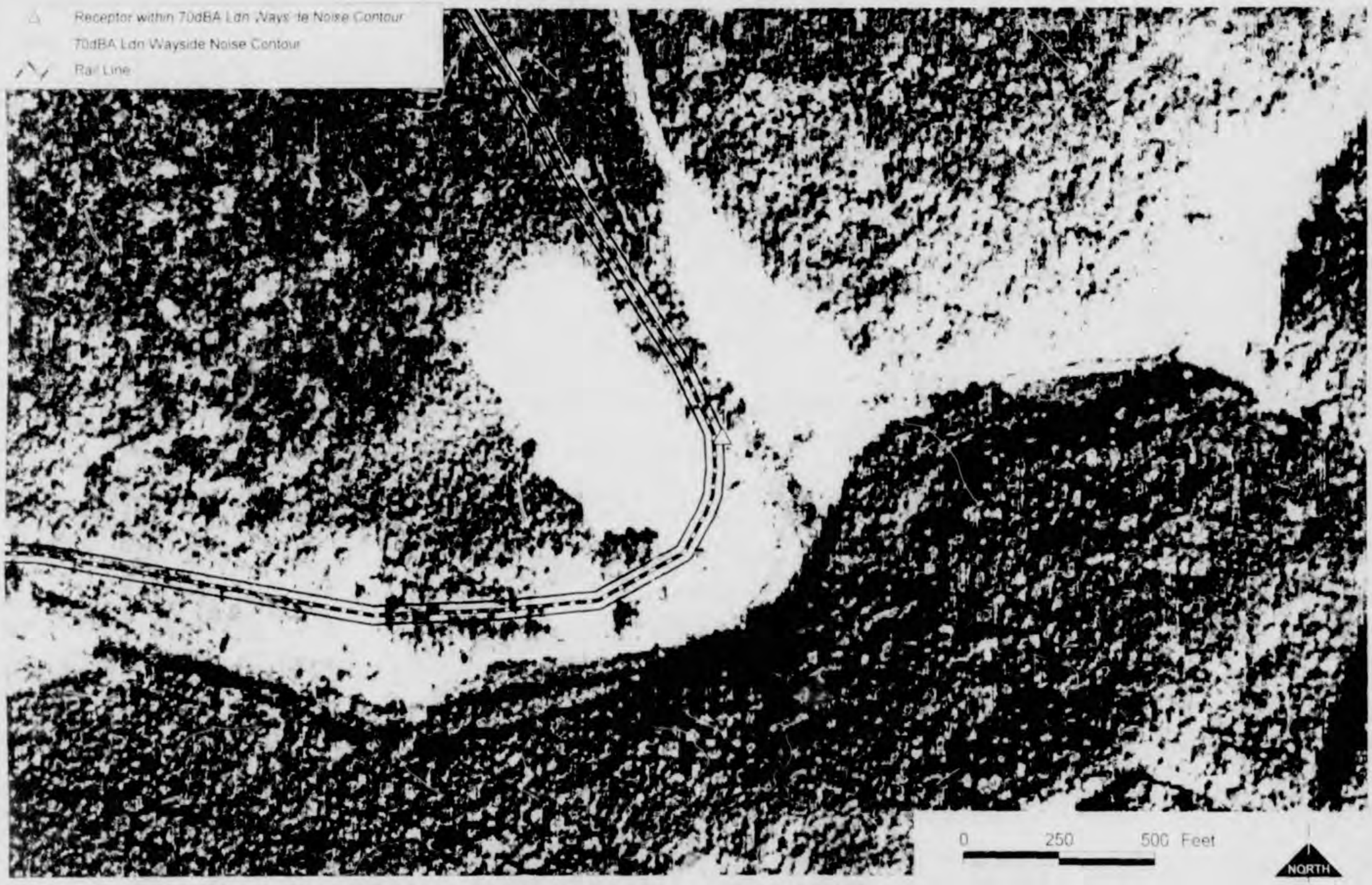

FIGURE 154 Area 1

FOLA MINE-TO-DEEPWATER, N-111 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 155 Area 2

FOLA MINE-TO-DEEPWATER, N-111 Receptors Within 70dBA Ldn Wayside Noise Contour

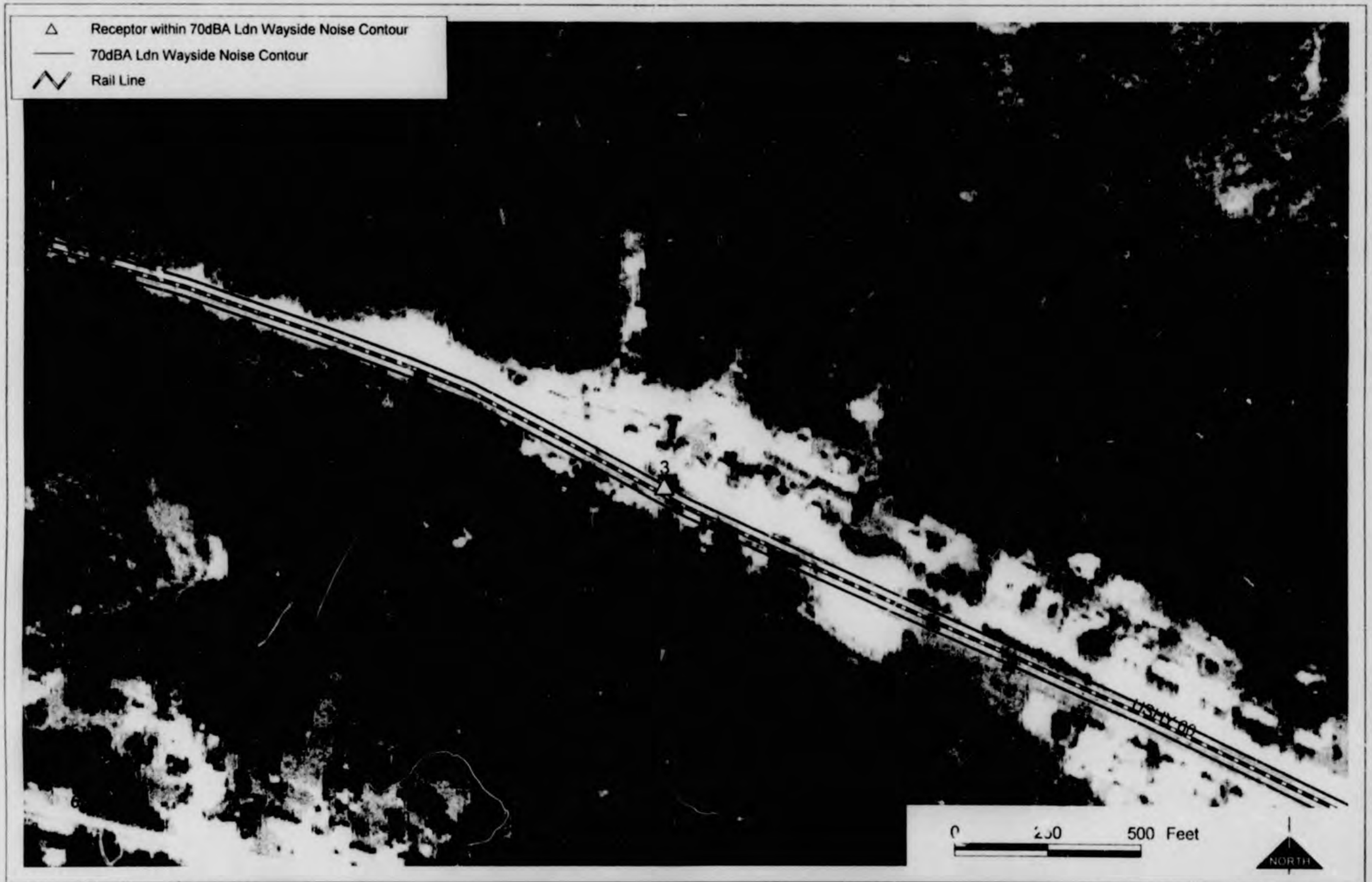

FIGURE 156 Area 3

FOLA MINE-TO-DEEPWATER, N-111 Receptors Within 70dBA Ldn Wayside Noise Contour

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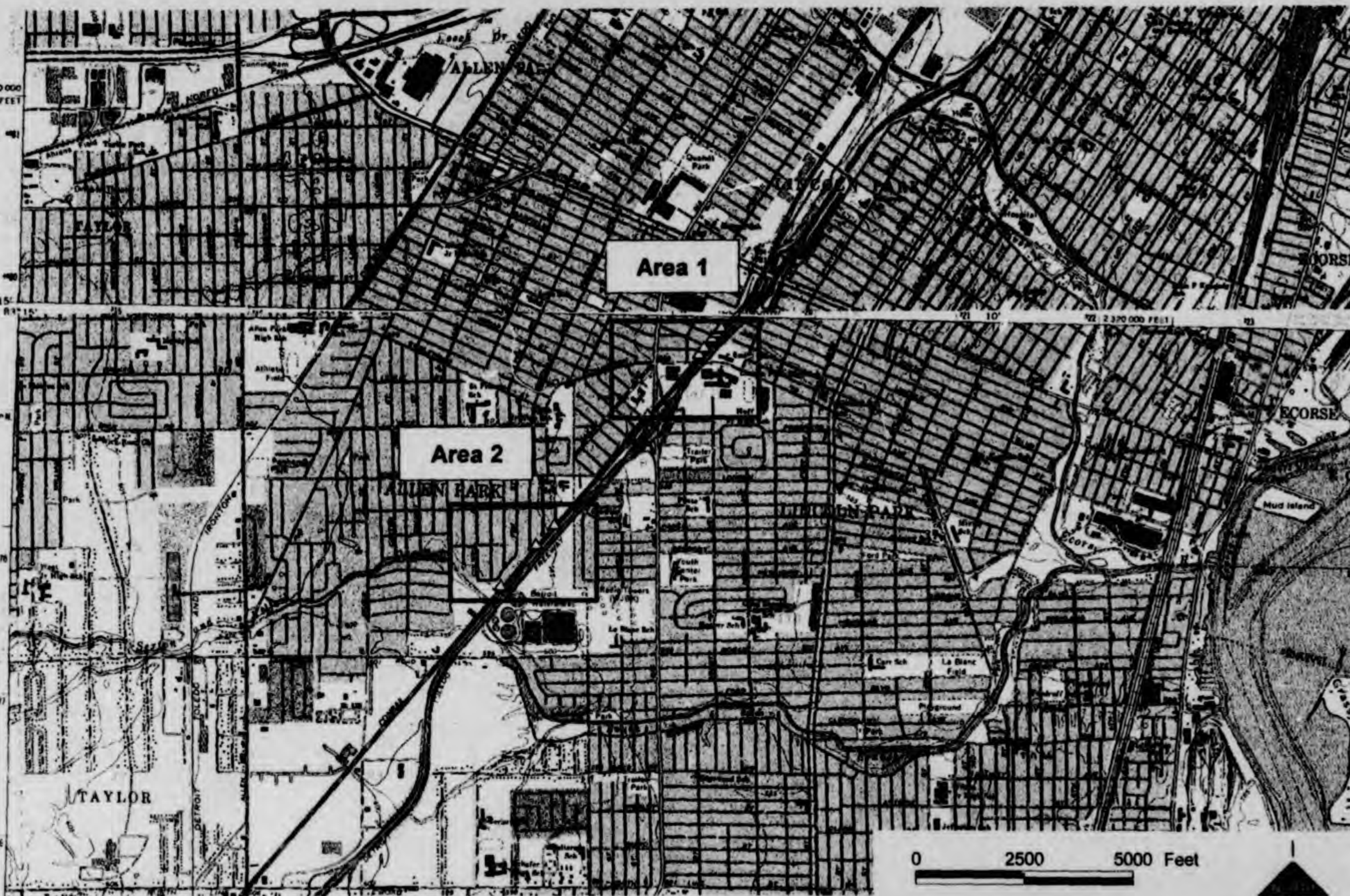

FIGURE 157A Key Map

CARLETON-TO-ECORSE, S-020 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

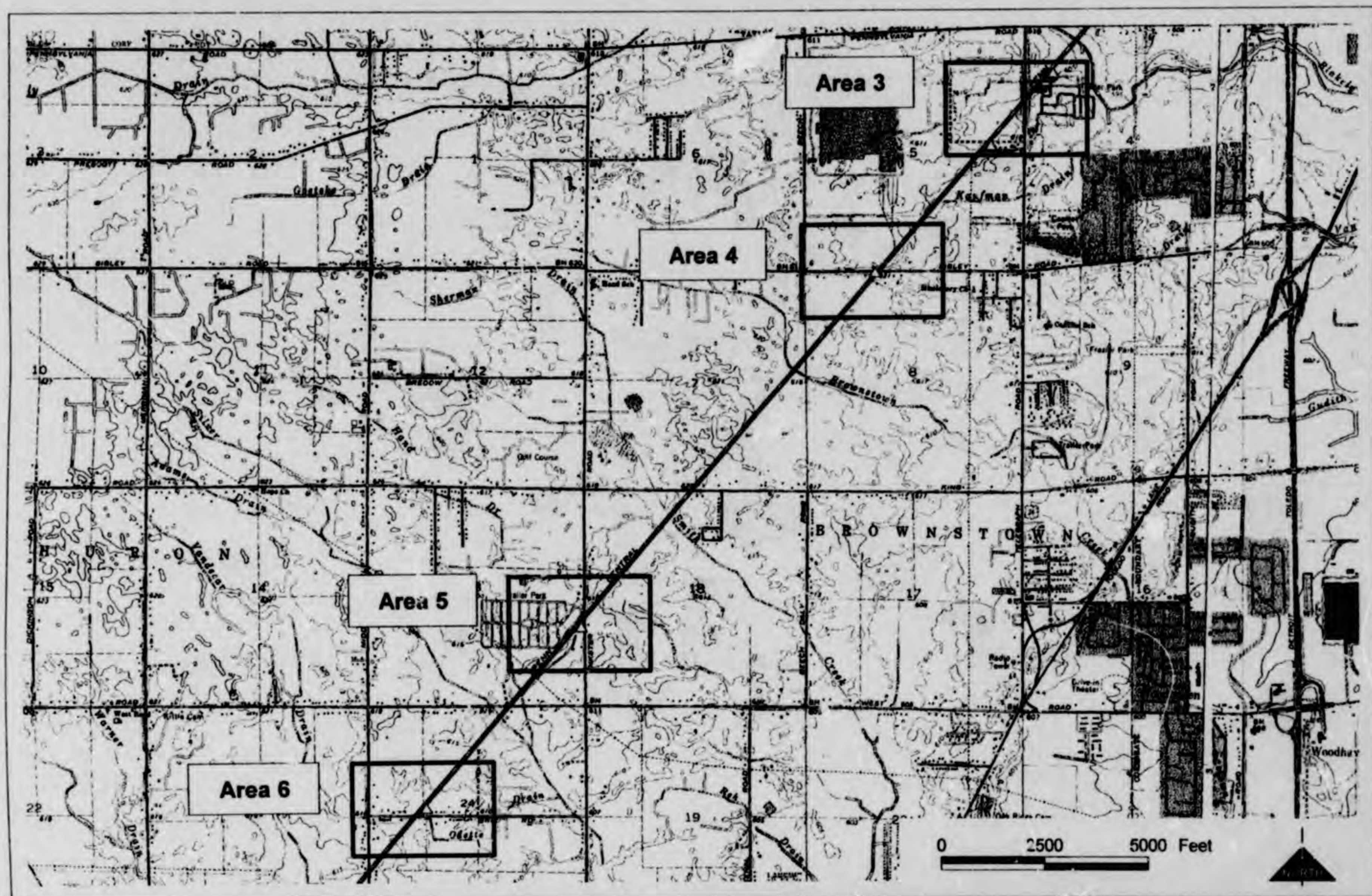

FIGURE 157B Key Map

CARLETON-TO-ECORSE, S-020 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

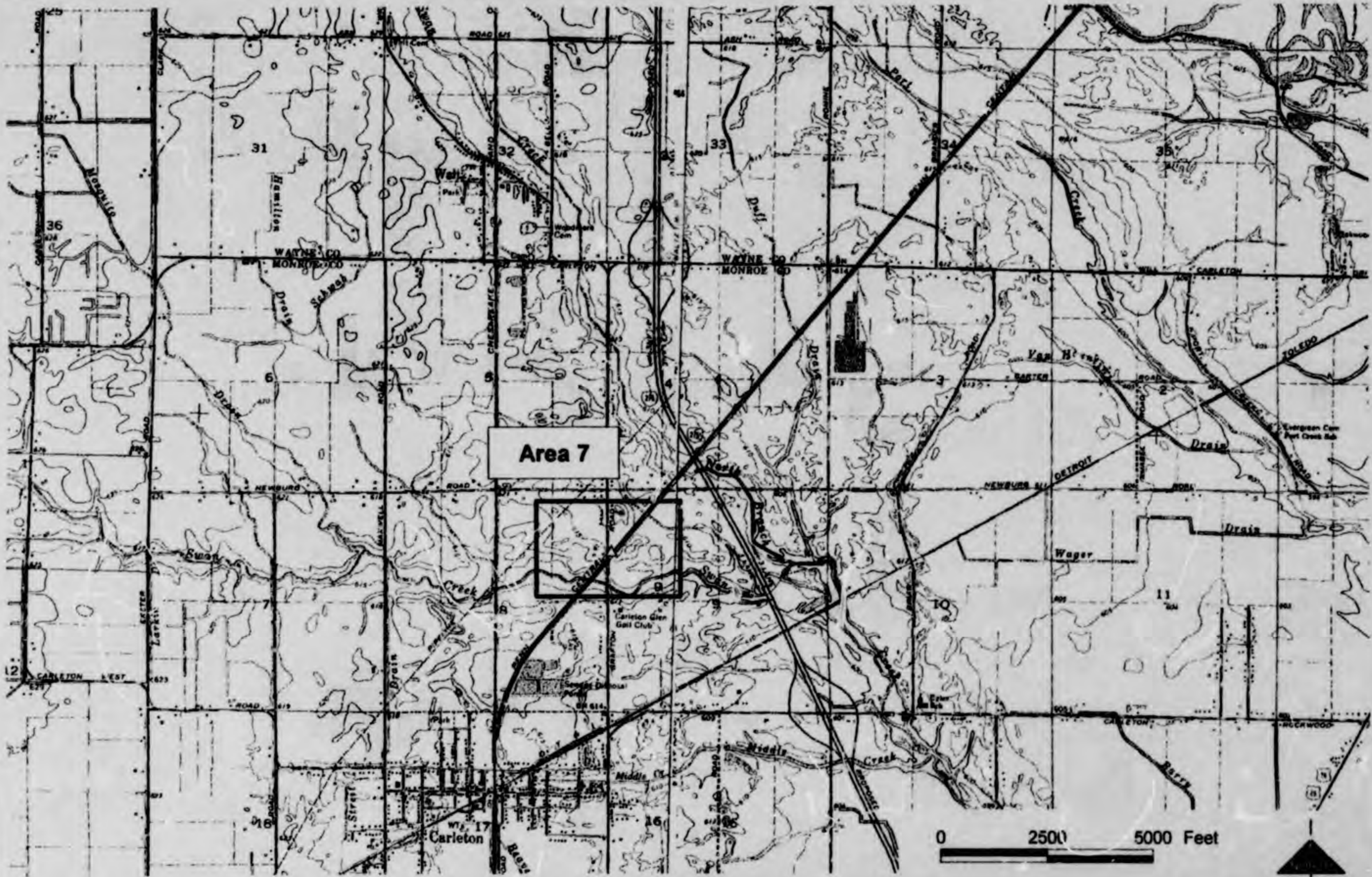

FIGURE 157C Key Map

CARLETON-TO-ECORSE, S-020 Areas Where Receptors Are Within the 70dBA Ldn Wayside Noise Contour

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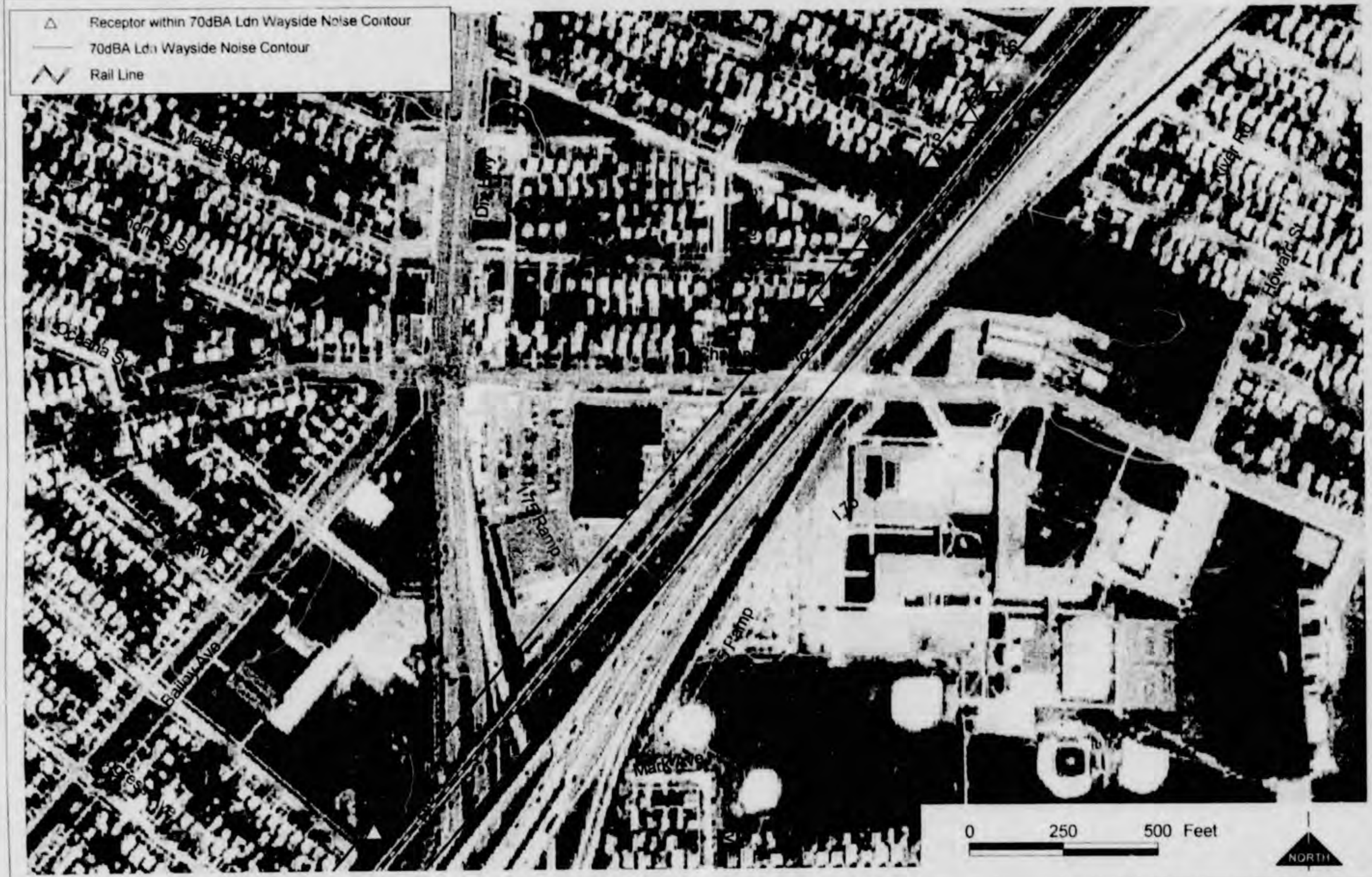

FIGURE 158 Area 1

CARLETON-TO-ECORSE, S-020 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 159 Area 2

CARLETON-TO-ECORSE, S-020 Receptors Within 70dBA Ldn Wayside Noise Contour

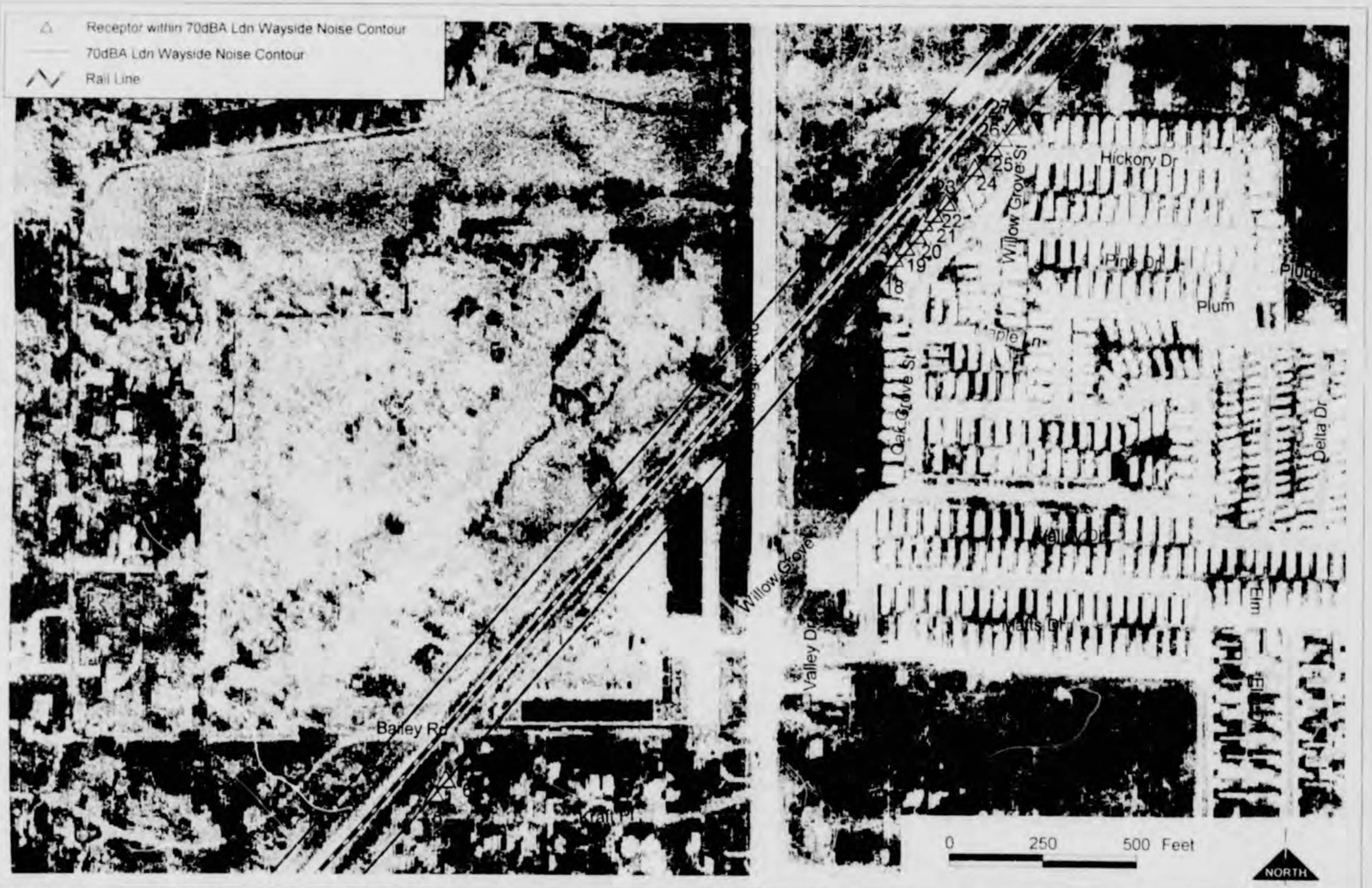

FIGURE 160 Area 3

CARLETON-TO-ECORSE, S-020 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 161 Area 4

CARLETON-TO-ECORSE, S-020 Receptors Within 70dBA Ldn Wayside Noise Contour

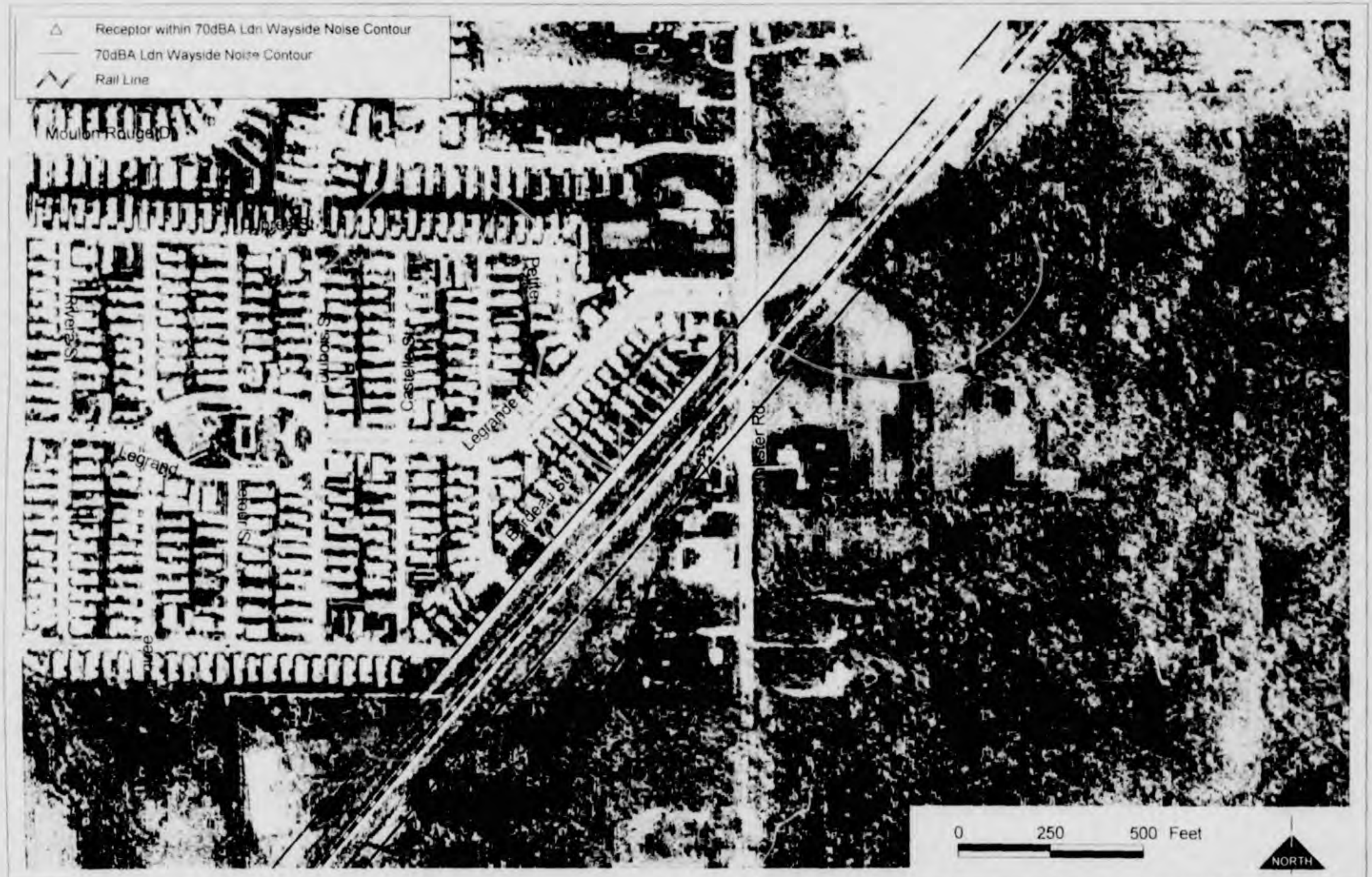

FIGURE 162 Area 5

CARLETON-TO-ECORSE, S-020 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 163 Area 6

CARLETON-TO-ECORSE, S-020 Receptors Within 70dBA Ldn Wayside Noise Contour

FIGURE 164 Area 7

CARLETON-TO-ECORSE, S-020 Receptors Within 70dBA Ldn Wayside Noise Contour

APPENDIX K
Cultural Resources Analysis

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K.3	PARIS-TO-DANVILLE ABANDONMENT	K-2

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APPENDIX K
CULTURAL RESOURCES ANALYSIS

The Section of Environmental Analysis (SEA) of the Surface Transportation Board (the Board) updated its cultural resources analysis from material presented in the Draft Environmental Impact Statement (Draft EIS) to reflect revised technical analyses of the potential environmental impacts associated with the proposed Conrail Acquisition. This appendix includes the updated cultural resources analysis SEA conducted for the Final Environmental Impact Statement (Final EIS). Specifically, SEA's analysis assessed potential impacts to cultural resources resulting from activities associated with the proposed new highway/rail grade separation on the Deshler-to-Willow Creek rail line segment (C-066) and the South Bend-to-Dillon Junction abandonment (NA02) in Indiana. This appendix also contains information on the status of Section 106 consultation on the Paris-to-Danville abandonment (CA01) in Illinois.

SEA conducted the revised analysis for this Final EIS using the same methodology presented in the Draft EIS.

K.1 RANDOLPH STREET GRADE SEPARATION

SEA recommends a highway/rail grade-separated crossing on the Deshler-to-Willow Creek rail line segment (C-066) at Randolph Street in Garrett, De Kalb County, Indiana, to replace the existing highway/rail at-grade crossing. According to preliminary designs submitted by CSX[1] in March 1998, CSX proposes creating a below-grade roadway for Randolph Street to pass under the tracks between Quincy Street and Railroad Street. The highway/rail grade-separated crossing would provide mitigation for traffic delay impacts on Randolph Street that would result from the proposed Conrail Acquisition.

SEA investigated potential impacts to cultural resources as a result of a highway/rail grade-separated crossing at Randolph Street. SEA identified buildings more than 50 years old in the general area of the recommended highway/rail grade-separated crossing; however, it is unlikely that construction of the grade-separated crossing would affect these structures because construction would occur within the Randolph Street right-of-way. SEA is consulting with the Indiana SHPO to determine the Area of Potential Effects for this site. The Indiana SHPO may require further analysis of the site when CSX has completed its detailed plans of the highway/rail grade-separated crossing.

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1 "CSX" refers to CSX Corporation and CSX Transportation, Inc.

K.2 SOUTH BEND-TO-DILLON JUNCTION ABANDONMENT

In a February 8, 1998 letter, the Indiana SHPO stated that "in regards to the archaeological aspects of the project, as long as the South Bend-to-Dillon Junction abandonment project remains within areas disturbed by previous construction, no known archaeological sites [historic properties] will be affected by this project." However, the letter also noted that the North Liberty Combination Depot (Wabash Depot), a site that is eligible for listing on the National Register of Historic Places (NRHP), was within the Area of Potential Effects. On March 5, 1998, SEA conducted a site visit and reported that the Wabash Depot no longer exists. Neighbors recollected demolition of the depot sometime from 1986 to 1987. A letter dated March 3, 1998, from NS[2] confirmed that the depot "no longer exists and was removed over nine years ago." As part of its ongoing Section 106 process, SEA will present this new information and again request the Indiana SHPO's concurrence with a finding of no historic properties for this abandonment.

K.3 PARIS-TO-DANVILLE ABANDONMENT

SEA reported in the Draft EIS that no cultural resources listed on or eligible for listing on the NRHP were present along the proposed Paris-to-Danville rail line abandonment. On January 13, 1998, SEA received a letter from the Illinois SHPO stating that their office had reviewed the Draft EIS, Chapter 5, "State Settings, Impacts and Proposed Mitigation," Section 5-IL, "Illinois," and found that the statements regarding cultural resources in Illinois were accurate.

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2 "NS" refers to Norfolk Southern Corporation and Norfolk Southern Railway Company.

APPENDIX L
Natural Resources Analysis

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APPENDIX L
NATURAL RESOURCES ANALYSIS

This appendix presents additional information about potential impacts of construction and hazardous materials transport on natural resources. The Section of Environmental Analysis (SEA) of the Surface Transportation Board (the Board) prepared this information to respond to public comments on the Draft Environmental Impact Statement (Draft EIS).

Several comments on the Draft EIS identified concerns regarding the proposed Conrail Acquisition and prospective increases in activity on rail line segments and at rail yards and intermodal facilities, as well as potential impacts on water quality. This appendix identifies existing practices that protect natural resources and describes SEA's proposed mitigation measures to further protect these resources where increased activity would occur as a result of the proposed Conrail Acquisition.

SEA addresses concerns relating to natural resources and water quality impacts as a result of the proposed Conrail Acquisition in the following three sections: Natural Resources Assessment, Stormwater Impacts Assessment, and Hazardous Materials Transport Assessment. The Natural Resources Assessment section describes the methodologies SEA used to identify environmentally sensitive areas potentially affected by the proposed Conrail Acquisition. The Stormwater Impacts Assessment section describes the potential water quality impacts associated with daily rail activities, as well as current mandatory programs and railroad practices in place to minimize potential impacts to water quality. The Hazardous Materials Transport Assessment addresses public concerns related to potential impact to water quality as a result of increased hazardous materials transport associated with the proposed Conrail Acquisition.

L.1 NATURAL RESOURCES ASSESSMENT

In the Draft EIS, SEA analyzed potential impacts to natural resources from proposed construction[1] and abandonment of rail line segments associated with the proposed Conrail

[1] The Applicants requested, and the Board granted, a separate environmental review process for seven rail construction projects (Seven Separate Connections). SEA addressed potential environmental impacts of the physical construction of the Seven Separate Connections at issue in Finance Docket No. 33388 (Sub Nos. 1 - 7), in Environmental Assessments that SEA prepared prior to and separate from this Final EIS. By a decision issued November 25, 1997, the Board approved, subject to certain environmental conditions, the physical construction of the Seven Separate Connections. This EIS, therefore, addresses only proposed operations over these connections. For further details, see Section 1.5.1, "Proposed Action."

Acquisition. (See Draft EIS, Appendix I, "Natural Resources.") This section describes SEA's investigation and analysis of the potential impacts to natural resources that may result from the proposed Conrail Acquisition.

L.1.1 Analysis Presented in the Draft EIS

SEA gathered information on the existing environmental conditions at construction and abandonment sites associated with the proposed Conrail Acquisition to determine the potential impacts to natural resources. Specifically, SEA gathered information on wetlands, water resources, and threatened and endangered species to identify any resources potentially affected by construction and demolition activity at the proposed construction and abandonment sites.

Wetland and Water Resources Analysis Procedures

SEA performed the following activities to analyze potential wetland and water resources impacts resulting from construction and abandonment activities associated with the proposed Conrail Acquisition:

- SEA reviewed U.S. Geological Survey topographic quadrangle maps for each proposed construction and abandonment site. SEA noted all surface waters, possible intermittent streams, and low-lying areas located within or adjacent to proposed construction and abandonment sites.

- SEA reviewed National Wetland Inventory maps for each construction and abandonment site. SEA noted all wetland systems for field verification during site visits.

- SEA reviewed county soil surveys for each construction and abandonment site. SEA noted all potential and known hydric soils for field verification during site visits. SEA used this information to aid in determining the potential presence of wetlands within proposed construction and abandonment sites.

- SEA reviewed appropriate Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps to determine whether proposed abandonment and construction activities are located within 100-year floodplains.

- SEA conducted field visits for wetland verification at each construction and abandonment site. SEA did not perform wetland delineations at any of the proposed construction or abandonment sites. The Applicants[2] will conduct wetland delineations as appropriate for the permitting process should the Board approve the proposed Conrail Acquisition.

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2 "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).

- SEA determined the need for National Pollutant Discharge Elimination System (NPDES) or wetland permits at each proposed construction and abandonment site after it identified potential impacts to wetlands and water resources. Because the Applicants had not determined actual construction limits when SEA conducted this analysis, SEA estimated limits based on construction and abandonment footprints to determine the need for permits.

- SEA contacted all state natural resource agencies by telephone for comments on watershed and water quality issues associated with proposed construction and abandonment activities.

Chapter 5 of the Draft EIS, "State Settings, Impacts and Proposed Mitigation," presents the results of SEA's wetland and water resources analysis for each proposed construction and abandonment site.

Threatened and Endangered Species Analysis Procedures

SEA performed the following activities to analyze potential impacts to threatened and endangered species from construction and abandonment activities associated with the proposed Conrail Acquisition:

- SEA contacted regional U.S. Fish and Wildlife Service (USFWS) and state natural resource agency representatives to determine the known and potential presence of Federally listed endangered and threatened species within proposed construction and abandonment sites.

- SEA obtained information from state Natural Heritage offices to determine habitat requirements for all Federally listed endangered and threatened species with known or potential locations within proposed construction and abandonment sites.

- SEA contacted and visited various herbaria to review preserved specimens of various protected plant species. SEA also contacted local experts to discuss the potential presence of endangered and threatened species within proposed construction and abandonment sites.

- SEA performed site visits at all proposed construction and abandonment sites to determine whether the presence of any Federally listed endangered and threatened species' habitats is known or potentially present within or adjacent to proposed construction or abandonment activity.

Chapter 5 of the Draft EIS, "State Settings, Impacts and Proposed Mitigation," presents the results of SEA's threatened and endangered species analysis for each construction and abandonment site.

facilities. Railroad facilities that are not regulated under current stormwater rules include mainline tracks, branch lines, classification yards, interchange yards, and other areas along the railroad.

EPA requires the SWPPP application to identify a pollution prevention team, describe potential pollution sources, describe appropriate stormwater management and control measures (including a schedule for implementation), and perform comprehensive compliance evaluations. EPA also requires the SWPPP to be consistent with other facility-specific plans, including:

- Spill Prevention Control and Countermeasure Plan (40 CFR 112).
- Preparedness, Prevention, and Contingency Plan (40 CFR 254).
- NPDES Toxic Organic Management Plan (40 CFR 413, 433, and 469).
- Occupational Safety and Health Association Emergency Action Plan (29 CFR 1910).

SEA reviewed selected SWPPPs from each Applicant. SEA concluded that the Best Management Practices (BMPs) that the SWPPPs describe reduce or eliminate potential and existing sources of stormwater contamination. BMPs address vehicle, material, and equipment storage; fueling; and other activities with the potential to pollute surface water runoff. Typical BMPs included in an Applicant's SWPPPs consist of the following:

- Good housekeeping, such as regular cleaning of outdoor maintenance, repair, work, and regulated areas.

- Preventive maintenance.

- Visual inspection of storage and chemical use areas.

- Spill prevention and response procedures.

- Sediment and erosion prevention.

- Runoff management practices, such as containment aprons and track pans, curbed concrete in work/maintenance areas, and oil/water separators.

- Employee training.

- Record keeping and internal reporting procedure of stormwater pollution prevention activities.

The Applicants have greatly minimized and avoided impacts to surface water by complying with EPA's NPDES Stormwater Pollution Prevention Plan program. The rail yards and intermodal facilities that are affected by the proposed Conrail Acquisition and that have NPDES-regulated activities on site have established SWPPP programs to minimize and avoid impacts to sensitive environmental receptors such as sensitive watersheds, critical habitat for Federally listed threatened and endangered species, and public water sources. Appendix P, "SEA's Best

Management Practices for Construction and Abandonment Activities," provides additional details on BMPs.

L.3 HAZARDOUS MATERIALS ASSESSMENT

A hazardous material is a substance that the Secretary of Transportation has determined is capable of posing an unreasonable risk to human safety and property when transported in commerce. (See 49 CFR Parts 172 and 173.) There are more than 50,000 generic chemicals in use throughout the nation. These generic chemicals are combined into more than 900,000 trade chemicals and mixtures, many of which, according to definition, are hazardous materials.

Increased hazardous materials transport on various rail line segments is a concern for several communities. A release of a hazardous material potentially could affect localized water quality. As this section describes, however, several factors indicate that little additional risk of a hazardous materials release exists or that minimal potential adverse water quality effects would occur as a result of the proposed Conrail Acquisition. Because it is nearly impossible to effectively determine where, when, and what type of release may occur, Federal, State, and local regulatory agencies established generalized safety methods concerning hazardous materials transport. This section explains the Applicants' safety records and precautions for hazardous materials transport. This section also explains the systems and programs currently in use to address a potential release of a hazardous material. These programs are intended to prevent accidents, to effectively respond to them, and to continually develop methods for preventing future accidents. SEA has recommended mitigation measures to address the increased risk associated with various rail line segments and rail operation facilities. This mitigation exceeds current mandatory programs to minimize potential impacts on water quality.

Given the range of hazardous materials transported nationwide, it is impossible for response agencies to effectively plan to respond to problems involving specific chemicals or mixtures. Therefore, planning, prevention, and response have focused on more general groupings or classifications of chemicals.

Chemicals occur as solids, liquids, and gases. For transportation purposes, manufacturers typically compress gases into pressurized liquids for ease and efficiency of handling. Each chemical has some measure of hazard as determined by its chemical and physical properties. Chemical properties include toxicity and reactivity, as well as volatility, water solubility, and multiphase flow potential. Physical properties determine whether a chemical is flammable or an oxidizer, or whether it may be transported in molten form. The U.S. Department of Transportation (DOT) established the following Chemical Hazard Classes according to the various groupings of these properties:

- Class 1 – Explosives and Blasting Agents.
- Class 2 – Compressed Gases.
- Class 3 – Flammable and Combustible Liquids.
- Class 4 – Flammable Solids.

- Class 5 – Oxidizers.
- Class 6 – Poisonous and Infectious Substances.
- Class 7 – Radioactive Substances.
- Class 8 – Corrosives.
- Class 9 – Other Regulated Materials.

This classification system provides standards for uniformly classifying the chemicals, keeping incompatible materials separated, and allowing response planners to prepare for a manageable set of circumstances. In addition, all chemicals in transit above threshold quantities must be clearly marked by hazard class and specific identification number.

DOT, EPA, FEMA, National Fire Protection Association (NFPA), and State and local police, fire, and emergency medical training programs recommend that all emergency response vehicles and command officers retain a copy of the DOT Emergency Response Guide, in which all major hazardous chemicals are cross-listed alphabetically and by United Nations classification number. Each chemical description includes emergency action steps to be taken by the first responder. In addition, in accordance with the NFPA's Standard 472, "Hazardous Materials Operations," all hazardous materials training programs must stipulate the importance of immediate accessibility to larger chemical information systems such as the U.S. Coast Guard's Chemical Hazard Response Information System or the Chemical Manufacturers Association free 24-hour CHEMTREC telephone hotline.

L.3.1 Chemical Migration

If a railroad accident involving hazardous materials occurs, the chemicals may migrate from the container to soil, groundwater, surface water, or air. When a response planner examines such an accident, the planner considers the pathway by which the spilled chemical might move, what action the chemical may take in that pathway, and the short-term effects and long-term impacts of the chemical movement. Table L-1 outlines the possible effects of a chemical release.

TABLE L-1
POTENTIAL EFFECTS OF A CHEMICAL RELEASE

Pathway	Potential Fate of Chemical	Potential Short Term Impact	Potential Long Term Impact
Air	Mixes	Explosive Toxic	Neutralized
Surface Water	Floats, mixes, or flashes	Human or ecological toxicity	Neutralized
Soil and Groundwater	Sinks or is absorbed	Migrates to groundwater or is trapped in soil	Migrates to groundwater; human or ecological toxicity

An important task of the rail industry is to prevent the accidental release of chemicals and petroleum products, and, if an accident does occur, to minimize the migration and impact of the chemicals upon all of the resources at risk. Railroads successfully complete these tasks through improved safety programs, training programs, attention to safe product handling and rail maintenance, quick and efficient response to accidents, and efforts to minimize the amount of chemical released.

Table L-2 presents the 10 most frequently transported hazardous chemicals and petroleum products (listed in descending order by volume transported) in the rail system that is the subject of the proposed Conrail Acquisition.

TABLE L-2
TOP 10 HAZARDOUS CHEMICALS
AND PETROLEUM PRODUCTS TRANSPORTED

Rank	Chemical	Hazard Class	Migration Pathway	Hazard	State
1	Liquified Petroleum Gas	3	Air	Flammable	Liquid to gas
2	Sodium Hydroxide	8	Surface water	Corrosive	Solid
3	Diesel Fuel	3	Surface water, groundwater	Flammable	Liquid
4	Sulfuric Acid	8	Surface water	Corrosive	Liquid
5	Chlorine	2	Air	Poison	Liquid to gas
6	Anhydrous Ammonia	2	Air surface water	Poison	Liquid to gas
7	Phosphoric Acid	8	Surface water	Corrosive	Liquid
8	Ammonium Nitrate	1 [9]	Surface water, groundwater	Explosive	Solid
9	Methyl Alcohol	3	Surface water	Flammable	Liquid
10	Vinyl Chloride	3	Surface water, groundwater	Flammable, poison	Liquid

By studying these chemicals in depth and examining the resources in the pathways they are likely to encounter, both the Applicants and local emergency response planners can prepare for most general accident scenarios. In the event of an accident, the emergency response team quickly identifies the specific chemical of concern, modifies the response action plan as appropriate, and takes corrective action.

L.3.2 Risk Potential for Hazardous Materials Transport

SEA analyzed the potential risk of rail accidents involving hazardous materials transport within the proposed Conrail Acquisition system and presented the findings in the Draft EIS, Chapter 4, "System-wide and Regional Setting, Impacts and Proposed Mitigation." SEA's analysis identified the number of accidents the Applicants reported, assessed the cause of each accident, determined the quantity of hazardous materials released, and estimated the potential effect of increased rail activity as a result of the proposed Conrail Acquisition.

SEA updated this analysis for the Final EIS based on revised and updated information. The increased risk potential for the 247 rail line segments that would experience an increase in volume of hazardous materials transported is presented in Appendix F, "Safety: Hazardous Materials Transport Analysis," Attachment F-4. SEA determined that because accidents are so infrequent, meaningful criteria for significance could not be based solely on the predicted accident interval. SEA determined that a more useful measure for determining adverse effects was to examine the increases in hazardous materials traffic on a segment-by-segment basis. SEA considered hazardous material transport impacts significant if such transport would either increase to more than 10,000 carloads per year for a key route or would at least double and exceed 20,000 carloads per year for a major key route. Appendix F presents the results of SEA's hazardous materials transport analysis of all rail line segments. Chapter 7, "Recommended Environmental Conditions," describes key route and major key route mitigation measures.

SEA also analyzed the risk potential associated with hazardous materials transport at intermodal facilities and rail yards for the Draft EIS and determined that the proposed Conrail Acquisition would not cause a system-wide change in accident rates or hazardous material releases. (See Draft EIS, Appendix B, "Safety.")

L.3.3 Mitigation for Potential Releases

SEA reviewed the Operating Plans submitted by the Applicants. These plans indicate that the Applicants have detailed policies and procedures for prevention of and rapid response to hazardous materials emergencies. These procedures, as well as additional third-party safety programs that the Applicants voluntarily adopted, are described in detail in the Draft EIS, Appendix B, "Safety." The Operating Plans contain specific written procedures for the safe movement and handling of hazardous materials. These procedures cover rail yards and intermodal facilities.

In addition to the accident prevention and response plans outlined in the Applicants' Operating Plans, SEA recommends that the Applicants design a Failure Modes and Effects Analysis (FMEA) program at CSX, NS, and Shared Assets Areas rail yards and intermodal facilities, which will exceed the Board's thresholds for environmental analysis, to address the sources and consequences of spills of both stored and transported hazardous materials. (See Chapter 7, "Recommended Environmental Conditions.") The FMEA program would be designed to reduce the risk of hazardous materials spills by identifying potential causes for such spills and eliminating or reducing the likelihood of the potential causes prior to an incident. Attachment L-1 provides a general description of the FMEA methodology.

SEA emphasizes that the existing regulatory structure ensures that areas and local communities have emergency response plans in place. Title III, Emergency Planning and Community Right-to-Know, of the Superfund Amendments and Reauthorization Act of 1986 [SARA Title III] requires local emergency planning committees to plan for possible releases of hazardous substances. SARA Title III establishes State Emergency Response Commissions (SERC) and requires that they, in turn, form Local Emergency Planning Committees (LEPC). A publicly coordinated LEPC exists in every county in the United States and is responsible for hazardous materials response planning for its locality.

Other Federal regulations have established the National Contingency Plan (40 CFR 300) and National Response Team, the Integrated Contingency Plan ("One Plan"), the Regional Contingency Plans and Regional Response Teams, and the Area Response Plans. These planning initiatives build upon the work of the LEPCs and SERCs, as well as the EPA's Chemical Emergency Preparedness Program (CEPP).

In addition to these Federal and regional frameworks, local governments operate under municipal laws setting forth public safety responsibilities. In general, municipal laws assign local responsibilities to fire departments and police agencies for protection against hazardous materials releases and other emergencies that threaten life and/or property.

EPA recommends that planning committees use the National Response Team guidance documents NRT-1 (Planning Guide), NRT-1A (Criteria for Plan Review), and EPA's Technical Guidance for Hazards Analysis as a basis for planning response activities. These documents ensure that areas and local communities consistently prepare contingency plans to a recognized standard and involve private firms and public agencies that have hazardous materials on site.

When an accident causes a hazardous materials release on private property but the release poses no threat to life and/or property through migration via surface water, groundwater, or air, the responsible private authority has the sole responsibility and authority for control and cleanup of the spill according to standards and regulatory mandates. If an uncontrolled release of hazardous materials migrates from private property and constitutes a threat to nearby life and/or property, the proper Federal, State, and local authorities must attempt a public emergency response.

The following paragraphs describe Federal regulations established to protect human health and environmental resources from contamination.

The Rivers and Harbors Act of 1899, as amended, addresses actions that potentially could affect navigable rivers. Section 9 of the Act specifically governs the construction of bridges across navigable waters, and Section 10 addresses any other construction-associated obstruction within navigable waters. The U.S. Coast Guard and the U.S. Army Corps of Engineers have permitting authority under this act.

The intent of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under Sections 401, 402, and 404 of this act, permits must be obtained for any activity with the potential to affect wetlands and waterways. Section 401 requires the appropriate state agency to certify that the regulated activity will not violate state water quality standards. Section 402 establishes stormwater discharge permits through the NPDES. Section 404 requires that a permit be obtained for the discharge of dredged or fill material into waters of the United States, including wetlands. The U.S. Army Corps of Engineers is the permitting authority for Section 404.

The U.S. Department of Interior, USFWS, and the Department of Commerce National Marine Fisheries Service are responsible for safeguarding all species, with particular emphasis on Federally threatened and endangered species. The USFWS has the authority to develop special species recovery plans that anticipate worst-case scenarios of hazardous materials releases and potential impacts on threatened and endangered species. The USFWS is also responsible for fully communicating species recovery plans to local and regional emergency response planners. Emergency response plans frequently include special stipulations to help implement the species recovery plan.

L.3.4 Hazardous Materials Assessment Conclusions

Although the hazardous materials assessment characterizes efforts to avoid hazardous materials accidents and respond to incidents involving hazardous materials, SEA emphasizes that the estimation of future releases is uncertain because so few incidents occur in any given year. SEA believes that the Operating Plans and recommended Failure Modes and Effects Analysis will ensure the continued improvement of the shipment and handling of hazardous materials on a system-wide basis. In addition, SEA's recommended mitigation for key routes and major key routes will further reduce or eliminate any increased risk of a release due to the proposed Conrail Acquisition.

A review of the data in the Applicants' Operating Plans shows that the proposed Conrail Acquisition would result in the operation of approximately 1.9 percent more car-miles[3] per day of cars carrying hazardous material. (See Appendix F, "Safety: Hazardous Materials Transport Analysis.") Due to the infrequency of accident events, however, it is difficult to quantify the potential increase in hazardous material releases from accidents. The proposed concentration of railroad freight traffic in larger quantities (allowing grouping of rail cars) would result in a system-wide decrease of 4 percent in rail yard freight car handling. This would result in a slight reduction of the potential of a hazardous materials release.

More efficient hazardous materials transport, implementation of SEA's final recommended mitigation measures, and continual evaluation of the effectiveness of the Operating Plans, would

[3] A car-mile is one rail car carried one mile. The system-wide calculation is the annual number of carloads transported on a rail line segment multiplied by the length of the segment.

result in little or no system-wide or regional significant adverse impacts related to hazardous materials transport or handling as a result of the proposed Conrail Acquisition.

SEA believes that the extensive existing regulatory framework, combined with the additional mitigation measures described here and in Chapter 7, "Final Recommended Mitigation," will minimize any potential impacts that hazardous materials transport or handling associated with the proposed Conrail Acquisition might have on water quality.

ATTACHMENT L-1

Failure Mode and Effects Analysis (FMEA)

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ATTACHMENT L-1
FAILURE MODE AND EFFECTS ANALYSIS (FMEA)

INTRODUCTION

A hazardous material release during switching activities in rail yards or container handling and storage in intermodal facilities may cause an adverse exposure of employees, the general public, or the environment to the material. A Failure Mode and Effects Analysis (FMEA) can help the Applicants identify improvements to prevent or minimize such releases.

PURPOSE

The purpose of the FMEA is to prevent or minimize the frequency and consequences of releases of hazardous materials. An FMEA is a systemized set of activities intended to:

- Recognize and evaluate the potential for an incident involving hazardous material tank cars or containers and the consequences and effects of such incidents.
- Identify actions that could eliminate or reduce the likelihood of the potential incident
- Document the FMEA process.
- Periodically review and revise the FMEA while incorporating recent incident history.

PREPARATION

Before beginning a FMEA, the user must identify the specific activities to review, identify the FMEA team, and compile information about the identified activities. The activity(ies) must be specific to allow the FMEA team to evaluate individual activity steps and to avoid evaluating activities and activity steps that are unlikely to cause a failure. For example, "review of rail yard operations" may be too general an activity to review, but "review of rail car marshaling for tank cars (or containers) containing hazardous materials" could help focus a team concentrating on hazardous material spills. The members of the FMEA team should have experience and expertise including yard operations and equipment, safety and hazardous materials operations, and FMEA methodology.

Adequate information is essential to enable the team to effectively review all aspects of the activities undergoing the FMEA. Rail yard and intermodal facility activity descriptions, along with block flow diagrams, can provide excellent representations of specific activities that show individual activity steps and associated equipment and personnel. These items can assist the team in identifying potential causes of failures (hazardous material spills) and identifying possible improvements to prevent failures. Part of the FMEA may include the generation or refinement of activity descriptions and block flow diagrams to enable the team to adequately analyze all aspects of the activity.

METHODOLOGY

The Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (EPA) recognize FMEA as an acceptable form of process hazard analysis. The OSHA process safety management program requires a process hazard analysis for certain processes that involve highly hazardous chemicals (29 CFR Part 1910.119 (e)). The EPA Accidental Release Prevention Program (40 CFR Part 68) also recognizes FMEA as an acceptable form of process hazard analysis.

The methodology described here combines a qualitative approach to analyzing processes for potential failures and effects with a quantitative approach to ranking potential causes of the failures. This methodology results in a numerical ranking of potential causes, which allows for a corresponding ranking of actions to prevent specific process failures.

Although the purpose of FMEA is well-defined—prevent or minimize hazardous material spills and their consequences—the specific methodology for FMEA lacks definition. The FMEA team can and should tailor the methodology to the specific type of industry and processes it is analyzing. For example, an FMEA for a tank car failure could include the following specific definitions:

- Purpose – The tank car's purpose is to contain a hazardous material during transportation without a release.

- Failure – The potential failure is a release of the hazardous material to the environment.

- Effects – The effects of the potential failure range from no environmental impact or personal injury to a significant risk of an environmental impact or fatality. Table L-1.1 presents a format for documenting and recording the FMEA, as follows: The FMEA team identifies the specific steps or components of an activity and their related functions. The FMEA team then identifies the potential failures of each activity step or component (e.g., a spill of hazardous material might be a potential failure of a rail yard marshaling activity) as well as the potential effects of such failures (e.g., personnel exposure to the material and environmental impacts). The FMEA team ranks the seriousness of the potential effects ("severity") based on specific criteria on a scale of 1 to 10. Table L-1.2 presents possible criteria for evaluating and ranking severity of hazardous material spills.

Once the FMEA team reaches a consensus on how to define the potential failures of the activity, the next step is to identify the potential causes of failures. The team should identify these potential causes in terms of measurable or identifiable items that subsequently can be corrected or controlled. For example, the team might identify coupler bypass as a potential cause of failure and in turn identify retarder maintenance as the root cause of the coupler override.

The FMEA team also ranks the likelihood of specific failure causes ("occurrence"). Occurrence is the projected frequency of the failure cause ranked on a scale of 1 to 10. Table L-1.3 presents possible criteria for evaluating and ranking occurrence of failures.

The FMEA team then prioritizes potential causes of the identified failures by multiplying each severity (S) and occurrence (O) ranking to yield the Risk Priority Number (RPN).

$$RPN = (S)(O)$$

The RPN range is 1 through 100, with higher RPNs indicating a higher priority. In general practice, regardless of the resultant RPN, special attention should be given when severity is high. The RPNs should be used to order the concerns in the activity. For higher RPNs the FMEA team should identify corrective action(s) to reduce the risk of a failure. For example, if the RPN indicates that poor retarder maintenance is the primary cause of coupler bypass, the team may identify an adequate retarder maintenance schedule or periodic tests as appropriate action items.

Although the numerical values associated with the severity and occurrence rankings are somewhat subjective, the resulting RPNs nonetheless provide a decision-making tool for addressing future corrective actions to reduce environmental safety risks associated with hazardous material spills at rail yards and intermodal facilities.

FINDINGS AND RECOMMENDATIONS

The FMEA team can summarize the results of the RPN rankings in the form of a prioritized list of action items. Management should establish a system to promptly address the team's action items. The system should document the actions to be taken, the associated responsible persons, and target completion dates. (See Table L-1.1.)

The FMEA team should periodically review and update the FMEA in order to track the progress made in implementing the recommended action items and to generate new RPNs for the new actions. The FMEA team should establish a schedule for reviewing and revising the original FMEA. During that process, the team should incorporate updated incident histories, thereby identifying new action items that may be appropriate to continue reducing the risk of hazardous material spills.

FMEA provides a means for identifying possible causes of activity failures and for identifying solutions to these failures. The FMEA structure, however, is flexible enough to allow the team to organize the analysis according to its specific industry and activity needs and to merge the FMEA with ongoing safety and quality programs.

TABLE L-1.1
FAILURE MODE AND EFFECTS ANALYSIS FORMAT

Purpose: Reduce the number of hazardous material spills

Activity: Marshaling of hazardous material cars in rail yards.

Activity Responsibility (Dept.) ______

FMEA Document Number ______

Page ______ of ______

Prepared by ______

FMEA Date (Orig.) ______ (Rev.) ______

Activity Step	Function	Potential Failure Mode	Potential Effects of Failure	S	Potential Causes of Failure	O	RPN	Recommended Actions and Status	Responsibility and Target Completion Date	Action Results (Revised RPN)			
										Actions Taken	S	O	RPN
(Step #1) Receive incoming train.	Classification Yard Remove road locomotives. Add hump engine. Remove caboose or rear end device. Perform incoming mechanical inspection.	Release of hazardous material through tank car fitting.	Employee exposed to the hazardous material.	x_1	Loose fitting on tank car *Additional causes would be assigned "y_2", "y_3", etc.*	y_1	x_1y_1	Determine shipper and reinforce departure closure and inspection procedures.	John Smith, March 31, 1998				
	Intermodal Yard Spot-train for unloading. Straddle or piggy packer unload. Truck hauls away.	Rough handling of container creates release of hazardous material.	Employee exposed to the hazardous material.	x_2	Failure of crane operator to exercise caution. *Additional causes would be assigned "y_3", "y_4", etc.*	y_2	x_2y_2	Supervisory inspection and tests of operational activities.	John Smith, March 31, 1998				
Additional Steps													

TABLE L-1.2
EVALUATION CRITERIA AND RANKING FOR "SEVERITY"[a]

Word Description	Severity of Effect	Ranking
Catastrophic	Death to member of the public or employee; significant physical damage and/or environmental impact to facility and/or private property. (9 with warning, 10 without warning)	10 9
Critical	Severe injury to person or employee, requiring hospitalization; evacuation of public facilities as a result of health risk due to commodity released.	8 7
Moderate	FRA-reportable injury to person or employee not requiring hospitalization; cautionary evacuation of public facilities until actual risk due to commodity release can be determined.	6 5 4
Low	Release of a hazardous material requiring DOT reporting without a FRA-reportable injury to an employee; no evacuation of public facilities but may involve a total or partial evacuation of railroad facilities.	3 2
Minor	Incident involving damage or suspected damage to a tank car or container requiring inspection to ensure that a release of hazardous materials did not occur or will not occur in transportation.	1

[a] Severity (S) is an assessment of the seriousness of the effect of the potential failure. Severity, which applies to the effect only, is ranked on a 1 to 10 scale.

TABLE L-1.3
EVALUATION CRITERIA AND RANKING FOR "OCCURRENCE"[a]

Word Description	Probability of Failure	Ranking
Very High	Not an unusual event; could occur several times annually.	10 9
High	Failure could occur several times in a two-year period.	8 7
Moderate	Failure expected to occur at least once in a two-year period.	6 5 4
Low	Unlikely to occur in a two-year period.	3 2
Remote	Failure is not expected to occur or has never occurred in the history of the facility.	1

[a] Occurrence (O) is the estimated frequency of the specific failure cause. The occurrence ranking number is a relative ranking—not an absolute value. The team estimates the likelihood of the occurrence on a 1 to 10 scale. The ranking should not take into account failure-detecting measures. The "Probability of Failure" is based on the number of failures anticipated during the activity. The team should use statistical data from a similar activity to determine the occurrence ranking, if possible. In all other cases, a subjective assessment can use the word descriptions in the left column of the table, along with any historical data available for similar activities.

REFERENCES

Canadian Standards Association, *Risk Analysis Requirements and Guidelines, Document CAN/CSA-Q634-91* (1991).

Chrysler, Ford, and General Motors, in collaboration with the Automotive Division of the American Society for Quality Control (ASQC) and the Automotive Industry Action Group (AIAG), *Potential Failure Mode and Effects Analysis (FMEA), Reference Manual* (1993).

Coastal Video Communications Corporation, *Process Safety Management Compliance Manual* (1993).

HDR Engineering, Inc., *Potential Failure Mode and Effects Analysis (FMEA) Report, Monroe Auto Equipment* (March 1996).

Spellman, Frank R., *A Guide to Compliance for Process Safety Management/Risk Management Planning (PSM/RMP),* Technomic Publishing (1997).

APPENDIX M
Environmental Justice Analysis

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APPENDIX M
ENVIRONMENTAL JUSTICE ANALYSIS

This appendix presents the analysis the Section of Environmental Analysis (SEA) of the Surface Transportation Board (the Board) performed to assess the environmental justice effects of the proposed Conrail Acquisition and its alternatives. The goals of this assessment are to:

- Identify those areas where minority and low-income populations could bear disproportionately high and adverse impacts.
- Identify and assess appropriate mitigation measures for environmental justice populations with the potential to experience disproportionately high and adverse impacts.

M.1 BACKGROUND INFORMATION

In February 1994, President Clinton issued Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." This Order urges Federal agencies to make achieving environmental justice part of their mission. The Order requires Federal Executive Branch agencies, and requests independent agencies, to conform to existing laws to ensure that their actions:

- Do not discriminate on the basis of race, color, or national origin.
- Identify and address "disproportionately high and adverse human health or environmental effects" of their actions on minority and low-income populations.
- Provide opportunities for community input in the National Environmental Policy Act (NEPA) process, including input on potential effects and mitigation measures.

Although the Board is not a Federal Executive Branch agency, SEA conducted an environmental justice analysis because:

- The President requested agencies to comply with the Order (see Section 6-604 of the Order), particularly during the NEPA process.

- The U.S. Department of Transportation (DOT) Order and Council on Environmental Quality (CEQ) and U.S. Environmental Protection Agency (EPA) guidance emphasize addressing environmental justice concerns in the NEPA context.
- The Board is responsible for ensuring that this proposed transaction is consistent with the public interest.

In the context of the proposed Conrail Acquisition, SEA determined that the Executive Order, Federal agency guidance, and public interest warrant addressing:

- Whether the proposed Conrail Acquisition could have disproportionate high and adverse impacts on minority and low-income populations.

- If so, whether disproportionate high and adverse impacts could be eliminated or mitigated with reasonable and feasible mitigation measures.

- Whether it is appropriate to modify recommended mitigation measures to meet the needs of a disproportionately affected minority or low-income population.

M.1.1 Summary of Draft EIS Environmental Justice Analysis Methodology and Conclusions

In the Draft Environmental Impact Statement (Draft EIS), SEA examined a broad range of potential health and environmental effects that could result from the proposed Conrail Acquisition, including highway/rail at-grade crossing safety and delay, air quality, noise, cultural resources, hazardous waste sites and hazardous materials transport, natural resources, and land use/socioeconomics. SEA evaluated all activities related to the proposed Conrail Acquisition that would meet or exceed the Board's thresholds for environmental analysis, including proposed changes in operations on rail line segments and at intermodal facilities and rail yards, as well as new proposed rail constructions. (See Draft EIS Chapter 3, "Environmental Justice," and Appendix K, "Environmental Justice.")

SEA outlined six major steps in the Draft EIS to analyze potential disproportionate effects of the proposed Conrail Acquisition on environmental justice populations:

- Identify the potential health and environmental effects of the proposed Conrail Acquisition based on impact assessments performed for the other environmental resource categories (for example, noise or hazardous materials transport).

- Determine whether these potential effects might occur in minority or low-income populations by identifying the geographic areas where potential effects are likely to occur and identifying the minority and low-income populations within the Areas of Potential Effect.

- Assess whether the potential effects are "high and adverse" by comparing them to the criteria of significance SEA used for its other environmental resource analyses.

- Determine, after opportunity for input from the affected communities, whether potentially high and adverse effects would be disproportionate in environmental justice populations.

- If the impacts on environmental justice populations would be disproportionately high and adverse, identify and assess alternatives and potential mitigation measures.

- Determine appropriate mitigation measures to avoid or reduce the disproportionate effect. Using this process, SEA identified potential high and adverse impacts on environmental justice populations along 14 rail line segments and adjacent to one intermodal facility and associated truck routes. The potentially affected populations reside in Illinois, Indiana, Maryland, Ohio, Pennsylvania, and the District of Columbia.

As outlined in the Draft EIS, Chapter 3, "Analysis Methods and Potential Mitigation Strategies," Section 3.17.1, "Environmental Justice Analysis," SEA conducted targeted public outreach to potentially affected environmental justice populations near each of the 14 rail line segments and the intermodal facility and associated truck routes. SEA sought public input on the existence of any disproportionate impacts, the appropriateness of mitigation measures, and alternatives to reduce or avoid disproportionate impacts, among other things. (For further discussion of SEA's public outreach efforts, see Chapter 3, "Agency Coordination and Public Outreach," Section 3.3, "Environmental Justice," of the Final Environmental Impact Statement [Final EIS].)

M.1.2 Public Comments and SEA Response

SEA received and prepared responses to public comments on the environmental justice analysis presented in the Draft EIS. SEA incorporated several of the comments to refine its analysis of environmental justice impacts for this Final EIS. Chapter 5, "Summary of Comments and Responses," of this Final EIS presents a complete listing of these public comments and SEA's responses to them.

M.2 METHODOLOGY

SEA's environmental justice analysis for this Final EIS completes and refines the six-step approach outlined in the Draft EIS. This section of the Final EIS describes how SEA incorporated both additional information from the Applicants[1] and refined data from other environmental resource analyses (that is, noise, hazardous materials, and highway/rail at-grade

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).

crossing safety and traffic delay) into its environmental justice analysis, responded to public comments, and identified and evaluated disproportionately high and adverse impacts to environmental justice populations.

M.2.1 Identifying the Potential Health and Environmental Effects

In the Draft EIS, SEA announced its intent to use the impact assessments from other environmental resource categories (for example, noise or hazardous materials transport) as the basis for its environmental justice analysis. The Final EIS continues this approach, incorporating the results of refined analyses for noise, hazardous materials transport, and highway/rail at-grade crossing safety and delay discussed in Chapter 4, "Summary of Environmental Review," of this Final EIS. In response to public comments and consistent with this approach, SEA also evaluated possible impacts on minority and low-income populations along the alternative routes proposed by commentors in Indiana, Ohio, and Pennsylvania (see Appendix N, "Community Evaluations" of this Final EIS) for disproportionately high and adverse effects on minority and low-income populations.

M.2.2 Determining Whether Potential Effects Might Occur in Minority and Low-income Populations

In the Draft EIS, SEA identified geographic and demographic information to determine whether potential effects might occur in minority and low-income populations.

In the Final EIS, SEA continued this approach, refining its delineation of Areas of Potential Effect and its demographic analyses to reflect a more exact setting of rail line segment end points, using Geographic Information System-based mapping techniques.

In the Draft EIS, SEA determined that no high and adverse effects would exist in environmental justice populations adjacent to rail yards, new constructions, or abandonments. After review of the public comments, SEA concluded that this determination is correct. Therefore, SEA did not conduct further environmental justice analysis of these proposed activities in the Final EIS.

In the Draft EIS, SEA identified potential high and adverse environmental effects on environmental justice populations at only one intermodal facility, the 59th Street intermodal facility in Chicago, Illinois. Since the Draft EIS, CSX furnished SEA with the terms of an enforceable agreement with the City of Chicago to address that City's noise, traffic, and socioeconomic concerns about the proposed Conrail Acquisition. SEA determined that this agreement would adequately mitigate the potential high and adverse environmental effects on the City's residents, so SEA did not conduct a further environmental justice analysis of this intermodal facility.

Since issuing the Draft EIS, the Applicants expanded the proposed Conrail Acquisition to include two new intermodal facilities, one in Sandusky, Ohio (Sandusky NM-11), and the other in Philadelphia, Pennsylvania (AmeriPort NM-13). SEA analyzed the minority and low-income populations adjacent to these facilities and the associated truck routes. Neither met the definition of environmental justice populations, so SEA did not conduct a further environmental justice analysis of these intermodal facilities. (See Attachment M-1.)

The environmental justice analysis in this Final EIS, therefore, primarily addresses impacts to environmental justice populations along rail line segments. The analysis requires delineating an Area of Potential Effect (that is, a geographical area surrounding a rail line segment where a population could experience adverse health or environmental effects). For this analysis, the Area of Potential Effect is that portion of a census block group located within a specific distance from a rail line segment. (See the Draft EIS, Chapter 3, "Analysis Methods and Potential Mitigation Strategies," Section 3.17.1, "Environmental Justice Analysis," for a full discussion of Area of Potential Effect boundaries.)

In response to public comments on the Draft EIS, the Final EIS analysis makes one minor change to the distances (from the rail activity) used to define the Area of Potential Effect. In the Draft EIS, SEA defined the Area of Potential Effect as the maximum area potentially exposed to the Board's threshold for noise analysis of 65 dBA. (See the Draft EIS, Chapter 3, "Analysis Methods and Potential Mitigation Strategies," Section 3.17.1, "Environmental Justice Analysis.") In response to comments on the Draft EIS regarding the potential impacts of hazardous materials transport on surrounding communities, SEA expanded its delineation of the Area of Potential Effect to account for rail line segments whose route designation following the proposed Conrail Acquisition would change to a new key route or major key route. Along these routes, SEA redefined the Area of Potential Effect to be 1,500 feet on either side of the rail line tracks. SEA chose this number to maintain consistency with the maximum width of the Area of Potential Effect as defined in the Draft EIS (based on noise criteria) and to provide a more conservative analysis of the potential hazardous materials impacts on the surrounding community as suggested in the comments. This change affected only four rail line segments.

SEA then characterized the population within each Area of Potential Effect as an environmental justice (that is, minority and low income) or nonenvironmental justice population. The Final EIS used a definition of minority and low-income population identical to the one used in the Draft EIS. SEA defined a minority and low-income population as one in which either 50 percent or more of the residents within the area are minority or low income, or the percentage of minority or low-income residents in the area is more than 10 percent greater than that of the county in which the area is located. The smallest geographic level at which the U.S. Census Bureau provides this information is at the block group level. The Final EIS, like the Draft EIS, therefore assumes that the population within a block group is homogeneously distributed with regard to race, ethnic group, income, and density. In other words, SEA assumed that the population within the Area of Potential Effect portion of the block group is identical to that of the block group as a whole. SEA conducted extensive site visits to verify this assumption wherever this environmental justice analysis indicated that additional mitigation might be warranted.

In the Draft EIS, SEA aggregated census data from the Area of Potential Effect portion of block groups along individual rail line segments to determine the minority or low-income population adjacent to the rail line segment as a whole. Several commentors expressed concern about this approach. The Applicants argued that any assessment of disproportionality should be done on a system-wide basis. NS also commented that "there is no evidence that a potential [highway/rail] at-grade crossing safety issue has a significant adverse effect on an environmental justice community located elsewhere along the rail line segment." The City of Cleveland and others argued that SEA should analyze whether effects are disproportionate in specific environmental justice communities that are smaller than rail line segments (which can traverse multiple counties or states) because failure to do so masks impacts on disadvantaged populations. Therefore, for the Final EIS, SEA assessed environmental impacts on each block group Area of Potential Effect individually, and then aggregated the block group Area of Potential Effect data to assess disproportionality at the system-wide, state, and county levels.[2]

M.2.3 Assessing Whether Potential Effects are "High" and "Adverse"

In the Draft EIS, SEA defined potential effects as "high" and "adverse" if they would exceed SEA's criteria for significance. (See the Draft EIS, Chapter 3, "Analysis Methods and Potential Mitigation Strategies," Section 3.17.1, "Environmental Justice Analysis," and Appendix K, "Environmental Justice.") The Final EIS retained this definition. The Final EIS, like the Draft EIS, identified potentially significant impacts in the following environmental resource categories: noise, hazardous materials transport, and highway/rail at-grade crossing safety and delay.[3]

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2 Data from any number of block group Areas of Potential Effect may be combined to provide information about effects over a larger geographic area. SEA collectively refers to block group Areas of Potential Effect over all threshold segments in the proposed Conrail Acquisition as the "system-wide" Area of Potential Effect. Similarly, the combined Areas of Potential Effect in a state or county are the "state-wide" Area of Potential Effect and "county-wide" Area of Potential Effect, respectively. Typically, however, and unless otherwise stated in this appendix, the term Area of Potential Effect refers to the block group Area of Potential Effect.

3 The Draft EIS also identified potentially significant impacts in a few locations for freight rail safety. The Applicants argued that freight rail safety was not an appropriate subject for environmental justice analysis because the effects of an incident would not create a disproportionately high and adverse effect on surrounding environmental justice populations. In the Final EIS, SEA accepted this comment. The Draft EIS revealed that only two rail line segments that met environmental justice demographic criteria would experience potentially significant freight rail safety impacts; SEA recommended mitigation for these freight rail safety impacts. Neither segment suffered from other potential high and adverse impacts. Therefore, neither segment merited consideration for further environmental justice analysis.

M.2.4 Determining Whether Potentially High and Adverse Effects Are Disproportionate

The Draft EIS defined impacts as disproportionate if they would be predominately borne by minority or low-income communities or would be more severe or greater in magnitude in those communities. The Final EIS retained this definition.

To determine whether potentially high and adverse effects would disproportionately affect minority and low-income populations, SEA:

- Assigned a numerical Environmental Resource Score (ERS) to the relative impacts associated with noise, hazardous materials transport, and highway/rail at grade-crossing safety and delay in the absence of mitigation in each block group Area of Potential Effect.

- Used standard statistical methods to assess disproportionality on ERSs in each environmental category for the system-wide Area of Potential Effect. The system consists of 6,472 Areas of Potential Effect along the threshold segments SEA identified for environmental analysis. Attachment M-2 shows the demographic breakdown of the block group Areas of Potential Effect for rail line segments across the system.

- Combined the ERSs to calculate a Multiple Resource Score (MRS) for each Area of Potential Effect and rank-ordered all block group Areas of Potential Effect[4] according to their MRSs. SEA determined that those block group Areas of Potential Effect with the highest MRSs had potential impacts that could be more severe or greater in magnitude than elsewhere in the system. SEA therefore examined the distribution of impacts on environmental justice versus nonenvironmental justice populations within these Areas of Potential Effect.

- Used standard statistical methods for each of the four states in which the block group Areas of Potential Effect with the highest MRSs are located (Pennsylvania, Ohio, Indiana, and Illinois[5]) to assess whether the distribution of high and adverse impacts in each resource category (noise, hazardous material transport, and traffic safety and delay) would disproportionately affect the environmental justice Areas of Potential Effect, compared to the nonenvironmental justice Areas of Potential Effect. SEA also evaluated disproportionate impacts at the county level in these four states. SEA determined that

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4 SEA rank ordered all block group Area of Potential Effects located along any segment that met SEA's threshold criteria for environmental analysis.

5 Some segments identified in the Draft EIS as having environmental justice populations with potentially significant premitigation impacts lack block group Areas of Potential Effect with MRSs in the top two quintiles. In other words, total impacts in these Areas of Potential Effect would not be more severe or greater in magnitude than elsewhere in the system. SEA therefore did not recommend additional mitigation for these areas.

to be statistically significant, a county analysis required at least 70 block group Areas of Potential Effect. Six counties (Ashtabula, Cuyahoga, Lake, and Lorain Counties, Ohio; Allen County, Indiana; and Erie County, Pennsylvania) contained at least 70 block group Areas of Potential Effect. Other counties in Indiana, Illinois, and Ohio did not contain 70 block group Areas of Potential Effect, so SEA grouped them into the following geographic regions: Northwest Indiana and Illinois, Central Indiana, and Northern Ohio. Northwest Indiana and Illinois contain the following counties: Tippecanoe, Porter, and Fountain, Indiana, and Vermilion, Illinois. Central Indiana contains Cass, Carroll, De Kalb, Miami, Wabash, and Huntington Counties. Northern Ohio contains Seneca, Huron, Defiance, and Henry Counties. Attachment M-3 shows the demographic breakdown of the environmental justice and nonenvironmental justice Areas of Potential Effect by state and county.

- Conducted site visits to verify the assumptions of the statistical analysis and assess tailored or additional mitigation measures.

Determining the Environmental Resource Scores

SEA assigned an ERS on a relative scale of 0 to 6 to each type of premitigation impact (noise, hazardous materials transport, and highway/rail at-grade crossing safety and traffic delay) in each block group Area of Potential Effect. SEA selected this relative scale both for simplicity and because its uniformity enabled SEA to compare all Areas of Potential Effect to identify disproportionality. For each environmental resource, SEA categorized scores as low, medium, high, and very high.

Noise Environmental Resource Scores

SEA assigned noise ERSs to reflect both the premitigation noise level after the proposed Conrail Acquisition and the amount of increase in the noise level expected to occur in the absence of mitigation as a result of the proposed Conrail Acquisition. SEA defined the noise environmental resource score as the average of the following two components:

- Noise Level Associated with the proposed Conrail Acquisition. This is the day-night A-weighted average noise level (dBA L_{dn}), expected to occur 400 feet from a highway/rail at-grade crossing (which accounts for train horn noise) in the absence of mitigation. Table M-1 shows the noise ERSs that SEA assigned to various noise levels for this component.

TABLE M-1
PREMITIGATION NOISE LEVEL SCORES

Post-Acquisition Noise Levels 400 Feet from Highway/Rail At-grade Crossings (dBA L_{dn})	Environmental Resource Score
Less than 65	0
65 - 66	1
67 - 68	2
69 - 70	3
71	4
72	5
73+	6

- Increase in Noise Level. This component accounts for the amount of increase in the noise level in the absence of mitigation as a result of the proposed Conrail Acquisition. Table M-2 shows the noise ERSs assigned to increases in noise levels.

TABLE M-2
PREMITIGATION INCREASE IN NOISE LEVEL SCORES

Increase in Noise Levels (dBA) at 400 Feet	Environmental Resource Score
Less than 3.0	0
3.0 - 5.9	1
6.0 - 8.9	2
9.0 - 11.9	3
12.0 - 14.9	4
15.0 - 17.9	5
18.0 +	6

SEA used an increment of 3 dBA for the scores because the human ear does not normally perceive changes of less than 3 dBA. Attachments M-4 and M-5 present results of this analysis for Areas of Potential Effect at the state and county levels, respectively.

Hazardous Materials Transport Environmental Resource Scores

The Applicants provided data on the annual number of carloads of hazardous materials they expect to transport as a result of the proposed Conrail Acquisition. SEA characterized the magnitude of the risk to an Area of Potential Effect (in the absence of mitigation) based on the annual number of and increase in carloads of hazardous materials transported on each rail line segment that meets the Board's thresholds for environmental analysis threshold segment as a result of the proposed Conrail Acquisition.

The hazardous materials transport ERSs are the average of the following three components:

- Hazardous Materials Carload Traffic Related to the Proposed Conrail Acquisition. This component reflects the number of carloads of hazardous materials the Applicants project that they will transport along each rail line segment that meets the Board's thresholds for environmental analysis as a result of the proposed Conrail Acquisition. Table M-3 shows the hazardous materials transport ERSs assigned to this component.

TABLE M-3
PREMITIGATION HAZARDOUS MATERIALS TRANSPORT SCORES

Post-Acquisition Annual Number of Carloads	Environmental Resource Score
0 - 5,000	0
5,001 - 10,000	1
10,001 - 20,000	2
20,001 - 35,000	3
35,001 - 50,000	4
50,001 - 65,000	5
65,001 +	6

- Increase in Hazardous Materials Transported. This component reflects the increase in carloads of hazardous materials transported as a result of the proposed Conrail Acquisition. Table M-4 shows the hazardous materials transport ERSs assigned to this component.

TABLE M-4
PREMITIGATION INCREASE IN HAZARDOUS MATERIALS TRANSPORT SCORES

Increase in the Number of Carloads	Environmental Resource Score
0 to 1,000	0
1,001 to 8,000	1
8,001 to 15,000	2
15,001 to 22,000	3
22,001 to 29,000	4
29,001 to 36,000	5
36,001 +	6

- Change in Post-Acquisition Route Designation as Key Route or Major Key Route. For purposes of this Final EIS, SEA designated a route as a key route if, as a result of the proposed Conrail Acquisition, it would carry at least 10,000 carloads of hazardous materials. SEA designated a route as a major key route if, as a result of the proposed Conrail Acquisition, it would carry at least 20,000 carloads of hazardous materials and twice the number of carloads it carried prior to the proposed Conrail Acquisition. Table M-5 shows the hazardous materials transport ERSs assigned to this component.

TABLE M-5
ROUTE DESIGNATION SCORES

Change in Post-Acquisition Route Designation	Environmental Resource Score
No Hazardous Materials Carried on Route	0
Non-Key Route or No Change in Route Designation	1
Key Route	4
Major Key Route	6

Attachments M-6 and M-7 present the results of this analysis for Areas of Potential Effect at the state and county levels, respectively.

Highway/Rail At-grade Crossing Safety and Traffic Delay Environmental Resource Score

SEA assessed impacts related to highway/rail at-grade crossing safety and traffic delay within each block group. The data SEA used for this assessment consisted of identified unmitigated safety impacts and identified unmitigated traffic delay impacts at each highway/rail at-grade crossing within a block group Area of Potential Effect. Appendix E, "Transportation: Highway/Rail At-grade Crossing Safety Analysis," and Appendix G, "Transportation: Highway/Rail At-grade Crossing Traffic Delay Analysis," of this Final EIS discuss these impacts.

A single highway/rail at-grade crossing could generate multiple safety impacts, delay impacts, or both. SEA translated these impacts into highway/rail at-grade crossing safety and traffic delay ERSs as a function of the total number of these impacts identified in each block group.

To keep the highway/rail at-grade crossing safety and traffic delay ERSs consistent with the scores obtained for the noise and hazardous materials transport ERSs, SEA assigned highway/rail at-grade crossing safety and traffic delay scores to each Area of Potential Effect as presented in Table M-6.

TABLE M-6
PREMITIGATION HIGHWAY/RAIL AT-GRADE CROSSING SAFETY AND TRAFFIC DELAY SCORES

Number of Premitigation Highway/Rail At-grade Crossing Impacts Related to Safety and Traffic Delay	Environmental Resource Score
0	0
1 - 2	3
3 +	5

This scoring system recognizes that the existence of one or two highway/rail at-grade crossing safety and traffic delay impacts in a single Area of Potential Effect constitutes a more than marginal increase in impact over an Area of Potential Effect with no such concerns. The data show very few Areas of Potential Effect with more than three identified safety or traffic delay impacts. Therefore, SEA assigned a maximum score to Area of Potential Effects with three or more identified impacts.

Attachments M-8 and M-9 present the results of this analysis for Areas of Potential Effect at the state and county levels, respectively.

Multiple Resource Score

SEA calculated the MRS as the sum of the squares of the individual ERSs:

$$Score_{MRS} = Score_{Noise}^2 + Score_{Hazardous\ Materials\ Transport}^2 + Score_{Safety\ and\ Traffic\ Delay}^2$$

SEA used the standard technique of incorporating the sum of the squares of the individual scores in the MRS calculation to ensure inclusion of high individual ERSs in further analysis. SEA examined a histogram of multiple resource scores and noticed a natural demarcation in the relative number of block groups that fell above and below scores of 27. Therefore, SEA considered a score of at least 27 to be indicative of block groups that, in the absence of mitigation, would experience the greatest magnitude of multiple impacts.

The Areas of Potential Effect with scores of 27 or higher were located in Illinois, Indiana, Ohio, and Pennsylvania. SEA performed site visits in all counties with environmental justice populations in these states. (See Attachment M-10.) Attachments M-11 and M-12 summarize the breakdown of MRSs of Areas of Potential Effect affected by the proposed Conrail Acquisition at the state and county levels, respectively.

Statistical Analysis for Disproportionately High and Adverse Distribution of Impacts

SEA organized the MRS results for Illinois, Indiana, Ohio, and Pennsylvania into state and county groupings to test for a disproportional distribution of potential impacts on the individual environmental resources between the environmental justice and the nonenvironmental justice Areas of Potential Effect. On the system-wide scale, the results reflect the aggregate characteristics over a very large geographical area; this area is so large that the results do not reflect many internal variations among regions or even smaller areas. Therefore, SEA did not use the threshold segment system-wide level to focus on mitigation efforts.

Statistical Tests

SEA tested the system, state, and county Area of Potential Effects for disproportionate distribution of potential environmental impacts using the following two standard statistical methods:

- Chi-squared Test. SEA used the chi-squared test to determine whether the most severe impacts (measured by an ERS) would disproportionately affect the environmental justice populations. The chi-squared test result provides, as a percentage, the confidence, referred to as the significance level, with which SEA can state that the environmental justice Areas of Potential Effect would be affected by high and adverse effects to a degree disproportionate to the nonenvironmental justice Areas of Potential Effect. For this test, SEA grouped the ERSs for each environmental category into ranges of low/moderate (scores of 0-3) and high/very high (scores of 4-6).

SEA determined that a disproportional distribution of potential impacts for a specific environmental category occurred when the chi-squared test indicated a significance level of less than 50 percent (0.50).

- Means Ratio Test. Where the chi-squared test indicated disproportionality, SEA calculated the relative magnitude of the potential impacts on the environmental justice populations compared to the impacts on the nonenvironmental justice populations. SEA calculated the average of the full range of each of the three individual ERSs for this test. A means ratio test result greater than 1.0 indicated that the potential impacts on the environmental justice Areas of Potential Effect were higher than the potential impacts on the nonenvironmental justice Areas of Potential Effect. The means ratio, therefore, shows the relative magnitude of the entire spectrum of potential impacts on the environmental justice populations compared to the impacts on the nonenvironmental justice populations. It accounts for variations within the low/moderate and high/very high score categories. The means ratio statistic alone will not indicate disproportionately high and adverse effects because SEA applied it to the entire spectrum of ERSs.

M.3 QUANTITATIVE RESULTS

SEA's statistical analysis resulted in a list of geographic areas identified as having environmental justice concerns regarding the distribution of the potential impacts for one or more environmental categories. These results would occur absent any mitigation by the Applicants.

The analysis of rail line segments that met the Board's thresholds for environmental analysis shows that in the absence of mitigation, potential effects are predominately borne by environmental justice block-group Areas of Potential Effect for hazardous materials transport. SEA concluded that the majority of the potential hazardous materials transport impacts associated with the proposed Conrail Acquisition are due to the significant increase in hazardous materials transport in Cuyahoga County, Ohio. SEA determined that noise and highway/rail traffic safety and traffic delay impacts would not disproportionately affect minority and low-income populations. (See Attachment M-13.)

At the state level, the proposed Conrail Acquisition would have no disproportionate effects on environmental justice Areas of Potential Effect in Indiana. SEA identified the potential for disproportionately high and adverse effects for hazardous materials transport on environmental justice Areas of Potential Effect in Illinois and Ohio, and disproportionately high and adverse effects for noise on environmental justice Areas of Potential Effect in Pennsylvania. (See Attachment M-14.)

The summary of county block group Areas of Potential Effect shows that, in the absence of mitigation, 10 counties with environmental justice populations would be disproportionately impacted with respect to noise, hazardous materials transport, or highway/rail at grade-crossing safety and delay. Table M-7 lists by segment the county Areas of Potential Effect with disproportionately high and adverse environmental impacts on environmental justice populations. Attachment M-15 shows the results of SEA's county analysis. Attachment M-16 contains a map of the counties grouped for statistical analysis according to their geographic proximity and similarity of Area of Potential Effect impacts.

TABLE M-7
AREAS OF POTENTIAL EFFECT WITH DISPROPORTIONATELY HIGH AND ADVERSE EFFECTS ON MINORITY AND LOW-INCOME POPULATIONS BY RAIL LINE SEGMENT (PREMITIGATION)

Rail Line Segment	Location	County	State	Environmental Impact
CSX				
C-061	New London Village	Huron	OH	Hazardous Materials Transport
C-066	Portage Defiance City Holgate Village	Porter Defiance Henry	IN OH OH	Hazardous Materials Transport
C-068	Willard	Huron	OH	Hazardous Materials Transport
C-072	Cleveland Cleveland Heights	Cuyahoga Cuyahoga	OH OH	Hazardous Materials Transport
C-073	East Cleveland Cleveland	Cuyahoga Cuyahoga	OH OH	Hazardous Materials Transport
C-074	Berea	Cuyahoga	OH	Hazardous Materials Transport
C-075	Fostoria Tiffin Willard	Seneca Seneca Huron	OH OH OH	Hazardous Materials Transport

TABLE M-7
AREAS OF POTENTIAL EFFECT WITH DISPROPORTIONATELY HIGH AND ADVERSE EFFECTS ON MINORITY AND LOW-INCOME POPULATIONS BY RAIL LINE SEGMENT (PREMITIGATION)

Rail Line Segment	Location	County	State	Environmental Impact
		NS		
N-045	Attica Danville	Fountain Vermilion	IN IL	Hazardous Materials Transport
N-046	Lafayette City	Tippecanoe[6]	IN	Hazardous Materials Transport
N-070	Erie	Erie	PA	Highway/Rail At-grade Safety and Delay
N-075	Cleveland Cleveland Heights East Cleveland	Cuyahoga Cuyahoga Cuyahoga	OH OH OH	Hazardous Materials Transport
N-075	Mentor Painesville Wickliffe	Lake Lake Lake	OH OH OH	Noise (Horn)

Appendix N, "Community Evaluations," describes the results of SEA's environmental justice analysis for the proposed alternatives. Attachment M-17 shows the detailed results of the statistical tests.

SEA then used the results of the statistical analysis to evaluate the environmental justice Areas of Potential Effect for additional or tailored mitigation.

6 The regional analysis for Northwest Indiana and Illinois showed disproportionate hazardous materials transport effects on environmental justice populations. SEA also conducted an environmental justice analysis of the 45 block groups in Tippecanoe County, Indiana, in order to analyze the proposed Lafayette Bypass presented in this Final EIS. The analysis of the smaller number of block group Areas of Potential Effect revealed disproportionate effects related to horn noise. Both the Lafayette Bypass and SEA's additional mitigation in Tippecanoe County would alleviate the disproportionate effects that might result from the proposed Conrail Acquisition.