

ENGINEERING REPORT

GRADE SEPARATION OVER NORFOLK SOUTHERN RAILROAD

**SHEFFIELD, COLBERT COUNTY, ALABAMA
PROJECT NO. RRS-8817(1)**

Prepared For:

**Alabama Department of Transportation
1409 Coliseum Boulevard
Montgomery, Alabama 36130-3050**

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Executive Summary

Residents in the Shoals area have, for years, experienced significant delay at several railroad at-grade crossings. This is especially critical at the crossings on Montgomery Avenue and Atlanta Avenue in Sheffield.

In order to address this problem, Project No. RRS-8817(1) was initiated. Initially this project involved the development of alternatives in downtown Sheffield to provide a grade separation in order to relieve this problem. Several alternatives were evaluated based on operational characteristics, environmental constraints, and construction costs. After several meetings to discuss these alternatives, a decision was made to carry Alternate Nos. 4 and 5 forward for further consideration.

After the decision was made to carry these two alternates forward, another alternative was suggested. The possibility of relocating the section of the Norfolk Southern rail line that runs through Sheffield, Tuscumbia, and Muscle Shoals, was then evaluated. Environmental constraints were determined, the impact on the rail operation was determined, and construction costs were developed. A preferred alignment was selected for this alternative. This alignment was compared to the proposed alignment for the Memphis-to-Atlanta corridor to insure these were compatible.

At this time, there are four alternatives still under construction. Two of them involve the construction of a grade separation in downtown Sheffield. The other two involve a relocation of a section of the Norfolk Southern rail line. The characteristics of these four alternates are shown on the matrix, included in this report.

The next step is to determine which alternates are to be carried forward. Then comments from the public should be sought through the public hearing process, including meeting with Norfolk Southern in order to gain their acceptance of the project.

Engineering Report
Project No. RRS-8817(1)
Grade Separation over Norfolk Southern Railroad
Sheffield, Colbert County, Alabama

Description of Proposed Project

Project No. RRS-8817(1) began as a proposal to construct a grade separated crossing over the Norfolk Southern Railroad from Montgomery Avenue to First Street in downtown Sheffield. Currently, two at-grade railroad crossings on Montgomery Avenue and Atlanta Avenue provide access across the railroad. Motorists often experience significant delay when trains block these two crossings. This project was proposed to provide relief from this problem.

During the course of this study, another alternative was suggested. This alternative involves the relocation of the portion of Norfolk Southern Railroad that runs through Sheffield, Tuscumbia, and Muscle Shoals. Several at-grade crossings could be eliminated by abandoning a portion or all of the existing railroad track through these three cities. This alternative has been added for consideration to those developed for the grade separation in downtown Sheffield.

Project History

For several years, motorists in the Shoals area have experienced significant delay at the two main at-grade railroad crossings on Montgomery Avenue and Atlanta Avenue in downtown Sheffield. This section of the Norfolk Southern Railroad is a main line from Memphis to Birmingham. Consequently a large number of trains run on this line each day which, of course, disrupts vehicular traffic and causes considerable delay at certain times. In addition, a refueling yard is located near these two crossings and is used to refuel coal trains to avoid having them come into the main yard east of Muscle Shoals. With a long coal train, an at-grade crossing can be blocked during the refueling process.

At the present time, there is an average of 16 trains per day passing through Sheffield. The existing main line speed coming into Sheffield is 55mph, while the speed through Sheffield reduces to 25mph. There are ten (10) at-grade crossings in the Tuscumbia-Sheffield-Muscle Shoals area that could be impacted by this project. The ones with the highest average daily traffic are Montgomery Avenue (19,050), Avalon Avenue (16,050), Tuscumbia Road (9,610); and, Atlanta Avenue (9,050). Over several years, a total of 41 accidents have occurred at these ten (10) crossings. The largest number of accidents have occurred at Atlanta Avenue (11) and at Avalon Avenue (9). There were five (5) fatalities among these accidents.

In addition to the trains passing through the area, Norfolk Southern also provides service to several industries in these three cities. Nine customers were identified as being located along the track in the Tuscumbia-Sheffield-Muscle Shoals area. The number of trips per week vary from customer to customer. However, these additional trains add to the number of conflicts with the vehicular traffic.

The fueling facility located in downtown Sheffield is a one million gallon, above-ground, diesel fuel tank. There are 7,000 feet of siding associated with this station. It is used primarily to refuel the coal trains in order to avoid having to bring these long trains into the switch yard east of Tuscumbia.

Coming from Memphis, there is a single track into the Tuscumbia area. Near West Third Street, a second track begins; and, there are two or more tracks through Tuscumbia and Sheffield until the area near Sixth Street on the east side of Tuscumbia is reached. At that point, the line reduces to one track until it branches off into the switch yard.

Montgomery Avenue, Atlanta Avenue, and First Street are all multi-lane facilities. The intersections of Montgomery Avenue with First Street and Atlanta Avenue with First Street are signalized. These two intersections are very close to the railroad tracks. This requires a pre-emption operation at these two signalized intersections.

Project Alternatives

The initial approach to the project was to develop a number of possible alternatives that provide a grade separation over the railroad in downtown Sheffield; primarily, between Montgomery Avenue and First Avenue. From this group of alternatives, a selection was to be made based on factors such as environmental constraints, operational efficiency, cost, etc..

One of the decisions to be made concerned whether the grade separation was to be just a relief valve in the form of a two lane facility that would be used primarily when the crossings were blocked; or, should the proposed project be one that was used throughout the day and be capable of handling the projected traffic volumes at an acceptable level of service at any time? Ultimately, a decision was made to provide an alternative that could handle the projected volumes throughout the day at an acceptable level of service.

At least seven different alternatives received serious consideration. An environmental report was prepared for an area that encompassed all the alternatives being considered. A traffic analysis was done for each alternative using the projected 20 year traffic volumes for this area. The geometrics of each alternative were also evaluated, and a probable cost for each alternative was prepared. After several meetings involving ALDOT, FHWA, and the consultant, the number of viable alternatives was reduced to two. These are alternatives Nos. 4 and 5.

Alternative No. 4 is a multi-lane overpass in the vicinity of Atlanta Avenue that ties into Atlanta Avenue at its intersection with Blake Street. Blake Street is proposed to also be a multi-lane facility between Atlanta Avenue and Montgomery Avenue. The continuity of Atlanta Avenue north and south of the railroad is somewhat disrupted by this alternative; however, the grade separated crossing provides a much safer and less disrupted flow of traffic. The attached drawing shows the proposed layout.

Alternative No. 5 is also a multi-lane overpass in the vicinity of Atlanta Avenue. However, instead of tying into Atlanta Avenue, this alternative touches back down on the south side of the railroad; and, parallels First Street and the railroad to its intersection with Montgomery Avenue. Additional widening of Montgomery Avenue is needed to provide turn lanes. There is no disruption to the continuity of either Montgomery Avenue or Atlanta Avenue. The proposed layout for this alternative is shown on the attached drawing.

After the alternatives downtown were narrowed to the two described above, another possible alternative was suggested. This one involved the relocation of the portion of the Norfolk Southern rail line that runs through Sheffield, Tuscumbia, and Muscle Shoals. This alternative held the possibility of eliminating many of the at-grade crossings within the area; thus, significantly reducing the delay experienced by motorists and reducing the vehicular/train conflicts. A decision was made to further study this alternative and the consultant's contract was supplemented to evaluate this alternative.

The Tennessee Valley Authority had previously conducted a preliminary study that had considered the relocation of this section of the Norfolk Southern rail line. This study was used as a basis for the beginning of this evaluation. In addition, several meetings were held with representatives of Norfolk Southern to gather information about their present operations; customers they serve within the study area; their design criteria; and, details about their existing facilities.

Based on the data that was collected, alternative alignments for the rail line relocation were developed. An environmental study was conducted to determine the constraints within the corridor. The Memphis to Atlanta corridor also had an alternative running within this same area. Therefore, a comparison of the two projects was made to determine if the projects would be compatible. Costs for each alternative were also developed as a part of the evaluation process.

After considering the costs, the environmental constraints, the railroad operations, and the compatibility with the Memphis to Atlanta corridor project, a decision was made to consider only one alignment. However, with that one alignment there were two alternatives. One alternative involved only a single track over the entire relocation distance. The second alternative adds a 9,000 foot section of side track for refueling purposes.

At this point in the project, there are still four alternatives being considered. Two involve the construction of an overpass in downtown Sheffield and the other two involve the relocation of a section of the Norfolk Southern main line. Factors considered in the selection of an alternative are discussed in more detail below. These are then summarized in a matrix for easy comparison.

Operational Analysis

As each overpass alternative in downtown Sheffield was developed, an analysis was done to determine whether the projected traffic volumes could be handled at an acceptable level of service. This analysis helped determine the number of lanes that will be needed for each intersection or section of roadway. The intersection configurations and laneage for Alternates 4 and 5 are based on this analysis in order to provide an acceptable level of service. A traffic analysis report was submitted and approved, by ALDOT, for these two alternatives

With Alternate 4, the north-south continuity of Atlanta Avenue is disrupted somewhat. This alternate provides for that travel pattern, but in a slightly circuitous fashion. Montgomery Avenue is not impacted to this same extent. A new traffic signal will be needed at the 6th Avenue intersection with Blake and West Montgomery. The intersection of First Street with Atlanta Avenue will have significantly less traffic and may not require a traffic signal if this alternate was built.

Alternate 5 does not disrupt the north-south continuity of either Atlanta Avenue or Montgomery Avenue. However, it creates a new signalized intersection just south of the railroad crossing on Montgomery Avenue. Having an existing signalized intersection on Montgomery Avenue with First Street just north of the railroad crossing, and the new signalized crossing just south of the railroad crossing, may result in some coordination problems for traffic flow. Special phasing and timing will be needed for these two signalized intersections to function adequately.

The two railroad relocation alternatives provide the best solution to the operational conflicts that occur between the trains and vehicular traffic. By eliminating the 16 or more through trains that occur each day, the at-grade crossings function significantly better. It will be necessary to keep the rail line in place from the switching yard to downtown Sheffield in order to serve customers in Sheffield. However, the portion of the line from downtown Sheffield to the west could be abandoned. This will result in as many as four at-grade crossings being eliminated. The conflicts between trains and vehicles would be reduced at the remaining at-grade crossings to those trains providing service to customers between the switching yard and downtown Sheffield. Based on the present needs, this may be only one train per day that can be scheduled during an off-peak period such as midmorning.

The relocated rail line is proposed to have grade separated crossings at all public roads. Therefore, the train/vehicle conflicts will not exist. The only exception might be the need for an at-grade crossing to provide access to private property that is divided by the new rail line.

Environmental / Economic Impacts

Alternate 4

The Construction of an overpass in the downtown setting will disrupt nine businesses.

Cultural resources eligible for inclusion in the National Register of Historic Places will be affected by the construction of the railroad overpass. The resources include the Commercial Historic District, the South East Residential Historic District, a Bungalow-type structure, and the American Legion Hall. Potential effects on four resources may include adverse visual, audible, and atmospheric impacts. The proposed project may also alter the landscape and character of potentially historic resources. Implementation of this alternative will require review and approval under the requirements of Section 4(f) of the Department of Transportation Act.

Located in a heavily urbanized commercial setting, this alternative will involve properties associated with hazardous waste and materials. One site had reported leaking underground storage tanks to the Alabama Department of Environmental Management. One site is listed as a generator of hazardous wastes.

No flood plains, wetlands, or streams will be affected. No endangered or threatened species will be affected.

Alternate 5

The construction of an overpass in the downtown setting will disrupt five businesses.

Cultural resources eligible for inclusion in the National Register of Historic Places will be affected by the construction of the railroad overpass. The resources include the Commercial Historic District and the Bungalow Historic District. Potential effects at two resources may include adverse visual, audible, and atmospheric impacts. Implementation of this alternative will require review and approval under the requirements of Section 4(f) of the Department of Transportation Act.

This alternative will not involve properties associated with hazardous wastes and materials. No flood plains, wetlands, or streams will be affected. No endangered or threatened species will be affected.

Rail Corridor (Single Track and Double Track)

Land use within the corridor study area is mostly agricultural/forested. Due to the rural nature of the proposed project, there would likely be few, if any, land use changes. Noise sensitive receptors, e.g. homes, schools, churches, etc., are widely scattered due to the rural nature of this area. It appears that only two residential acquisitions would be necessary.

The railroad corridor area contains large tracts of prime farmland. A railroad alignment within this corridor study area would result in the conversion of approximately 41.9 hectares (103.5 acres) of prime or unique farmland.

There are an estimated 28.3 hectares (70 acres) of wetlands within the study area; however, only 0.87 hectares (2.2 acres) would be affected by construction of the railroad. The easternmost portion of the project may impact a small portion of the floodway of Spring Creek.

The U.S. Fish and Wildlife Service did not identify any threatened or endangered species in the project area. However, a letter from the Tennessee Valley Authority's Regional Natural Heritage Project reported the possible presence of four plant species that are listed as endangered (E) or threatened (T). The species are:

- Eriogonum longifolium* var. *harperi* - Harper Umbrella plant - Alabama (E).
- Jamesianthus alabamensis* - Jamesianthus - Alabama (E).
- Leavenworthia alabamica* var. *alabamica* - Glade cress - Alabama (E).
- Lesquerella lyrata* - Lyre-leaf Bladderpod - Alabama (E) and Federal (T).

Several archaeological sites have been identified in previous studies conducted in the study area. The majority of these archaeological sites have been determined ineligible for the National Register as a result of low artifact density, or poor preservation. Of the sites identified, only four sites have the potential to be impacted by the proposed railroad alignment. Detailed field investigations of the final alignment would be necessary to adequately assess potential impacts to these resources. The area around Spring Creek has a high potential for containing archaeological sites. In addition to the four archaeological sites, there are four homes, constructed at the turn of the century, located in close proximity to the proposed railroad right-of-way. The project will not require the acquisition of these houses, but may involve some acquisition of land associated with the houses.

Construction Costs

Construction costs for each alternative were developed using the Preliminary Cost Estimating Chart provided by ALDOT. The conceptual plans for each alternative were sent to the Division; and, the right-of-way and utility costs were provided by Division personnel. The construction cost totals for each alternative are shown on the comparison matrix. The construction costs shown for the two rail line relocation alternatives do not consider salvage values for the abandoned portions of the existing rail line materials and right-of-way. This value could only be determined after negotiations with Norfolk Southern.

Summary

This report outlines each alternative that is presently being considered. These items are summarized in the comparison matrix. The next step in the process is to review each alternative to determine if all of them should be presented to the public for comments. Once that decision is made, the next action will be to hold a public hearing to present the selected alternatives for comments from residents of the area. Also, discussions with Norfolk Southern will need to be held to gain their acceptance of the project.

CONCEPTUAL ALTERNATIVE COMPARISON MATRIX

Railroad Overpass Study
Project No. RRS-8817(1)
Sheffield, Colbert County

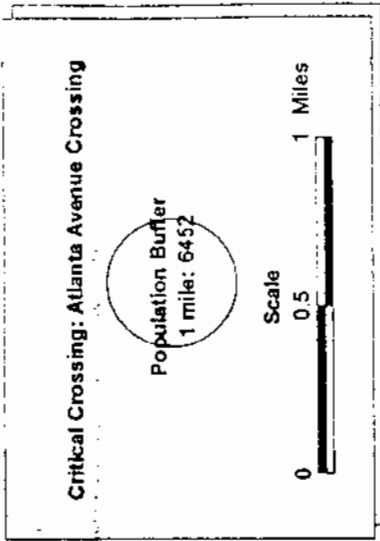
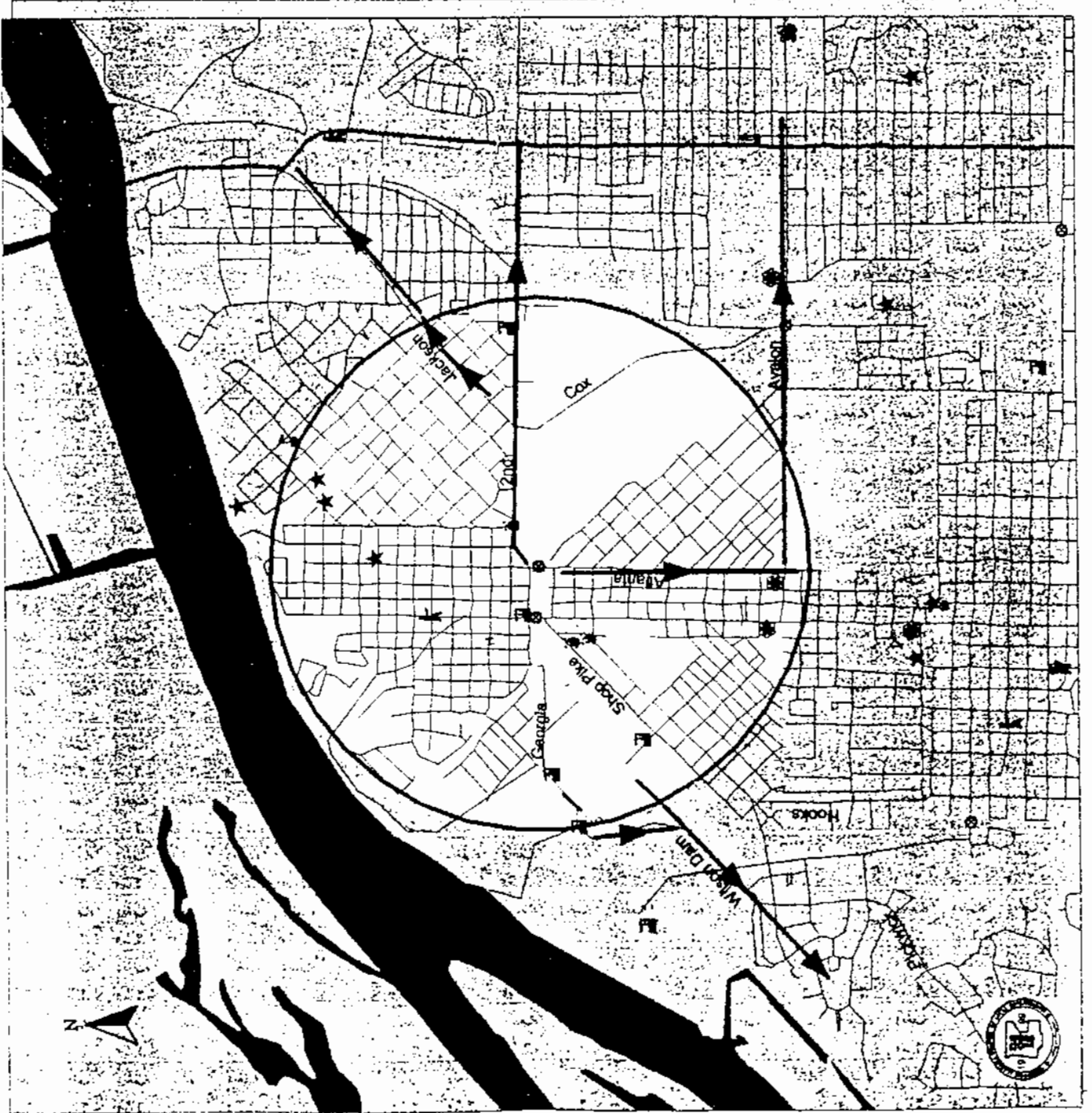
Barge, Waggoner, Sumner & Cannon, Inc.

March 19, 1999

	ALTERNATE 4	ALTERNATE 5	Single Track Single Track Grading Double Track R.O.W.	Single Track Plus Refueling Track Double Track R.O.W.
Construction Costs				
R.O.W.	\$1,753,000.00	\$993,000.00	\$1,241,850.00	\$1,241,850.00
Utilities	\$300,000.00	\$225,000.00	\$373,240.00	\$373,240.00
Roadways	\$4,500,000.00	\$4,570,000.00	\$13,284,700.00	\$16,056,150.00
Bridges	\$1,500,000.00	\$2,750,000.00	\$5,912,830.00	\$7,060,130.00
TOTAL COST	\$8,053,000.00	\$8,538,000.00	\$20,812,620.00	\$24,731,370.00
Number of Displacements				
Businesses	9	5	0	0
Residences	0	0	2	2
Historic Resources Affected	Commercial Historic District SE Residential Historic District Bungalow American Legion Hall	Commercial Historic District Bungalow	Close proximity to 4 homes (ca. 1908)	Close proximity to 4 homes (ca. 1908)
Historic Resource Impacts	Alter Resource Landscape: 2 Alter Resource Character: 2 Adverse VAA Impact: 4	Adverse VAA Impact: 2	Potential VAA Impact (To be determined)	Potential VAA Impact (To be determined)
Environmental Impacts				
UST/LUST/RUST	Lust	None	None	None
RCRA/CERCLA	1 RCRA	None	None	None
Floodplain	Yes	Yes	Yes	Yes
Wetlands	No	No	0.87 ha (2.2 ac)	0.87 ha (2.2 ac)
Archaeological	No	No	4 (potential)	4 (potential)
Prime Farmland	No	No	41.9 ha (103.5 ac)	41.9 ha (103.5 ac)
T & E Species	No	No	4 (potential)	4 (potential)

VAA - Visual, Audible and Atmospheric

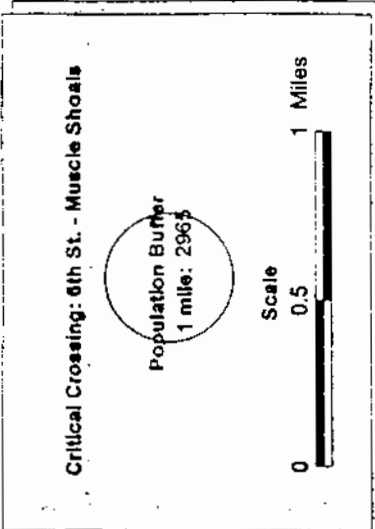
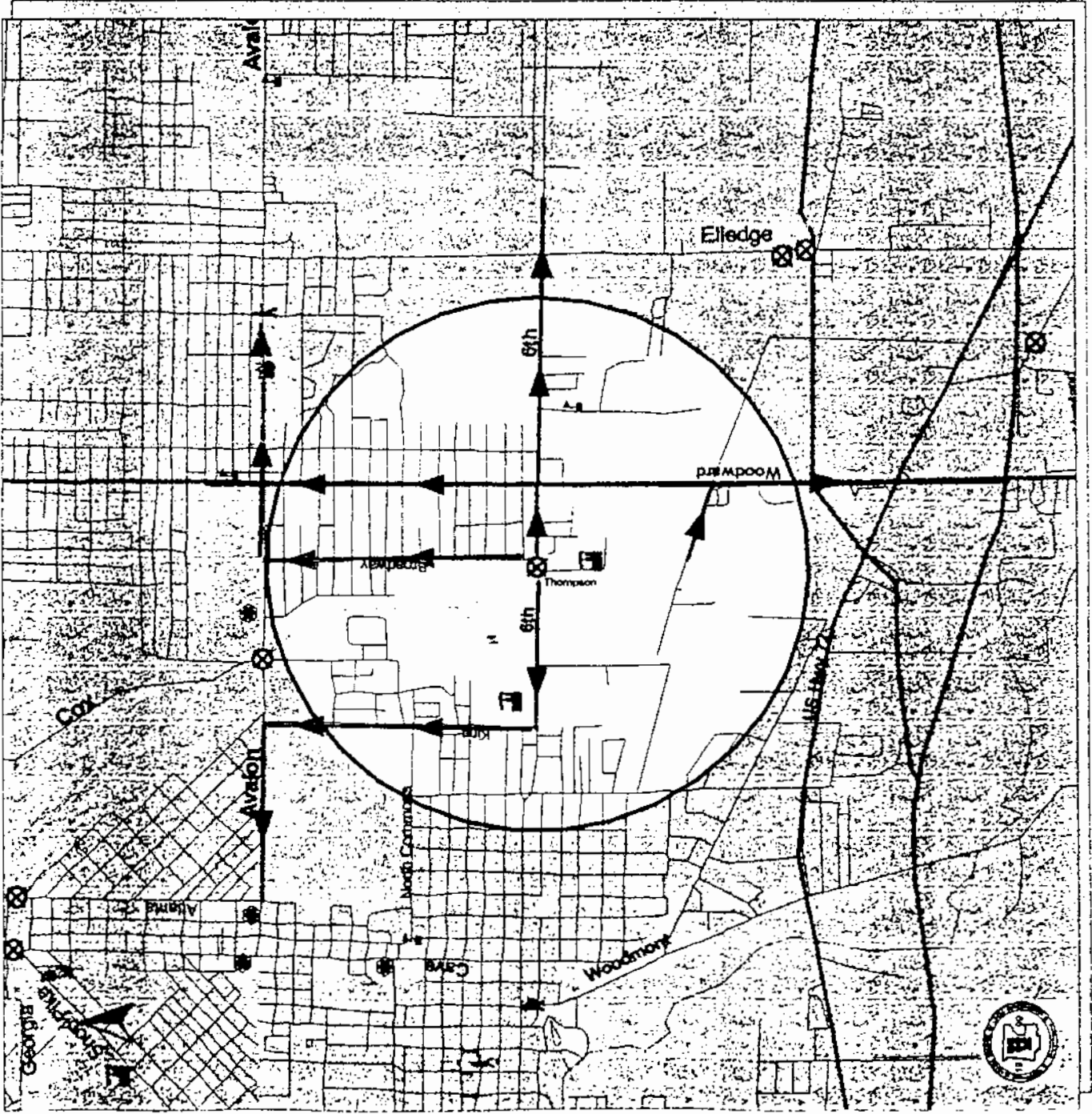
Atlanta Avenue Crossing



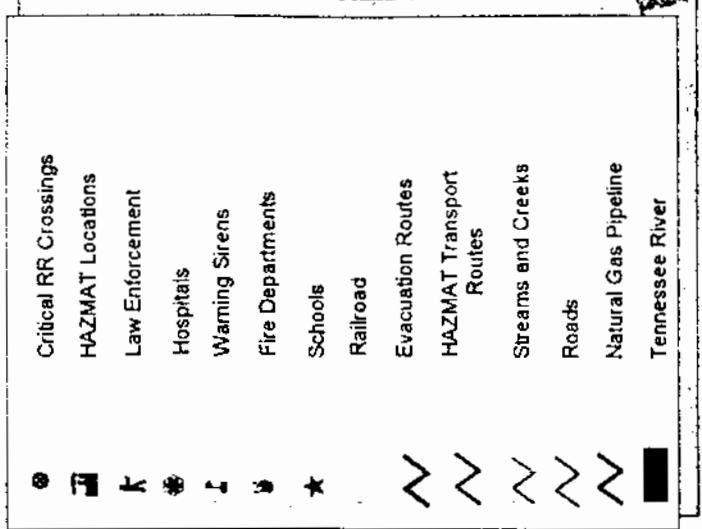
Legend

- Critical RR Crossings
- HAZMAT Locations
- Law Enforcement
- Hospitals
- Warning Sirens
- Fire Departments
- Schools
- Railroad
- Evacuation Routes
- HAZMAT Transport Routes
- Streams and Creeks
- Roads
- Natural Gas Pipeline
- Tennessee River

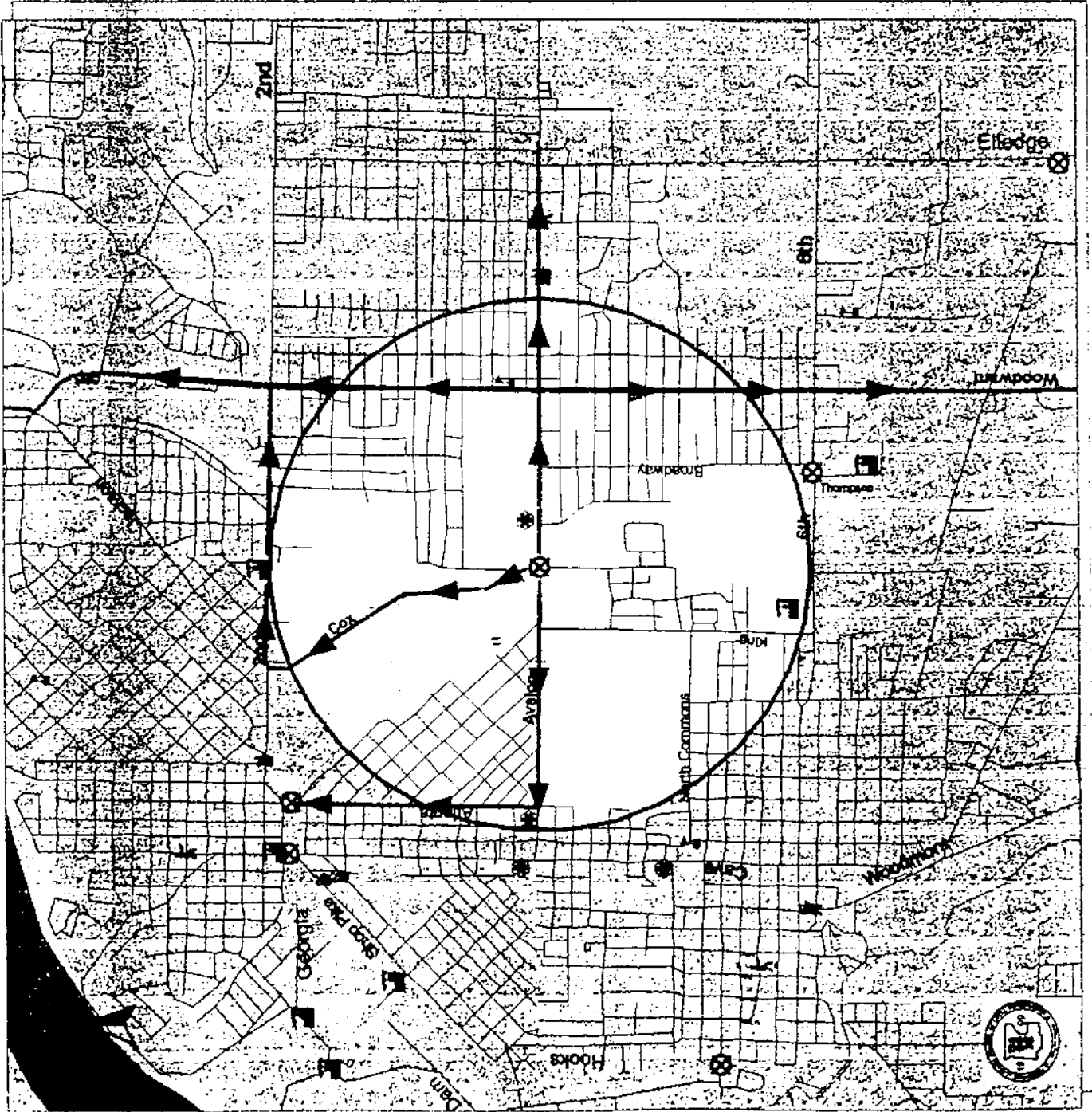
6th St. - Muscle Shoals



Legend



Avalon Avenue Crossing



Critical Crossing: Avalon Avenue Crossing

Population Buffer
1 mile: 3999

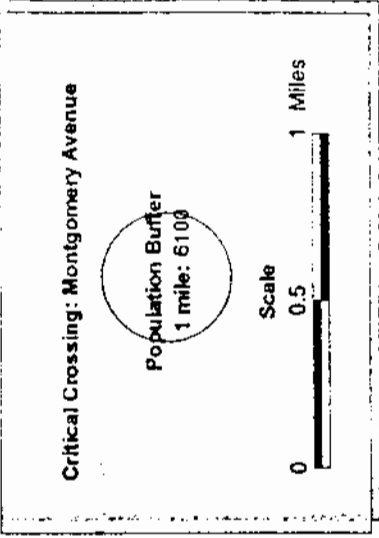
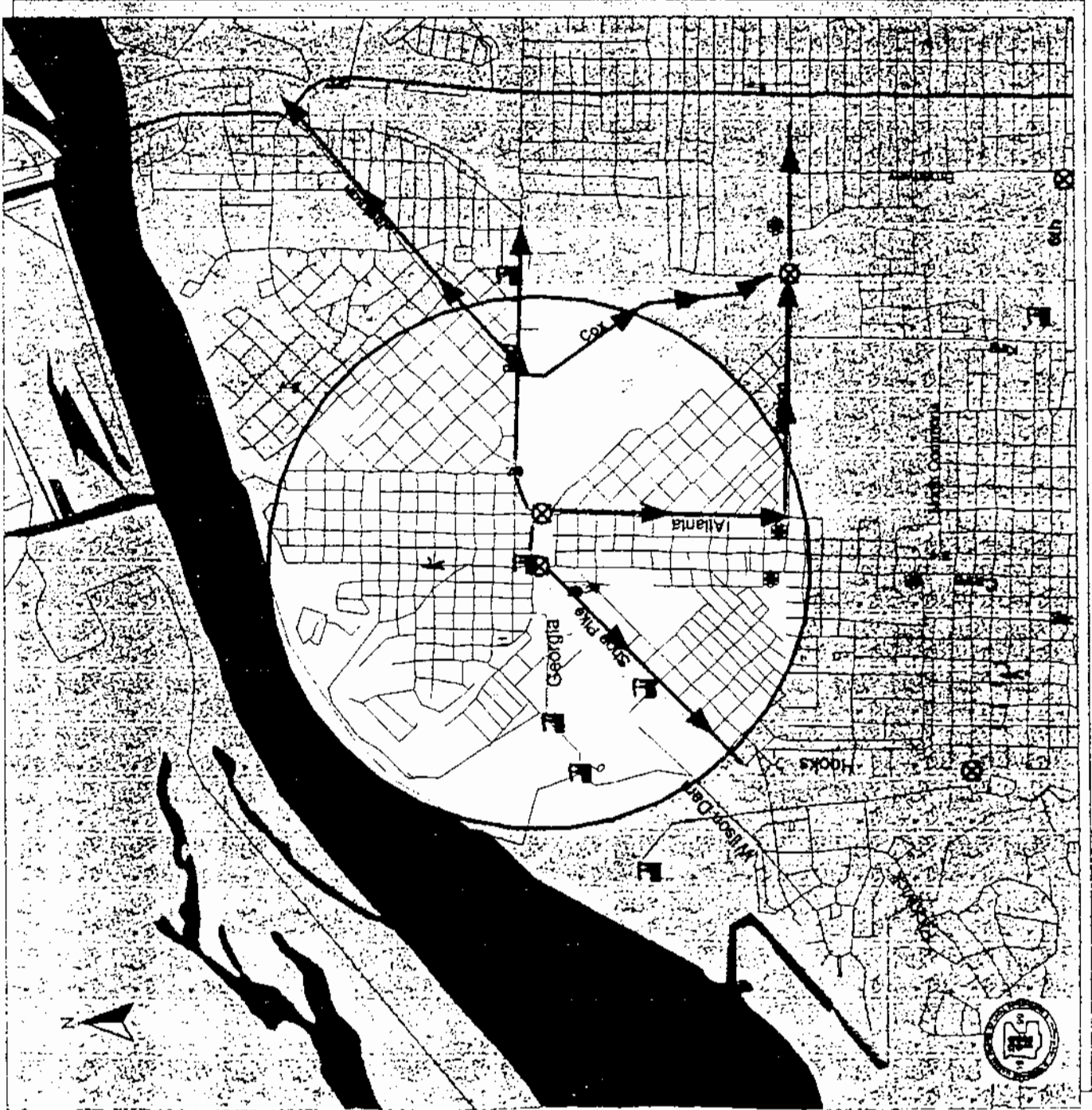
Scale

0 0.5 1 Miles

Legend

- ⊗ Critical RR Crossings
- 🏠 HAZMAT Locations
- 👮 Law Enforcement
- 🏥 Hospitals
- 📢 Warning Sirens
- 👮 Fire Departments
- 🎓 Schools
- 🚂 Railroad
- ➡ Evacuation Routes
- ➡ HAZMAT Transport Routes
- ➡ Streams and Creeks
- 🛣️ Roads
- 🛡️ Natural Gas Pipeline
- 🌊 Tennessee River

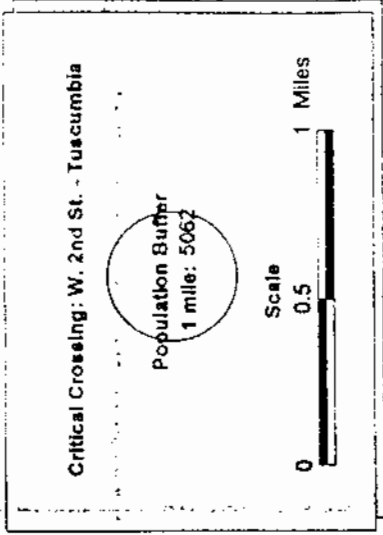
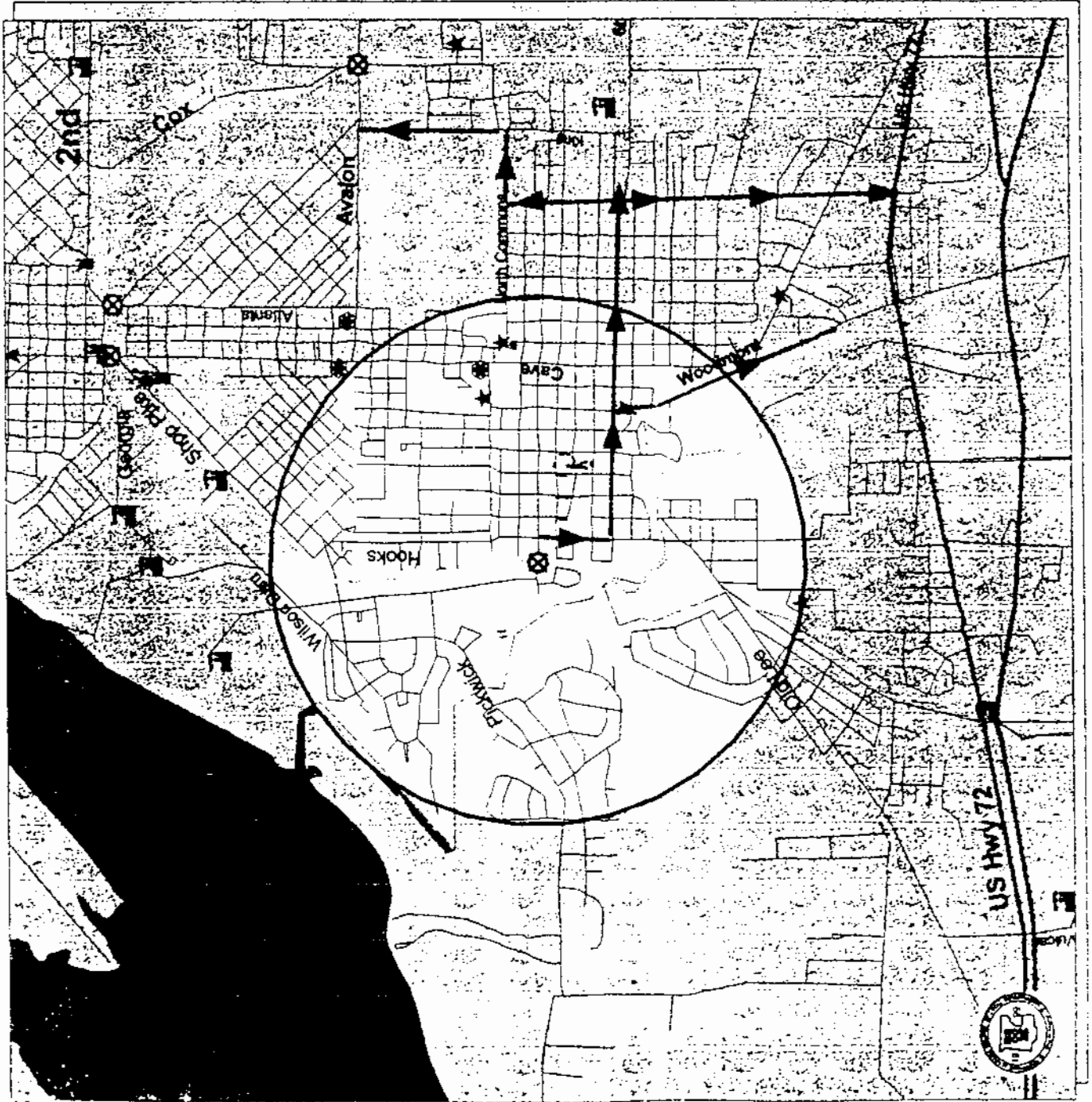
Montgomery Ave. Crossing



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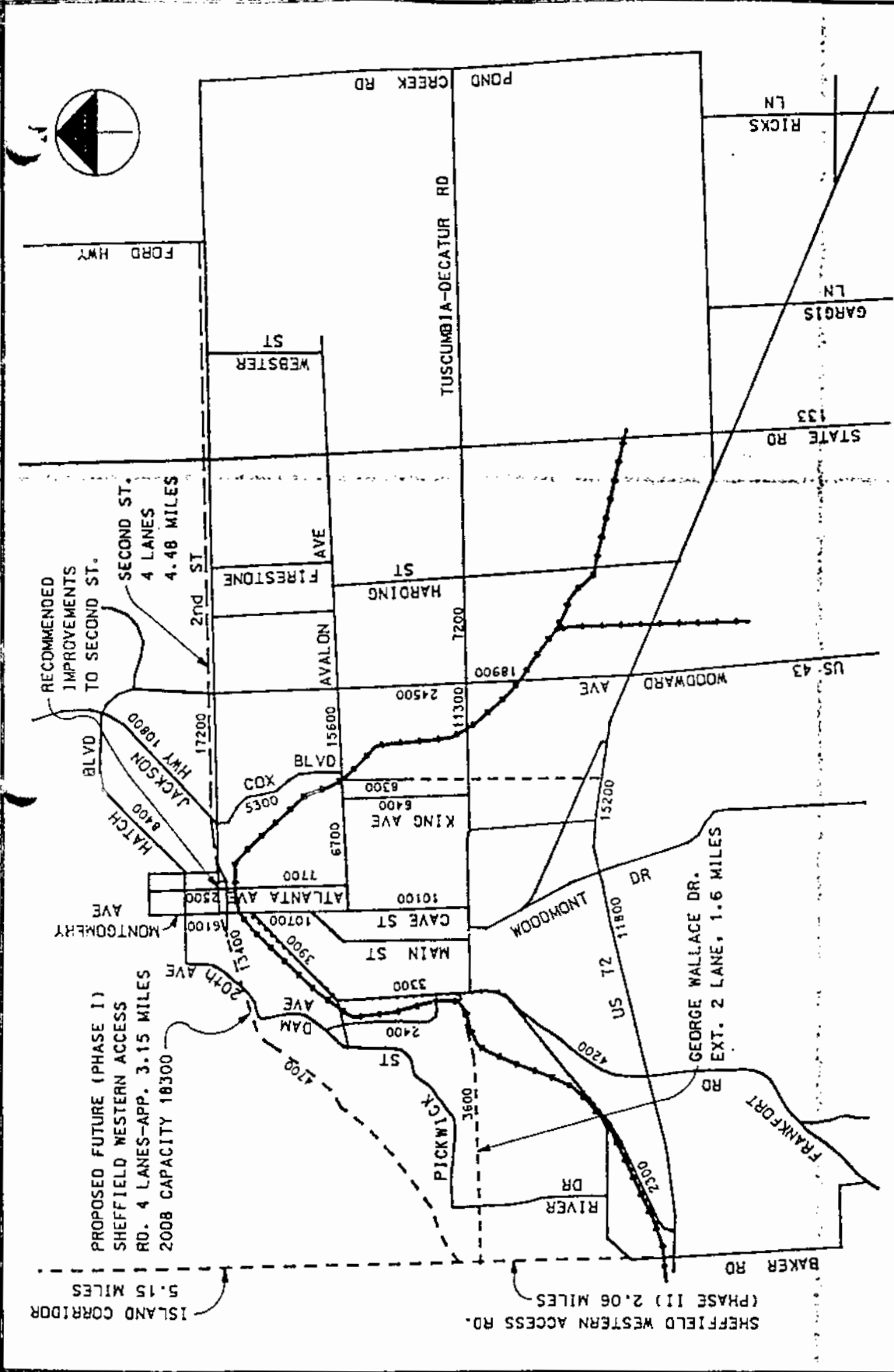
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W. 2nd St. - Tuscumbia



Legend

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SHEFFIELD, TUSCUMBIA AND MUSCLE SHOALS AREA A.A.D.T.
 PROJECTED TRAFFIC COUNTS FOR THE YEAR 2008

REFERENCE:
 YEAR 2008 SHOALS AREA TRANSPORTATION PLAN, OCTOBER 1989
 BY ALABAMA HIGHWAY DEPT., BUREAU OF URBAN PLANNING,
 AND MONTGOMERY STATE COLLEGE OF COMMUNITY DEVELOPMENT

FIGURE

ACCIDENTS

The following is a list of train related accidents at railroad crossings within the study area. This information was provided by the Design Bureau, Traffic Engineering Section of the State of Alabama Highway Department. The information covers a time period from January 1980 to December 1993.

<u>Location</u>	<u>Street</u>	<u>Type of Accident</u>	<u>Class of Accident</u>	<u>Date</u>
Tuscumbia	Old Memphis Rd	Property Damage Only	_____	Jan. 8, 1985
Tuscumbia	Old Memphis Rd	P.D.O.	_____	Aug. 18, 1988
Tuscumbia	Avalon St.	P.D.O.	_____	July 13, 1980
Tuscumbia	Avalon St.	P.D.O.	_____	Jan. 19, 1986
Tuscumbia	Avalon St.	P.D.O.	_____	Mar. 17, 1986
Tuscumbia	Old Memphis Rd	Injury	1 Serious Injury	Nov. 22, 1991
Sheffield	Douglas St.	P.D.O.	_____	Nov. 25, 1986
Sheffield	Douglas St.	P.D.O.	_____	May 15, 1989
Sheffield	Douglas St.	P.D.O.	_____	Dec. 9, 1991
Sheffield	Montgomery Ave.	P.D.O.	_____	Feb. 3, 1987
Sheffield	Montgomery Ave.	P.D.O.	_____	Dec. 13, 1990
Sheffield	Montgomery Ave.	Injury	1 Serious Injury	Sept. 17, 1992
Sheffield	Atlanta Ave.	P.D.O.	_____	Oct. 26, 1983
Sheffield	Atlanta Ave.	P.D.O.	_____	Jan. 7, 1988
Sheffield	Atlanta Ave.	P.D.O.	_____	Feb. 27, 1988
Sheffield	Atlanta Ave.	P.D.O.	_____	Feb. 6, 1989
Sheffield	Atlanta Ave.	Fatality	2 Killed, 1 Serious Injury	April 4, 1993
Muscle Shoals*	State Hwy. 20 (US 72)	Injury	1 Serious Injury	Mar. 19, 1989
Muscle Shoals*	State Hwy. 20 (US 72)	Injury	1 Less Serious Injury	May 18, 1990

*Construction of an overpass was completed in 1993 at this crossing. (State project no. RRS-105[15])