STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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U-4416

January 8, 2001

MEMORANDUM TO: Ms. Margaret H. Kluttz, Member, Board of Transportation
Mr. S. Pat Ivey, P.E., Division Engineer, Division 9
Mr. David D. King
Mr. C. W. Leggett, P.E.
Mr. J. M. Lynch, P.E. (3) Attention: Jim Dunlop, P.E.
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Mr. A. L. Avant (2)
Mr. J. D. Lane
Mr. T. A. Peoples, P.E.
Mr. H. A. Tasaico, P.E.

FROM: For Mr. H. Franklin Vick, P.E. Derrick W. Jones
Feasibility Studies Unit Head

SUBJECT: Feasibility Study # FS-9909G, Landis Railroad Grade Separation Study Re-evaluation, Landis, Rowan County.

Our staff has completed a feasibility study for the subject proposed project. This brief analysis suggests improvements that would be logical if the project were to be funded. A copy of our report is attached for your information.

HFV/dl

Attachment

cc: Mr. R. L. Hill, P.E.
Mr. L. A. Sanderson, P.E.

PHONE 919-733-2039 FAX 919-733-3585

U-4416

FEASIBILITY STUDY

Landis

Landis Railroad Grade Separation Study
Rowan County

Division 9

FS-9909G

Prepared by the
Program Development Branch
Division of Highways
N. C. Department of Transportation

Derrick W. Lewis, P.E.
Feasibility Studies Engineer

H. Franklin Vick, P.E.
Feasibility Studies Unit Head

1/5/01
Date

Landis
Landis Railroad Grade Separation Study

Rowan County

FS-9909G

I. General Description

This feasibility study describes the construction of a new railroad grade separation in Landis. The study area for this project is bound by Ryder Avenue (SR 1210) in Landis and 22nd Street (SR 1254 / SR 1171) in Kannapolis (See Figure 1). Based on discussions with the NCDOT Rail Division, five potential locations were identified as alternatives for this proposed railroad grade separation. These five locations are Ryder Avenue (SR 1210), Rice Street (NC 153), Corriher Street, Airport Road, and 22nd Street. These locations are described in detail below:

At the request of the City of Kannapolis, the scope of Alternative 5 has been expanded to include an interchange at the US 29A / 22nd Street intersection. It should also be noted that the right-of-way cost estimate for Alternative 4 (Airport Road) has been revised to included the new industrial park east of the railroad.

Alternative	*Total Cost*
1. Construct a railroad grade separation (overpass) at the existing Ryder Avenue (SR 1210) at-grade rail crossing. Includes a grade separation of Main Street (SR 2739-US 29A) and Central Avenue	$ 10,070,000 (Not Recommended)
2. Construct a railroad grade separation (overpass) from West Rice Street (NC153) / Main Street intersection to East Rice Street. This alternative includes a grade separation of South Chapel Street and South Central Avenue.	$ 5,050,000 (Not Recommended)
3. Construct a railroad grade separation (underpass) from the Main Street / Third Street intersection to the Corriher Street / South Chapel Street intersection.	$ 4,620,000 (Feasible)
4. Construct a railroad grade separation (overpass) from the Main Street / Airport Road (SR 1182) intersection to the South Chapel Street (SR 1464) / Hickory Street (SR 2709) intersection. Includes $1,420,000 for upgrading Hickory Street from South Chapel Street to US 29.	$ 6,970,000 (Recommended)
5. Construct a railroad grade separation (overpass) at the existing 22nd Street at-grade crossing. This alternative includes an interchange at the Main Street / 22nd Street intersection.	$ 11,350,000 (Feasible)

Given the dynamic and complex nature of the area, a recommended alternative cannot be identified at this time. However, we currently consider Alternatives 3, 4, or 5 as feasible locations for a railroad grade separation.

- Alternative 3 (Corriher Street) is the nearest one of the three to the center of Landis. It is also the least expensive alternative and has significantly less right-of-way impacts.
- Alternative 4 (Airport Road) is near the southern city limit of Landis, serves the recent explosion of development in the area, and is a natural extension of a proposed thoroughfare on the approved Cabarrus-South Rowan Thoroughfare Plan (See Figure 2). However, this alternative does cross a newly developed industrial park, which may significantly increase the right-of-way cost as it develops.
- Alternative 5 (22nd Street) is the southern most alternative studied and is inside the City of Kannapolis approximately 1.8 miles (2.9 km) south of the downtown area of Landis. Current traffic projections indicate that this alternative would serve the greatest number of motorist when compared to the other three, but at a much greater cost in both right-of-way and construction. In addition, there is some concern that its location may not meet the requested scope for a railroad grade separation in Landis.

This study is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including costs, and to identify potential problems that may require consideration in the planning and design phases.

II. Need for Project

Improving traffic safety, for motorists, rail passengers and train crews, is the primary reason that NCDOT is evaluating a future railroad/highway grade separation between Ryder Avenue in Landis and 22nd Street in north Kannapolis. The Department agreed to conduct this feasibility study as part of the near-term (0-2 years) recommendations contained in the South End Traffic Separation Study. As part of a comprehensive evaluation of traffic patterns and road usage for an entire municipality or region, Traffic Separation Studies determine the need for improvements and/or elimination of public grade crossings to improve safety. Depending on its location, the construction of this grade separation would facilitate a crossing closure at Mills Street in Landis. This project is supported by the Town of Landis as well as the Rail Division of the North Carolina Department of Transportation.

Ryder Avenue is designated as a major thoroughfare in the Cabarrus-South Rowan Thoroughfare Plan and as a collector in the North Carolina Statewide Functional Classification System. Main Street (SR 2739) is

designated as a major thoroughfare in the Cabarrus-South Rowan Thoroughfare Plan and as a minor arterial in the North Carolina Statewide Functional Classification System. US 29 is designated as a major thoroughfare in the Cabarrus-South Rowan Thoroughfare Plan and as a principal arterial in the North Carolina Statewide Functional Classification System. NC 153 is designated as a minor thoroughfare in the Cabarrus-South Rowan Thoroughfare Plan and as a minor arterial in the North Carolina Statewide Functional Classification System. South Chapel Street is designated as a minor thoroughfare in the Cabarrus-South Rowan Thoroughfare Plan and as a collector in the North Carolina Statewide Functional Classification System. 22nd Street is designated as a minor thoroughfare in the Cabarrus-South Rowan Thoroughfare Plan and as a collector in the North Carolina Statewide Functional Classification System.

Ryder Avenue (SR 1210) is currently a two-lane curb-and-gutter roadway, 33 feet (10.0 m) of wide face-to-face of curbs. Under Alternatives 1, 2, and 3, Main Street (SR 2739) is a two-lane curb-and-gutter roadway with 36 feet (10.97 m) wide, face-to-face of curbs. For Alternatives 4 and 5, Main Street is a two-lane shoulder section with 22 feet (6.71 m) of pavement. For Alternatives 1, 2 and 3, South Chapel Street is a two-lane curb-and-gutter section with 36 feet (10.97 m) wide, face-to-face of curbs. For Alternative 4, South Chapel Street (SR 1464) is a two-lane shoulder section with 24 feet (7.31 m) of pavement. West Rice Street (NC 153) is a two-lane shoulder section with a pavement width of 30 feet (9.14 m). East Rice Street is a two-lane curb-and-gutter facility, 30 feet (9.14 m) wide, face-to-face of curbs. Corriher Street is a two-lane curb-and-gutter section, 30 feet (9.14 m) wide, face-to-face of curbs. 22nd Street is a two-lane shoulder section with 20 feet (6.1 m) of pavement west of Main Street and 24 feet (7.31 m) of pavement east of Main Street. Hickory Street (SR 2709) is a two-lane shoulder section with 20 feet (6.1 m) of pavement.

The major rail line through the project study area is the North Carolina Railroad, owned by the State of North Carolina. Norfolk Southern provides freight service over this line with 49 daily trains. Amtrak operates an additional six daily passenger trains that include the Crescent and the state-sponsored Piedmont and Carolinian.

There are existing traffic signals at the following intersections: Ryder Avenue (SR 1210) / Main Street (SR 2739), Ryder Avenue /Central Avenue, and Main Street / West Rice Street (NC 153).

III. Discussion of Alternatives

This feasibility study describes construction of a railroad grade separation in an area between Ryder Avenue (SR 1210) in Landis and 22nd Street (SR 1254 / SR 1171) in Kannapolis. Based on discussions with the NCDOT Rail Division, five potential locations were identified as Alternatives for this proposed railroad grade separation.

Ryder Avenue
(Alternative 1)
(Not Recommended)

Alternative 1 proposes to construct a railroad grade separation at the existing Ryder Avenue (SR 1210) at-grade rail crossing. Because both Main Street (SR 2739) and Central Avenue are adjacent to the railroad in this area, the grade separation would also span these roadways. Therefore, all access between these facilities would be via the existing street network. It should also be noted that this area of Landis appears to be eligible for the National Register of Historic Places and Section 4(f) of the Department of Transportation Act will apply if federal aid funds are utilized. In addition, this alternative would have significant impact on the central business district near the existing railroad crossing and require a vertical grade modification to Chapel Street in order to maintain access to the proposed grade separation. Therefore, we do not recommend the implementation of this alternative.

However, if a grade separation were provided at this location, a new structure, approximately 250 feet (76.2 m) long and 42 feet (12.8 m) wide, with sidewalks on both sides. The recommended cross-section is a two-lane curb-and-gutter section, 32 feet (9.75 m) wide from face-to-face of curbs, with 10-foot (3.0-m) berms. In order to minimize the right-of-way impacts in this area, reinforced earth walls are recommended on the fill sections. It is anticipated that 14 residences and 6 businesses will be relocated due to this alternative. The total cost of the project, including construction and right-of-way, is estimated to be $10,070,000.

Construction	$ 7,100,000
Right-of-way	$ 2,970,000
Total Cost	$ 10,070,000

Rice Street
(Alternative 2)
(Not Recommended)

Alternative 2 proposes to construct a railroad grade separation from West Rice Street (NC 153) to East Rice Street. Given the existing grade difference between the West Rice Street (NC 153) / South Main Street (SR 2739) intersection and the railroad, it is recommended that the proposed grade separation begin at this intersection. It is anticipated that this grade separation would span South Central Avenue and South Chapel Street before connecting with East Rice Street. This alternative would connect to East Rice Street within an existing residential area of Landis and utilize the existing street network to access a local thoroughfare. Therefore, implementation of this alternative is not recommended.

However, a grade separation at this location would include a new structure, approximately 650 feet (198.1 m) long and 42 feet (12.8 m) wide with sidewalks on both sides. The recommended cross-section is a two-lane curb-and-gutter section, 32 feet (9.75 m) wide, face-to-face of curbs, with 10-foot (3.0-m) berms. It is anticipated that 8 residences and 1 business will be relocated due to this alternative. The total cost of the project, including construction and right-of-way, is estimated to be $5,050,000.

Construction	$ 4,000,000
Right-of-way	$ 1,050,000
Total Cost	$ 5,050,000

Corriher Street
(Alternative 3)
(Feasible)

Alternative 3 proposes to construct a railroad grade separation from the Main Street / Third Street intersection to Corriher Street east of the railroad. Given the existing terrain in this area, this proposed roadway would cross beneath the railroad. Therefore, a temporary detour of the railroad would be required to construct the proposed railroad overpass.

This alternative is considered feasible, but will include coordination with the railroad because of the railroad detour. Of the alternatives evaluated, this one is the most economical and has the least amount of impact on the community. In addition, it is close enough to downtown Landis to meet the purpose of providing a railroad grade separation in Landis as indicated in the South End Traffic Separation Study.

If this alternative were utilized, the proposed railroad structure would be approximately 52 feet (15.85 m) long and 35 feet (10.7 m) wide. The recommended cross-section is a two-lane curb-and-gutter section, 32 feet (9.75 m) wide from face-to-face of curbs, with 10-foot (3.0-m) berms. It is anticipated that 3 residences and no businesses will be relocated due to this alternative. The total cost of the project, including construction and right-of-way, is estimated to be $4,620,000.

Construction	$ 3,700,000
Right-of-way	$ 920,000
Total Cost	$ 4,620,000

Airport Road
(Alternative 4)
(Recommended)

Alternative 4 proposes to construct a railroad grade separation from the South Main Street (SR 2739) / Airport Road (SR 1182) intersection to the South Chapel Street (SR 1464) / Hickory Street (SR 2709) intersection. A proposed grade separation at this location would include a new structure 250 feet (76.2 m) long and 42 feet (12.8 m) wide with sidewalks on both sides. The recommended cross-section is a two-lane curb-and-gutter section, 32 feet (9.75 m) wide from face-to-face of curbs, with 10-foot (3.0-m) berms.

The proposed grade separation in Alternative 4 (Airport Road) provides direct access between Main Street (SR 2739) and South Chapel Street with significantly less right-of-way impacts when compared to Alternative 5 (22nd Street). Direct access to US 29 is provided via South Chapel Street and Hickory Street. It should also be noted that the approved Cabarrus-South Rowan Thoroughfare Plan proposes a new thoroughfare that connects NC 153 west of Landis to the Main Street / Airport Road intersection south of Landis (See Figure 2). Alternative 4 is considered a logical extension of this proposed thoroughfare. It will also serve the recent explosion of development within this area.

It is anticipated that 4 residences and 1 business will be relocated due to this alternative. The total cost of the improvement, including construction and right-of-way, is estimated to be $5,550,000.

Construction	$ 3,500,000
Right-of-way	$ 2,050,000
Total Cost	$ 5,550,000

As a supplement to Alternative 4, improvements to Hickory Street (SR 2709) between South Chapel Street and US 29 were also considered. The recommended cross-section is a two-lane curb-and-gutter section, 32 feet (9.75 m) wide, face-to-face of curbs, with 10-foot (3.0-m) berms. It is anticipated that 5 residences and no businesses will be relocated due to this supplemental improvement. If this supplemental improvement were to be included, the total cost, including construction and right-of-way, is estimated to be $1,420,000.

Construction	$ 800,000
Right-of-way	$ 620,000
Total Cost	$ 1,420,000

The total cost of this alternative including the Hickory Street improvements is $6,970,000. However, if the recently developed industrial park between the railroad and South Chapel Street continues to materialize, the right-of-way cost of this alternative could increase.

22nd Street
(Alternative 5)
(Feasible)

Alternative 5 proposes to construct a railroad grade separation at the existing 22nd Street at-grade rail crossing in Kannapolis. Since Main Street is parallel to the railroad in this area, the grade separation would also span this facility. In addition, the two 22nd Street approaches to Main Street form an offset intersection and the western 22nd Street approach should be relocated opposite the eastern approach. At the request of the City of Kannapolis, this alternate includes a partial cloverleaf interchange between Main Street and 22nd Street with the ramps and loops to the west of Main Street. With this interchange, the projected traffic volumes are expected to be significant. Therefore, we recommend that a five-lane curb and gutter section, 64 feet (19.5 m) wide be provided from the proposed interchange with Main Street to the US 29 / 22nd Street intersection. West of the proposed interchange, a two-lane curb and gutter section, 32 feet (9.75 m) wide face to face of curbs, would be utilized to transition back to the existing cross section.

The proposed grade separation at this location would include a new structure, approximately 310 feet (94.5 m) long and 74 feet (22.6 m), wide with sidewalks on both sides. It is anticipated that 39 residences and 6 business will be relocated due to this alternative. The total cost of this alternative, including construction and right-of-way, is estimated to be $11,350,000.

Construction	$ 6,500,000
Right-of-way	$ 4,850,000
Total Cost	$ 11,350,000

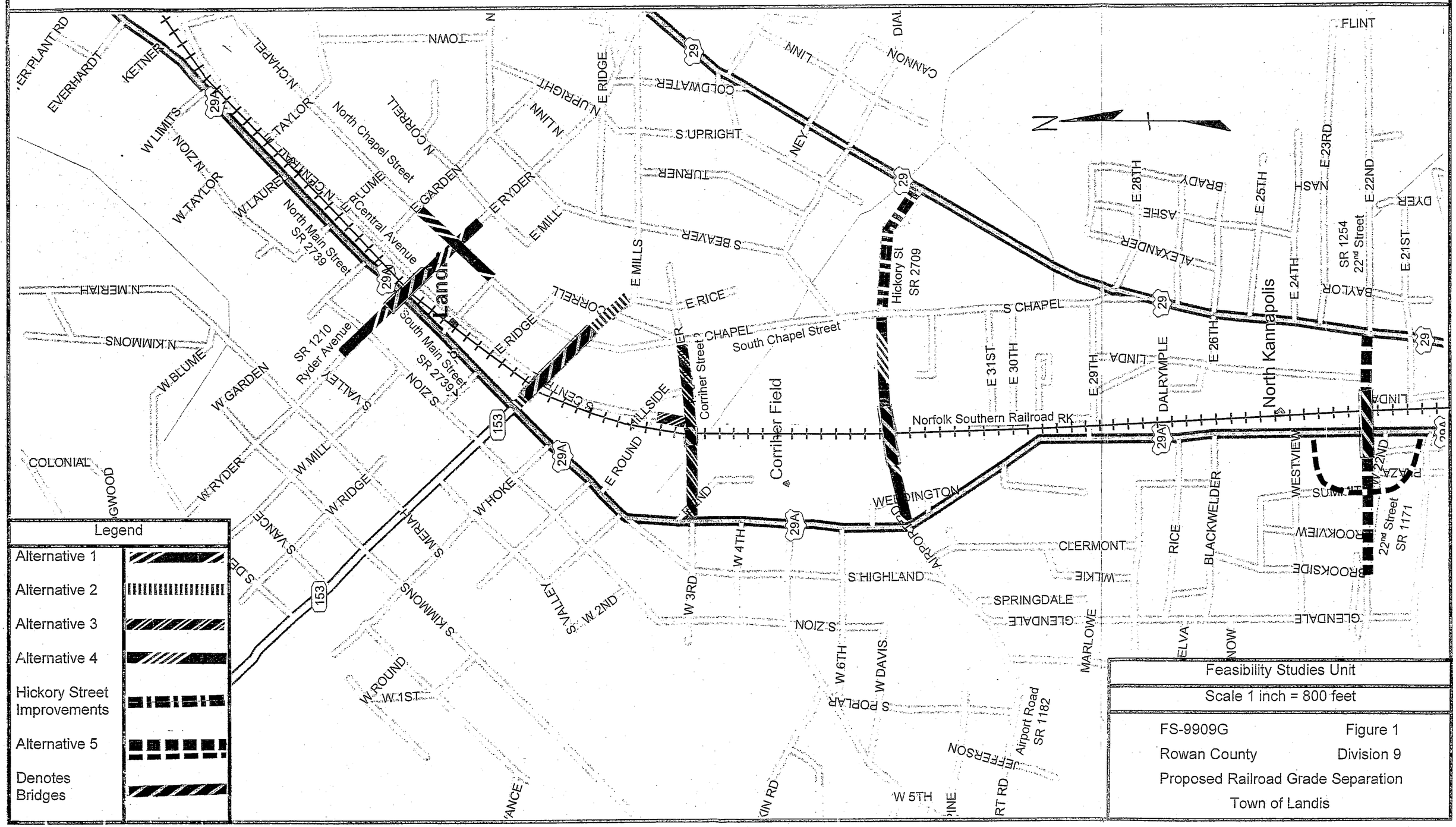
V. Additional Comments

An environmental screening was not conducted for this study.

The NCDOT Division of Bicycle and Pedestrian Transportation has not requested that bicycle accommodations be provided under this project. However, the cost estimates for this project include pedestrian and bicycle accommodations in case future conditions indicate the need.

A transportation benefit analysis was not completed for this project because the proposed improvements are beyond the capabilities of the benefit analysis package developed by the Statewide Planning Branch. However, the addition of a grade-separated railroad crossing within this area will improve the traffic safety and operations of the area.

FS-9909G
Landis Railroad Separation Study



Feasibility Studies Unit

Scale 1 inch = 800 feet

FS-9909G — Figure 1

Rowan County — Division 9

Proposed Railroad Grade Separation

Town of Landis

An Excerpt From The

Cabarrus – South Rowan Thoroughfare Plan

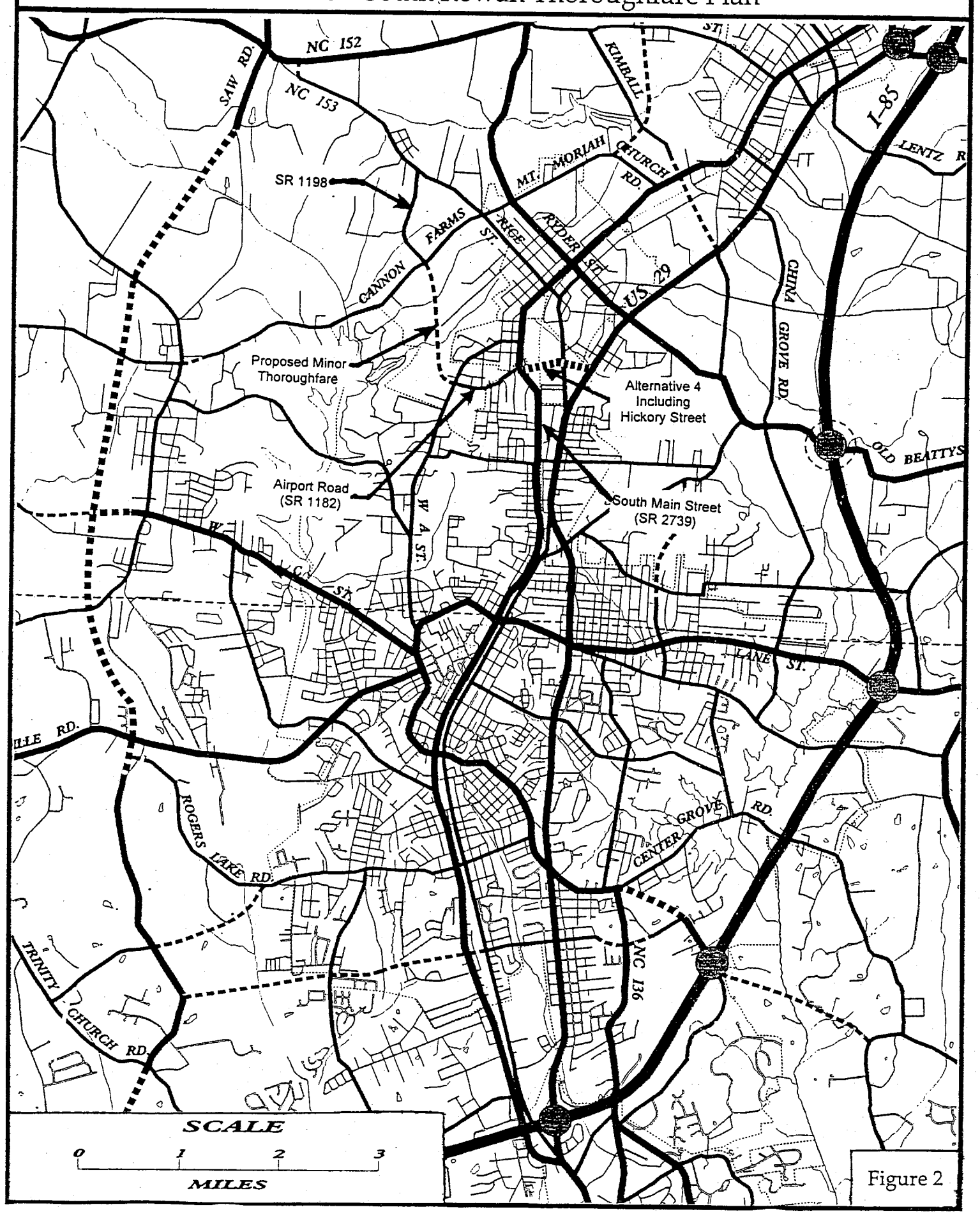


Figure 2