FEASIBILITY STUDY

Statesville
US 21 (Sullivan Road)
from US 64 to I-40
Iredell County

U-2930

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

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I. GENERAL DESCRIPTION

This is a feasibility study for the widening of US 21, from US 64 to I-40 in Statesville, a distance of approximately 2.0 miles (3.2 kilometers) (See Figures 1 and 2). The recommended typical section is a five-lane, 64-foot (19.5-meter), face-to-face, curb and gutter section with 8-foot (2.4-meter) berms, on 100-foot (30.5-meter) wide right-of-way, without access control. The estimated cost of this project is $11,000,000 ($3,000,000 for right-of-way and $8,000,000 for construction).

The US 21 corridor is a major traffic generator which intersects the I-40 corridor. It is recommended that the proposed improvements to the I-40 corridor be fully evaluated before completing the final design of the US 21 corridor. The I-40 corridor study would evaluate improvements to interchanges in the vicinity of the existing I-40 and I-77 interchange. The outcome of the I-40 corridor study may affect the recommendations and cost estimates for the US 21 corridor, since the interchange of I-77 and I-40, is located less than 1.0 mile (1.6 kilometers) east of the US 21 and I-40 interchange. Due to the possible changes, the estimated cost given above should not be used for program funding, until the I-40 corridor study is completed.

This study is not a detailed planning/environmental investigation. A feasibility study presents recommended cross sections for improvements, general alignments of improvements, and estimated cost of construction and right-of-way. This study attempts to identify any potential environmental, permitting, or other observed issues which deserve consideration in the planning and construction stages.

II. NEED FOR PROJECT

This project was requested by the City of Statesville. The recommended improvements are needed to relieve traffic congestion and improve safety on the studied section of US 21. This route is classified as a Major Thoroughfare on the Statesville Thoroughfare Plan, and as an Urban Minor Arterial on the Statewide Functional Classification System.

The existing US 21 (See Figure 2), from US 64 (Davie Avenue) to approximately 150 feet (45.7 meters) north of Dogwood Road, is a two-lane, 34-foot (10.4-meter), face-to-face, curb and gutter section on a 60-foot (18.3-meter) wide right-of-way. From approximately 150 feet (45.7 meters) north of Dogwood Road to approximately 250 feet (76.2 meters) north of Lakeside Drive, US 21 is a two-lane, 21-foot (6.4-meter) wide roadway with 2 to 6-foot (0.6 to 1.8-meter) shoulders on a 60-foot (18.3-meter) wide right-of-way. From approximately 250 feet (76.2 meters) north of Lakeside Drive to the I-40 eastbound ramps, US 21 is a four-lane, 44-foot (13.4-meter), face-to-face, curb and gutter section on a 60-foot (18.3-meter) wide right-of-way. Between the I-40 eastbound and westbound ramps, US 21 is a three-lane, 39-foot (11.9-meter) wide roadway with guardrails on each side. Land use is residential south of Lakeside Drive and commercial north of Lakeside Drive.

The south terminal is located at the signalized intersection of US 21, Stockton Street, East End Avenue, and US 64 (See Figure 2). Land use around the five-leg intersection is commercial and residential.

The north terminal is located at the I-40 westbound ramp (See Figure 2). North of this location, US 21 consists of a five-lane, 64-foot (19.5-meter), face-to-face, curb and gutter section with 8-foot (2.4-meter) berms. Land use is commercial.

Structure Number 63 carries US 21 over Fourth Creek approximately 0.2 miles (0.3 kilometers) south of I-40. The sufficiency rating of this culvert is 82.4 out of 100.

Structure Number 137 carries I-40 eastbound over US 21 approximately 0.9 miles (1.4 kilometers) west of I-77. The sufficiency rating of this bridge is 94.0 out of 100. The bridge is approximately 138 feet (42.1 meters) in length with

a 43.4-foot (13.2-meter) wide deck and a 40-foot (12.2-meter) clear roadway width.

Structure Number 142 carries I-40 westbound over US 21 approximately 0.9 miles (1.4 kilometers) west of I-77. The sufficiency rating of this bridge is 70.9 out of 100. The bridge is approximately 124 feet (37.8 meters) in length with a 31.4-foot (9.6-meter) wide deck and a 28-foot (8.5-meter) clear roadway width.

Structure Number 144 carries I-40 eastbound over Fourth Creek approximately 500 feet (152.4 meters) east of US 21. The sufficiency rating of this bridge is 77.0 out of 100. The bridge is approximately 151 feet (46 meters) in length with a 43.5-foot (13.3-meter) wide deck and a 40.1-foot (12.3-meter) clear roadway width.

Structure Number 147 carries I-40 westbound over Fourth Creek approximately 500 feet (152.4 meters) east of US 21. The sufficiency rating of this bridge is 52.7 out of 100. The bridge is approximately 151 feet (46 meters) in length with a 43.5-foot (13.3-meter) wide deck and a 40-foot (12.2-meter) clear roadway width.

The traffic capacity analysis for US 21 is based on adjusted traffic volumes for the design year, 2015. These volumes were adjusted for several reasons. At the south terminal of the project, the existing intersecting streets are not likely to be widened for additional traffic capacity due to the existing adjacent land use. Therefore, the traffic volumes were derived by calculating the volume of traffic through the intersection of US 21, US 64 (Davie Avenue), and East End Avenue, so that the intersection would operate at capacity. The analysis indicates that eliminating Stockton Street from the existing five-leg intersection would reduce turning conflicts. The traffic volume at the south terminal of US 21 was estimated to be 13,500 vehicles per day (vpd) in the design year, 2015. The area at the north terminal of the project has the potential for further commercial and industrial growth. Analysis of this area was based on obtaining a LOS C in the design year, at the interchange between I-40 and US 21. Due to the high cost of improving an interchange in a developed area, an interchange design was analyzed that could handle maximum capacity volumes from a widened US 21 and I-40. The traffic volume at the north terminal of US 21 was estimated to be 33,500 vpd.

During the period from June, 1990, through May, 1993, a total of 180 accidents were reported along the studied section of US 21. This resulted in an accident rate of 760.1 accidents per 100 million vehicle miles (acc/100mvm), compared to a statewide average of 325.2 acc/100mvm for similar US routes. Vehicles making left turns accounted for 52% of the accidents. A majority (150 out of 180) of the accidents occurred in a 0.3-mile (0.5-kilometer) section, between Free Nancy Avenue and the I-40 interchange. The proposed improvements are expected to reduce the accident rate.

III. RECOMMENDATIONS

It is recommended that US 21 (Sullivan Road) be widened from US 64 to the I-40 westbound ramps, a distance of approximately 2.0 miles (3.2 kilometers). The recommended typical cross-section is a five-lane, 64-foot (19.5-meter), face-to-face, curb and gutter section with 8-foot (2.4-meter) berms, on 100-foot (30.5-meter) wide right-of-way.

The five-leg intersection at the south terminal would be revised to a four-leg intersection (See Figure 2). It is recommended that access to Stockton Street be eliminated to decrease the number of traffic conflicts at this intersection. Stockton Street would be terminated with a cul-de-sac.

It is recommended that the existing diamond interchange at I-40 and US 21, be reconstructed as a single-point urban interchange (SPUI) (See Figure 3). A SPUI is an interchange where the turning movements at the ramp terminals operate as a single intersection with free flowing traffic between the terminals. At a diamond interchange the ramp terminals operate as two intersections where traffic may be stopped between terminals. Due to the traffic flow characteristics of a SPUI, it is able to handle a higher volume of traffic than a diamond interchange. The SPUI is recommended to minimize business relocations around the interchange and provide an acceptable level of service for traffic in this developing area. Structure Numbers 137 and 142 would be reconstructed to accommodate the recommended interchange design. Additional bridges may be required on the westbound I-40 exit ramp and the eastbound I-40 entrance ramp to accommodate the interchange (See Figure 2).

It is recommended that access between SR 1965 (Gaither Road) and I-40 via the I-40 westbound ramp be eliminated. SR 1965 would be realigned on a new location to intersect US 21 approximately 0.1 mile (0.2 kilometer) north of I-40 (See Figure 2). The recommended typical cross-section is a two-lane, 24-foot (7.3-meter) roadway with 8-foot (2.4-meter) wide usable shoulders, on a 60-foot (18.3-meter) wide right-of-way with no access control.

The recommended improvements would reduce traffic congestion and improve safety along the US 21 corridor. The US 21 corridor is a major traffic generator which intersects the I-40 corridor. It is recommended that the proposed improvements to the I-40 corridor be fully evaluated before completing the final design of the US 21 corridor. The I-40 corridor study would evaluate improvements to interchanges in the vicinity of the existing I-40 and I-77 interchange. The outcome of the I-40 corridor study may affect the recommendations and cost estimates for the US 21 corridor, since the interchange of I-77 and I-40, is located less than 1.0 mile (1.6 kilometers) east of the US 21 and I-40 interchange.

The estimated project costs are as follows:

Section	Right-of-way	Construction	Total
US 21	$2,200,000	$1,600,000	$ 3,800,000
I-40 & US 21 Interchange	$ 200,000	$6,200,000	$ 6,400,000
SR 1965	$ 600,000	$ 200,000	$ 800,000
Total Project	$3,000,000	$8,000,000	$11,000,000

* Due to possible changes, these estimated costs should not be used for program funding, until the completion of the I-40 corridor study.

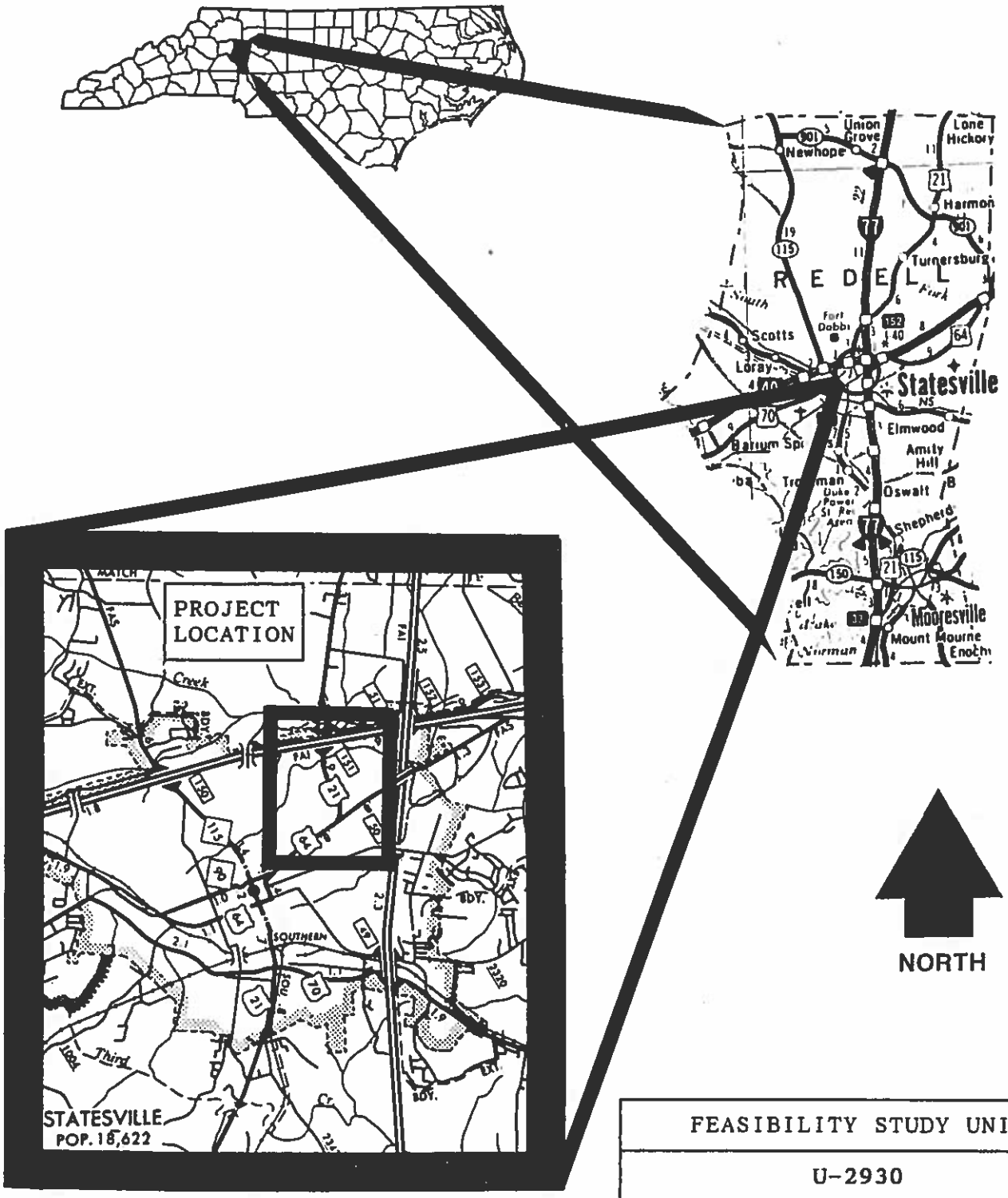
Moderate utility conflicts are expected.

IV. OTHER COMMENTS AND CONCERNS

It is estimated that this project will require the relocation of three residences and five businesses.

Based on available traffic data and land use patterns, improvements to the I-40 corridor on the east side of Statesville between NC 115 and US 64 would further decrease traffic congestion in the vicinity of US 21.

No historical or architectural sites are known to be located in the vicinity of the project. No public parks would be affected.



FEASIBILITY STUDY UNIT	
U-2930	
STATESVILLE	
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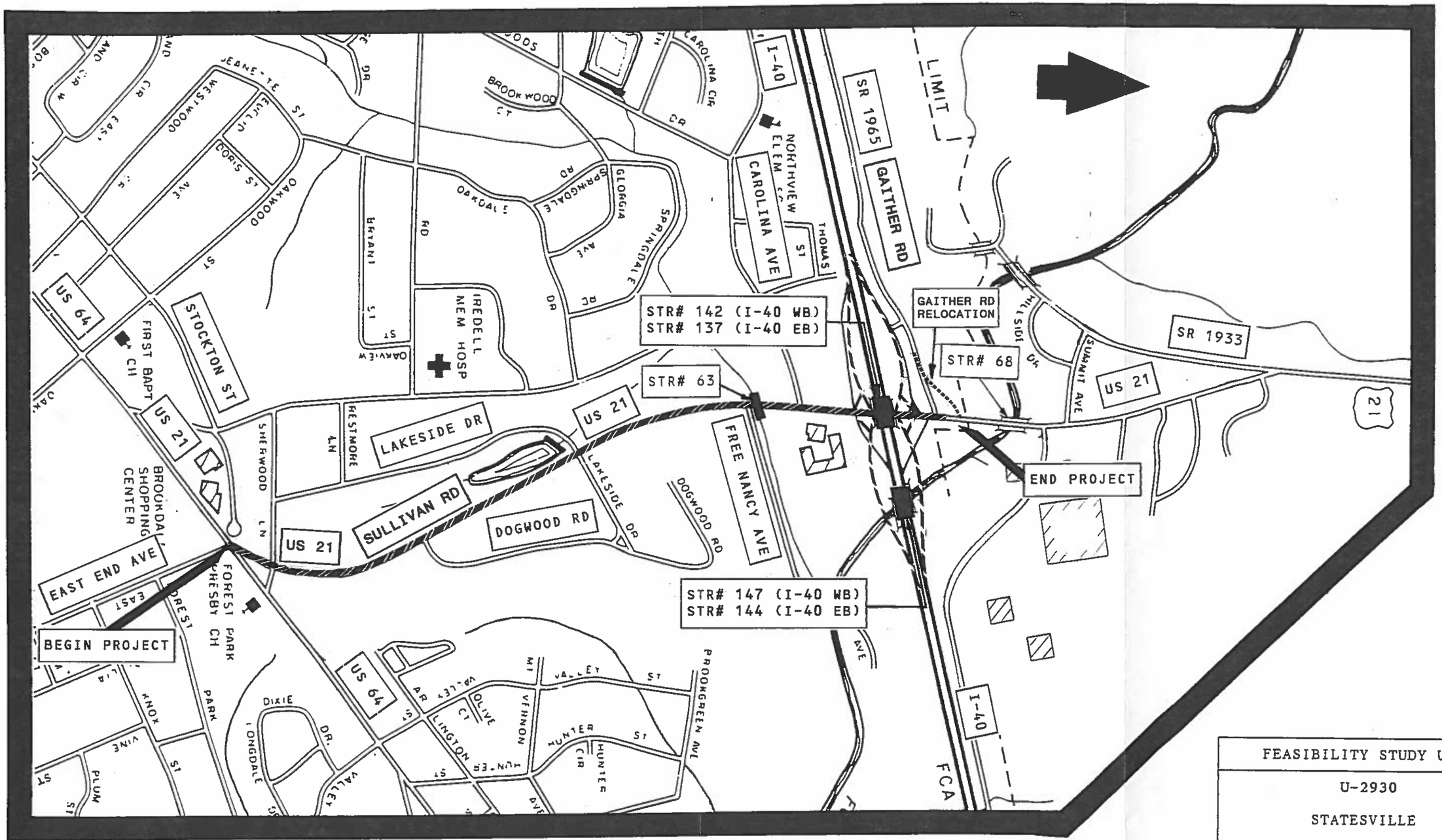
DIV. 12	FIGURE 1



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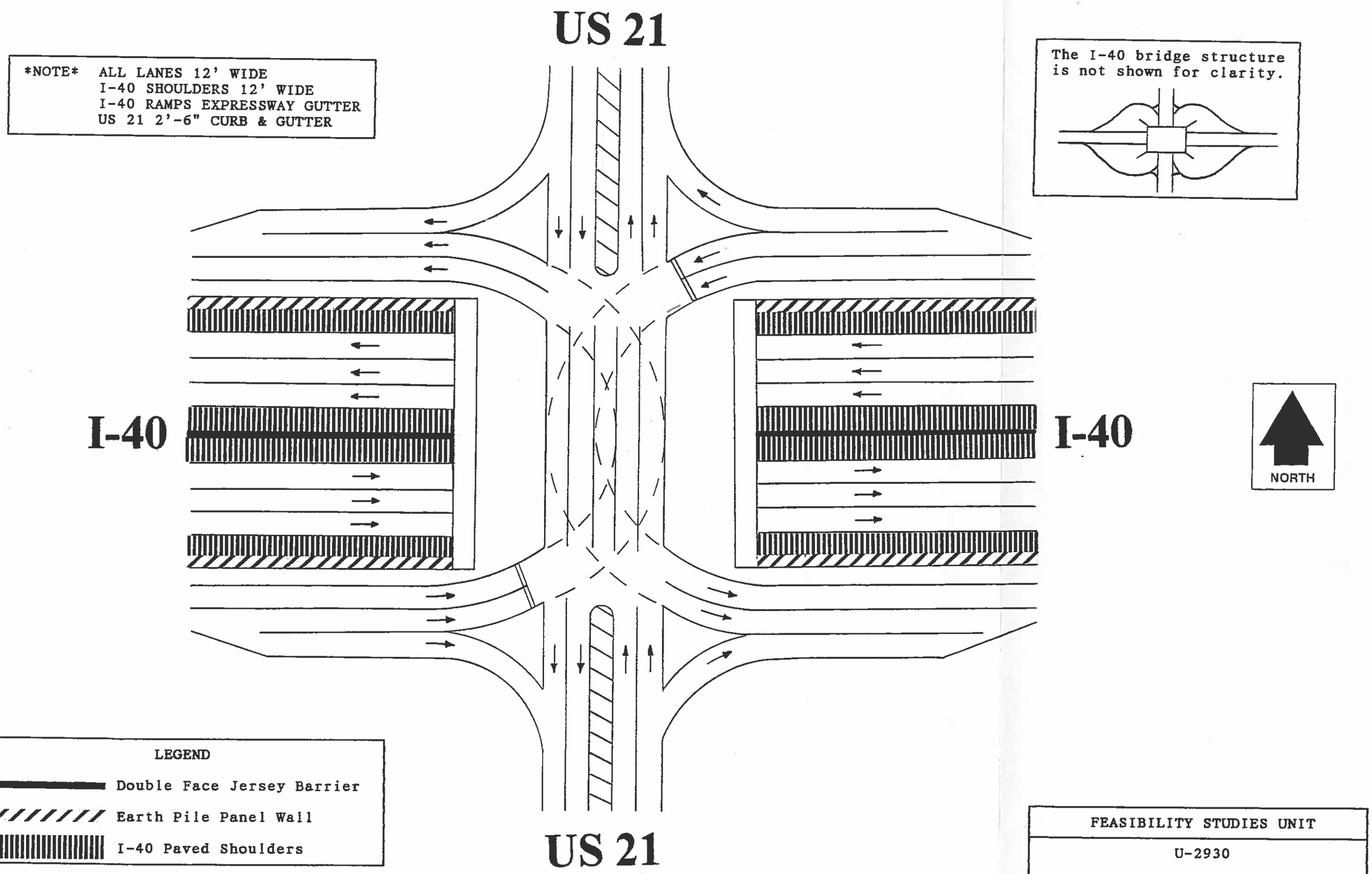

FEASIBILITY STUDIES UNIT

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Single-Point Urban Interchange at US 21 and I-40

NOT TO SCALE

FIGURE 3