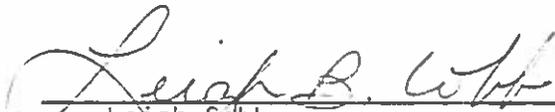


FEASIBILITY STUDY

US 74
INTERCHANGE JUSTIFICATION STUDY
AT SR 1166 NEAR BRYSON CITY
SWAIN COUNTY

Prepared by
Planning and Research Branch
Division of Highways
N. C. Department of Transportation



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Date 

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US 74
INTERCHANGE JUSTIFICATION STUDY
AT SR 1166 NEAR BRYSON CITY
SWAIN COUNTY

The Planning and Research Branch has studied the feasibility of providing an additional interchange on US 74 at SR 1166 in Swain County (see Figure 1).

Summary

Based on a road user analysis, provision of an additional interchange at SR 1166 is not warranted.

Basis For Request

The studied interchange is being requested by residents in the communities of Shepards, Kirklands, and Sitton. A petition (copy attached) consisting of approximately 1000 signatures was submitted.

The proposed interchange would allow nearby residents to utilize US 19 for improved access to Sylva, Waynesville, Cherokee, Bryson City, Robbinsville, Andrews, and Murphy. As a result, better access for emergency vehicles would result and movement of agricultural products would be improved.

SR 1166

SR 1166 is grade separated from US 74 and has a pavement width of 18 feet. SR 1166 connects with US 19 north of the proposed interchange area. To the south SR 1166 and other connecting secondary roads serve scattered residential development. Each of the secondary roads terminates in rugged terrain south of the studied area. Development in the studied area consists of approximately 200 residences, 2 businesses, a church, and a community center.

The current traffic volume on SR 1166 ranges from 400 to 1000 vehicles per day. By the year 2008 the volume is expected to increase to approximately 700 to 1700 vehicles per day without an interchange or 700 to 4000 vehicles per day with an interchange.

Studied Interchange

Preliminary design studies indicate a modified diamond-type interchange would be most feasible at this location. A loop would be provided in the southeast quadrant in lieu of a ramp in the southwest quadrant. The existing structures, which carry US 74 over SR 1166 have lengths of 176 feet and 178 feet. Each has a roadway width of 40 feet. Both structures were built in 1978 and have sufficiency ratings of 79.6 and 94.4.

The total estimated cost of the interchange is approximately \$4,000,000, including \$3,600,000 for construction and \$400,000 for right of way acquisition.

Some negative environmental consequences would result from the project. This includes disruption of wetlands and acquisition of three residences.

Economic Analysis

Estimates of 1988 and 2008 traffic movements with and without the studied interchange are shown in Figures 3 and 4.

Applying the traffic centroids shown in Figure 1, a roaduser benefit-cost analysis yielded possible annual savings of \$355,200 (see Figure 5). The resulting benefit cost ratio of 0.9 indicates the interchange is not economically justifiable.

Interchange Spacing

The studied interchange would be approximately 1.4 miles from the nearest interchange to the east (SR 1168) and 1.2 miles from the nearest interchange to the west (SR 1159). It would be located in an area designated as rural in nature.

Provision of the studied interchange would lower the average spacing between interchanges in the area to 2.0 miles, which is below the 8 mile desirable average spacing for interchanges in rural areas.

The minimum distance to the nearest interchange would be 1.22 miles, which is below the desirable minimum distance of 3 miles between interchanges in rural areas.

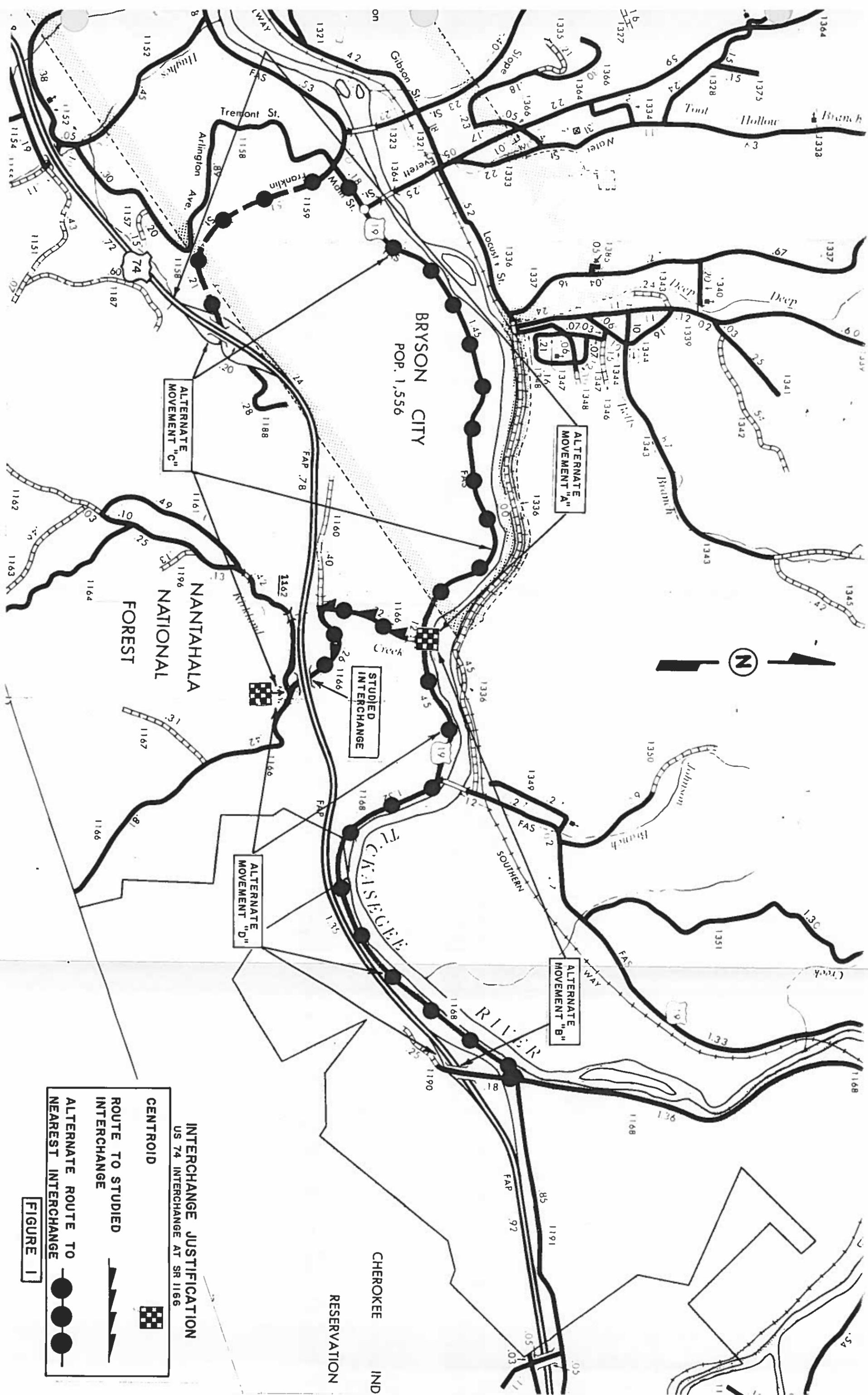
Studied Alternative

One additional alternative was studied to provide improved access to the area. SR 1160 could be extended along the north side of US 74 (see Figure 1) to connect with SR 1159. This would include 0.7 mile of roadway on new location and 0.4 mile of upgrading SR 1160. Estimated cost is approximately \$1,200,000, including \$1,100,000 for construction and \$100,000 for right-of-way acquisition. Although this proposed connector would improve access to the west, only limited benefits would result. Therefore, the studied extension of SR 1160 is not justifiable.

Conclusions

Although some benefits would be derived from provision of the studied interchange, existing development and traffic demand do not warrant an expenditure of \$4,000,000. Therefore, it is recommended that an additional interchange at SR-1166 not be provided at this time.

LC/rm



INTERCHANGE JUSTIFICATION
 US 74 INTERCHANGE AT SR 1166

CENTROID 

ROUTE TO STUDIED INTERCHANGE 

ALTERNATE ROUTE TO NEAREST INTERCHANGE 

FIGURE 1



	NORTH CAROLINA DE TRANSPORTATION DIVISION OF HIGHWAY PLANNING AND RES	
	US 74 PROPOSED INTERCHANGE A SWAIN COUNTY	
6/88		

EST. 1988/2008 ADT IN HUNDREDS

US 19 FROM SR 1159 TO SR 1168, BRYSON CITY

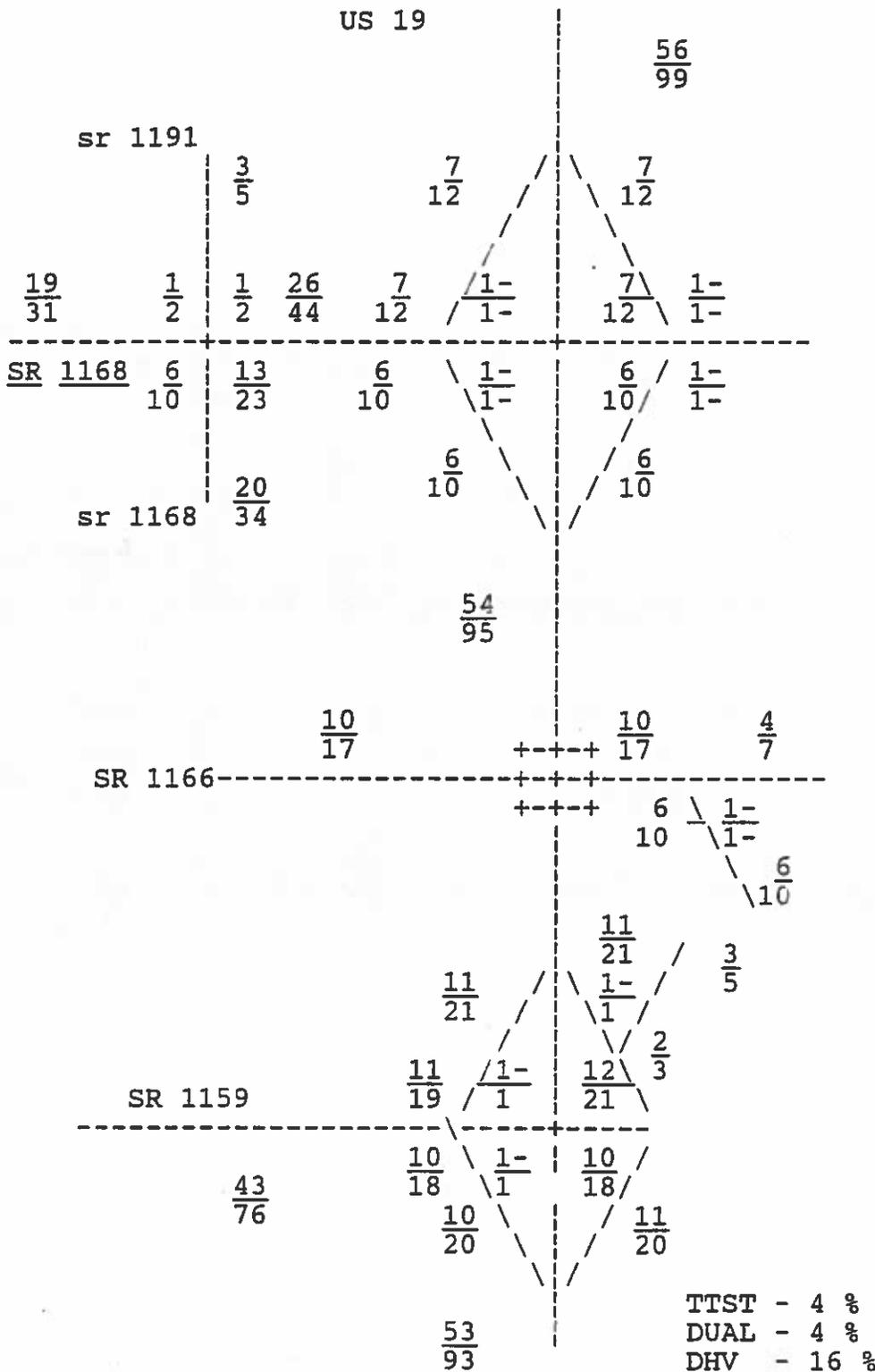


FIGURE 3

WITH INTERCHANGE AT SR 1166

EST 1988/2008 ADT IN HUNDREDS
 US 19 FROM SR 1168 TO SR 1159

US 19

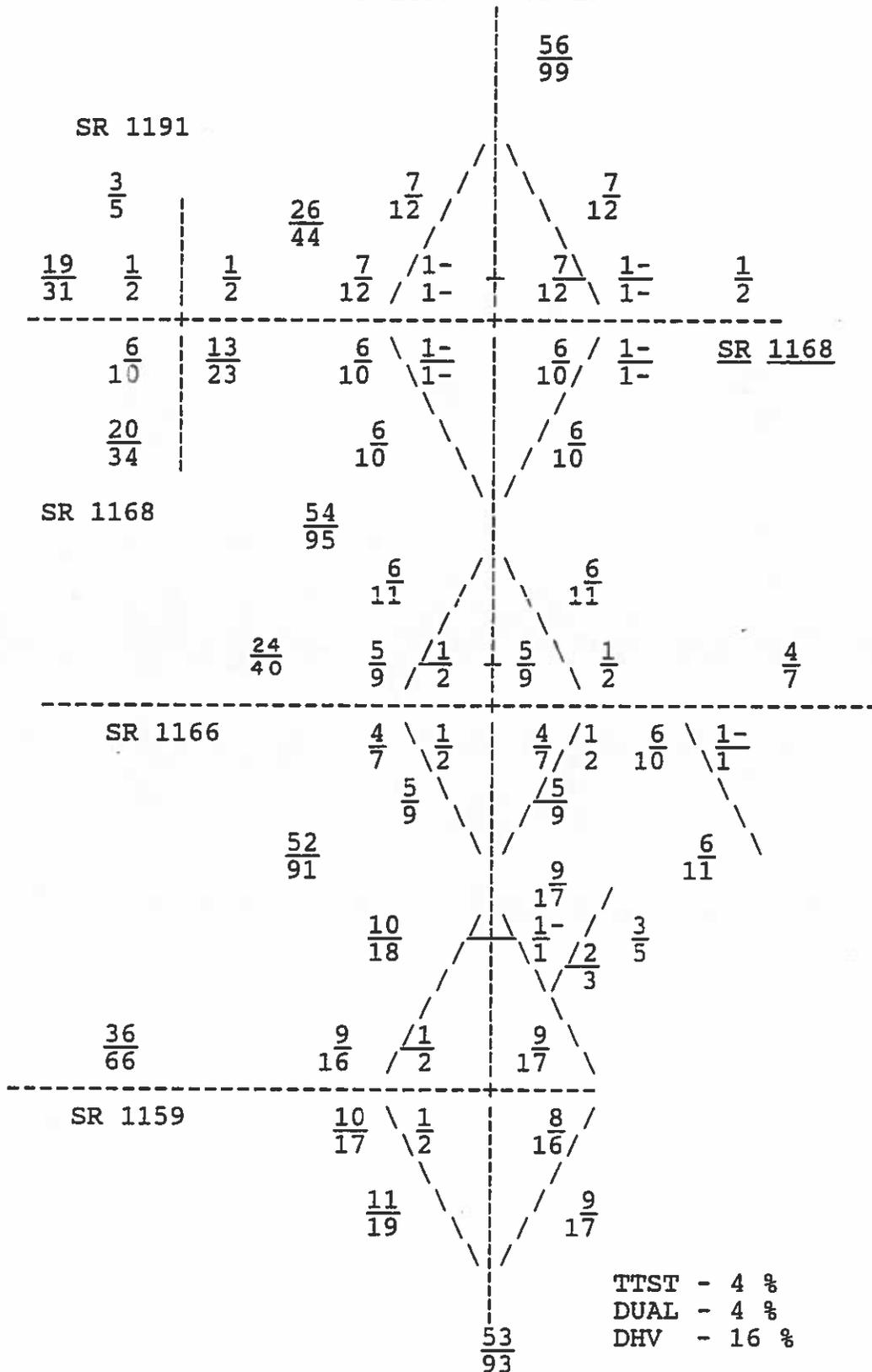
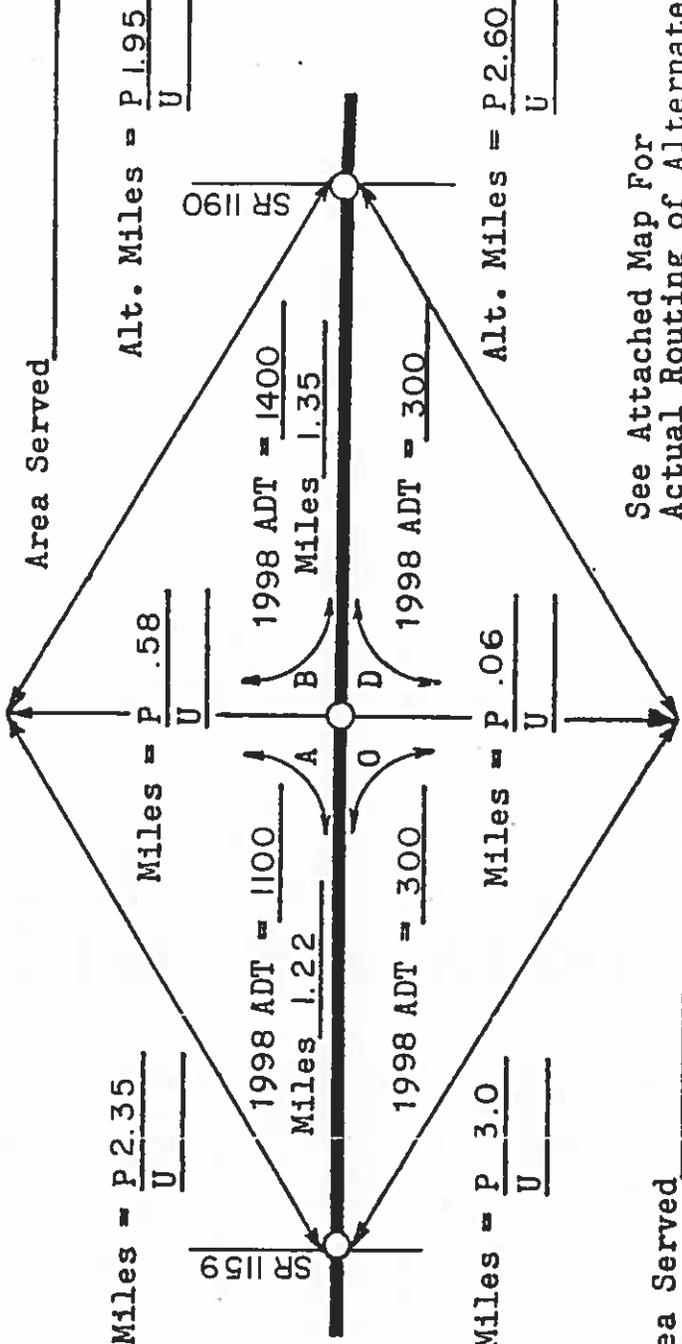


FIGURE 4

WORKSHEET FOR DETERMINING BENEFIT-COST RATIO

ROUTE NO. US 74
INTERCHANGE AT SR 1166



Area Served _____
See Attached Map For Actual Routing of Alternate

ROAD USER SAVINGS = (FJ + GK) + (HR) - (EL + FM + GN) (PQ):
Refer to Procedure For Discussion of Formula Factors

Without Interchange	With Interchange	Road User Savings
F J G K H R	E L F M G N	P Q
A = $[(.30 \times 2.35) + x] + (.07 \times 1.5) - (.30 \times .58) + .26 \times 1.22$	+ x	(365) (1100) = \$ 197,200
B = $[(.30 \times 1.95) + x] + (.07 \times 0.25) - (.30 \times .58) + .26 \times 1.35$	+ x	(365) (1400) = \$ 39,600
C = $[(.30 \times 3.0) + x] + (.07 \times 2.0) - (.30 \times .06) + .26 \times 1.22$	+ x	(365) (300) = \$ 63,800
D = $[(.30 \times 2.60) + x] + (.07 \times 1.25) - (.30 \times .06) + .26 \times 1.35$	+ x	(365) (300) = \$ 54,600
Algebraic sum of annual road user savings		= \$ 355,200

Cost of providing ramps ----- = \$ 4,000,000
Annual capitalization and maintenance cost (\$ 4,000,000 x 0.10) = \$ 400,000
Interchange benefit-cost ratio ----- = 0.9
The interchange is is not justified based upon benefit-cost ratio

INTERCHANGE JUSTIFICATION SUMMARY

Route No. US 74 Proposed Interchange NEAR SR 1166
 Section: SR 1140 TO SR 1415 (JACKSON CO.)
 Section Length 7.84 Mi. Area Classification RURAL
 Average Interchange Spacing in Section 2.0 Mi.; Desirable 8.0 Mi.
 Distance to Nearest Interchange in Area 1.22 Mi.; Desirable 3.0 Mi.

Description of Crossroads:
 System: N. C. Major Arterial Minor Arterial Collector
 F.A.P. F.A.S. F.A.U. State Other
 Condition: Paved Unpaved
 No. of Lanes: Existing 2 Future 2
 Grade Separation: Would Would not Exist without Ramps

Interchange ADT Traffic and Environment
1.35 Mi. to Interchange AT SR 1190

1.22 Mi. to Interchange AT SR 1159

This Interchange Does not Does
 Create Abnormal Interference with Freeway Traffic

Parallel Routes Adequate Inadequate
 Economically Improvable Yes No

Summary of Benefit-Cost Ratio
 Cost of Providing Interchange \$400,000
 Interchange Benefit-Cost Ratio 0.9

Interchange is Justified Yes No

Support for Determination:

Spacing	Adequate	<input type="checkbox"/>	Inadequate	<input checked="" type="checkbox"/>
Route Classification	Major	<input type="checkbox"/>	Minor	<input checked="" type="checkbox"/>
Traffic Need	Evident	<input type="checkbox"/>	Not evident	<input checked="" type="checkbox"/>
Traffic Operation	Not Impaired	<input checked="" type="checkbox"/>	Impaired	<input type="checkbox"/>
Alternative Routes	Inadequate	<input type="checkbox"/>	Adequate	<input checked="" type="checkbox"/>
Benefit Cost Ratio	Favorable	<input type="checkbox"/>	Unfavorable	<input checked="" type="checkbox"/>
Other	_____			

FIGURE 6