ROUTE 29

CORRIDOR STUDY

CITY OF CHARLOTTESVILLE AND ALBEMARLE COUNTY

DRAFT ENVIRONMENTAL IMPACT STATEMENT SECTION 4(f)/106 EVALUATION

6029-002-122, PE 100

U.S. Department of Transportation
Federal Highway Administration
and
Virginia Department of Transportation

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SECTION 4(f)/106 EVALUATION

Submitted Pursuant To: 42 U.S.C. 4332(2) (c), 23 U.S.C. 128(a)
49 U.S.C. 303(c), and 16 U.S.C. 470(f)

U.S. Department of Transportation
Federal Highway Administration
and
Virginia Department of Transportation

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The proposed project is to provide relief from current and anticipated traffic congestion on the Route 29 north corridor in the City of Charlottesville and Albemarle County. A Base Case alternative with eight corridor construction alternatives have been considered in addition to Mass Transit and Transportation System Management (TSM) alternatives. An alternative will be recommended following circulation of the Draft Environmental Impact Statement, a Location Public Hearing, and a full consideration of comments received.

Comments on this Draft Environmental Impact Statement are due by July 9, 1990 and should be sent to Mr. R.L. Hundley, Virginia Department of Transportation, Environmental Division, 1401 East Broad Street, Richmond, Virginia 23219.

SUMMARY

PROJECT DESCRIPTION

The proposed action is located in the U.S. Route 29 corridor in the City of Charlottesville and Albemarle County, Virginia. This section of Route 29 is a four-lane divided highway with at-grade, signalized intersections. It begins at the U.S. Route 250 Bypass in Charlottesville and ends at the South Fork Rivanna River in Albemarle County, a distance of approximately 3.3 miles.

Improvements already programmed for this section, designated the "Base Case" for purposes of this document, involve widening the existing road to six lanes divided with at-grade, signalized intersections and continuous right turn lanes.

The proposed action involves construction of one of the following alternatives:

- An expressway 3.3 miles long, along existing Route 29, from Route 250 Bypass to the South Fork Rivanna River, consisting of four express lanes with three-lane, one-way service roads on both sides.

- A new location, four-lane divided, controlled access facility along one of seven alignment alternatives, designated as 6, 6B, 7, 7A, 10, 11, and 12, within a study area eight miles wide and nine miles long.

Four alternatives begin east of Route 29 on Route 250 or Route 250 Bypass and end on Route 29 between Route 649 (Airport Road) and the North Fork Rivanna River for lengths of 7.0 to 8.1 miles. Three of the alternatives begin west of Route 29 at the junction of Route 29 Bypass, Route 29/250 Bypass, and Route 250 Business (Ivy Road), and end on Route 29 between Route 631 (Rio Road) and the North Fork Rivanna River for lengths of 5.4 to 12.9 miles.

The proposed action is needed to solve existing and future traffic congestion problems and to complete the Charlottesville area element of ongoing improvements to Route 29 throughout central Virginia. Route 29 is the most heavily travelled highway in the Charlottesville area. Not only is it the only major north-south highway for interregional transportation through central Virginia, it is the main connecting route between developments north of Charlottesville and Charlottesville itself. Furthermore, geographic and topographic features, along with city and county economic development objectives, have led to extensive growth of business and residential development along the Route 29 corridor north of Charlottesville.

The increasing traffic volumes on this section of Route 29 have approached capacity. Congestion and delays, already experienced during morning and afternoon peak traffic periods, will become worse in the future as levels of service continue to deteriorate.

Except for the area north of Charlottesville, controlled access improvements at all urbanized areas along Route 29 through central Virginia, including a portion of Charlottesville, have been built or committed. These improvements prevent delays to through traffic.

A major part of the study was the development of a travel demand model based on detailed land use and socioeconomic data, household surveys, roadside surveys, historical traffic data, and the existing road network. The model was used to project each alternative's effect on future traffic volumes.

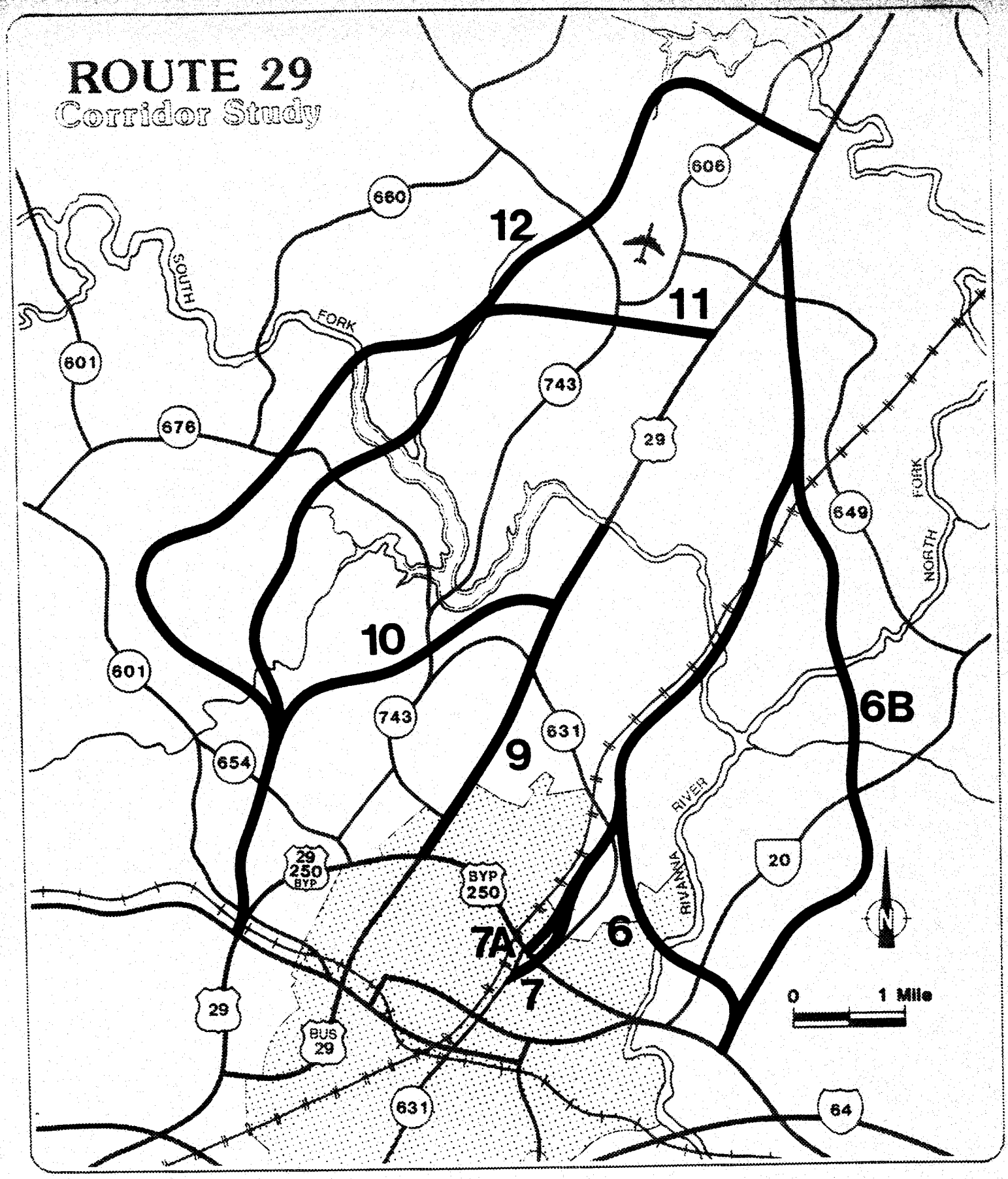
The results of the traffic modeling showed that in the design year, 2010, the Base Case would function at level of service F. The expressway alternative also would operate at level of service F although the express lanes would operate slightly better at level of service E. Under all of the new location alternatives, assuming Base Case improvements are also implemented, Route 29 would still operate at level of service F. If, in addition to the Base Case improvements, grade separated interchanges were built at three intersections, the average level of service on Route 29 would improve to B. (See Table IV-3 in Chapter IV.) Further, with these additional improvements and construction of one of the bypass alternatives, level of service would improve to A or B depending on the alternative.

OTHER MAJOR FEDERAL ACTIONS IN SAME GEOGRAPHIC AREA

There are no known major federal actions in the same geographic area. However, a local initiative to build a project called the Meadowcreek Parkway could potentially become a federal action at some future time. The Parkway, an element of the Charlottesville Area Transportation Study (CATS, the regional transportation plan) follows the alignment of Alternative 7A discussed in this Environmental Impact Statement. The Parkway would be a four-lane divided controlled access facility, but with a narrower median than that provided by bypass alternatives presented in this document.

ALTERNATIVES CONSIDERED

Between October, 1987, and June, 1988, many potential bypass alternatives were examined. These were screened based on environmental, traffic, and engineering factors and those that were not feasible, did not satisfy the need, or had severe impacts were eliminated. In June, 1988, 27 conceptual alternatives were presented to the public with a recommendation that five be retained as Candidate Build Alternatives in addition to the Base Case and the expressway alternative. Subsequently, two additional 4(f) avoidance alternatives were added to avoid impacts to McIntire Park, Pen Park, and Rivanna Park. All of the alternatives were then refined as additional data became available. Figure S-1 shows the Candidate Build Alternatives. The alternatives considered are as follows:



Candidate Build Alternatives

Figure No. **S-1**

Base Case - This alternative, as contained in the Virginia Department of Transportation's six-year improvement plan, consists of widening 3 miles of Route 29 from the existing four lanes divided to six lanes divided between Hydraulic Road and the South Fork Rivanna River. At-grade signalized intersections would remain at major intersections. Left turn lanes and continuous right turn lanes would be provided. A variant of this alternative incorporating grade-separated interchanges at Rio Road, Greenbrier Road, and Hydraulic Road has also been evaluated.

Transportation System Management (TSM) - This alternative consists of relatively low-cost actions designed to maximize efficiency of the existing transportation system. Such actions include high occupancy vehicle lanes, intersection improvements, and signal optimization. Evaluation of TSM actions revealed none that would solve the transportation problems.

Mass Transit - This alternative involves improvements to the existing bus system. There are no mass transit improvements that will solve the transportation problems. The transit system and its potential as a project alternative are addressed in Chapter II.

Alternative 6. This alternative, 8.1 miles long, is located to the east of Route 29. Its northern terminus is at Route 29, just north of Route 649, and its southern terminus is at Route 250 in the Pantops area east of the Rivanna River. It has interchanges where it crosses Route 20 and Route 643.

Alternative 6B. This alternative is 7.8 miles long, has the same terminus points as Alternative 6 but for most of its length is located farther east. It has interchanges where it crosses Route 20 and Route 643. This alternative is designed to avoid the park land impacts of Alternative 6.

Alternative 7. This alternative, 7.3 miles long, follows the general corridor of the proposed CATS Plan Meadowcreek Parkway. It has the same northern terminus as Alternatives 6 and 6B. At its southern end, it connects with McIntire Road south of Route 250 Bypass, and relocates the McIntire Road intersection with Route 250 Bypass. It has grade separated interchanges with Rio Road (Route 631) and Route 643. This alternative is designed to avoid the impacts on McIntire Park.

Alternative 7A. This alternative, 7.0 miles long, is identical to Alternative 7, except for the southern terminus. Instead of remaining east of McIntire Park, this alternative passes through the eastern third of the park and connects with Route 250 Bypass just opposite McIntire Road.

Alternative 9. This alternative, also called the "Expressway Alternative" follows the existing corridor of Route 29 North. It is 3.3 miles long, from its southern end near the intersection of Route 29 and 250 Bypass to its northern end at the South Fork of the Rivanna River. The facility would have a four-lane limited access freeway in the center of the right of way flanked by one-way three-lane service roads on either side. Existing cross streets would be maintained with the expressway lanes generally depressed below the at-grade

intersections. Slip ramps at various locations would connect the express lanes and the service roads.

Alternative 10. This alternative, 5.4 miles long, is the nearest new location alternative on the west side of Route 29. Its southern terminus is at the interchange of Route 29 Bypass, Bypass 29/250, and Business 250 (Ivy Road). It has its northern terminus at Route 29 near Woodbrook Drive, with additional grade separated interchanges at Route 654 (Barracks Road) and Route 743 (Hydraulic Road). This alternative avoids impacts to the Schlesinger Farm, a property determined by VDHR to be eligible for the National Register of Historic Places.

Alternative 11. This alternative, 9.4 miles long, has the same southern terminus as Alternative 10. It crosses the South Fork Rivanna River Reservoir and connects with Route 29 south of the Charlottesville-Albemarle airport. Interchanges are located at Route 654, Route 676, and Route 743 (Miller Road).

Alternative 12. This alternative, 12.9 miles long, is the farthest west and the longest of the Candidate Build Alternatives. It has the same southern terminus as alternatives 10 and 11, crosses the reservoir, and connects with Route 29 approximately 0.3 miles north of the North Fork Rivanna River. It has interchanges with the same roads as Alternative 11.

ENVIRONMENTAL CONSEQUENCES

Environmental consequences of the alternatives are summarized in a matrix, presented in Figure S-2.

Traffic. With the Base Case, traffic on Route 29 in the year 2010 is projected to be 64,700 vehicles per day on the segment just north of the Route 250 Bypass. This compares to existing daily traffic of almost 46,000 vehicles. The Candidate Build Alternatives were compared to the Base Case with respect to future Route 29 traffic. The Expressway Alternative, with its higher capacity freeway lanes, would increase total traffic on Route 29, depending on the location, between 16.2 percent and 20.2 percent compared with the Base Case. The east side alternatives, 6, 6B, 7, and 7A, would decrease traffic between 1.1 and 8.3 percent, compared with the Base Case. The west side alternatives would decrease traffic on Route 29 between 7.5 and 26.9 percent.

Socioeconomic. The principal socioeconomic impact would be displacements of residences and businesses. Alternative 6 would displace 40 residences and one business; Alternative 6B, 33 residences and one business; Alternative 7, 51 residences, two businesses and a non-profit organization; and Alternative 7A, 27 residences and one business. The Expressway would displace seven businesses, but no residences. On the west side, Alternative 10 would displace 12 residences, five businesses and two support units of the University of Virginia; Alternative 11, 15 residences and two support units of the University of Virginia; and Alternative 12, 21 residences, two businesses, and two support units of the University of

COMPARATIVE SUMMARY OF IMPACTS [a]

ALTERNATIVE	6	6B	7	7A	9	10	11	12	BASE CASE
TRAFFIC IMPACTS ON ROUTE 29									
% Change in Traffic from									
Base Case Between:									
Rte 250 and Hydraulic Rd	-2.2	-3.1	-4.2	-1.1	+16.2	-16.4	-11.4	-8.0	0.0
Hydraulic Rd and Rio Rd	-3.8	-4.3	-4.4	-2.3	+20.2	-17.9	-12.8	-9.2	0.0
Rio Rd and S. Fork Rivanna	-5.0	-3.8	-3.8	-8.3	+18.8	-26.9	-10.0	-7.5	0.0
Rte 29 Arterial LOS	F	F	F	F	F	F	F	F	F
RIGHT OF WAY REQUIRED (ACRES):	373	420	311	306	24	325	473	500	2
DISPLACEMENTS:									
Families	40	33	51	27	0	15	13	19	0
Businesses	1	1	2	1	7	5	0	2	7
Non profit organizations	0	0	1	0	0	0 (b)	0 (b)	0 (b)	0
ESTIMATED TAX REVENUE LOSS:									
Albemarle County	$52,270	$49,658	$39,662	$39,662	$98,018	$162,615	$73,161	$82,804	$44,909
City of Charlottesville	$0	$0	$37,575	$5,650	$47,241	$0	$0	$0	$0
Total	$52,270	$49,658	$77,237	$45,312	$145,259	$162,615	$73,161	$82,804	$44,909
CULTURAL RESOURCES IMPACTED:									
Standing Structures Eligible for National Register	0	2	0	0	0	2	4	5	0
Archaeological Sites	6	2	10	6	0	1	2	1	0
4(f) INVOLVEMENTS:									
Parks	2	0	0	1	0	0	0	0	0
Historic Sites	0	0	0	0	0	0	2	1	0
NOISE RECEPTORS IMPACTED:	138	53	172	177	48	56	43	46	44
AGRICULTURAL/FORESTAL LAND USE (ACRES):									
Agricultural (c)	27.9	47.6	11.9	11.9	0.0	31.7	100.1	133.9	0.0
Forestal (c)	18.8	16.8	7.9	7.9	0.0	0.0	0.0	0.0	0.0
Ag/Forestal District	0.0	0.0	0.0	0.0	0.0	13.5	116.3	174.2	0.0
Prime Farmland	89.5	78.1	78.2	78.2	0.0	48.7	101.7	157.6	0.0
AQUATIC AND WATER RESOURCES:									
Stream Crossings (Number)	27	26	26	27	4	13	28	41	4
Length Across Watershed (Miles)	0	0	0	0	0	4.2	7.4	8.4	0
Reservoir Crossings (Number)	0	0	0	0	0	0	1	1	0
Wetland Sites (Number)	5	3	4	4	1	1	3	4	1
Wetland (Acres)	1.5	0.1	0.2	0.2	0.1	0.1	0.3	0.6	0.1
Floodplains Crossed (Number)	7	5	9	9	0	0	4	8	0
COST ($1000s):									
Construction and Engineering	$103,287	$108,304	$87,732	$89,395	$133,859	$77,523	$98,338	$180,315	$17,584
Right of Way	$10,078	$9,802	$12,095	$8,102	$23,618	$30,429	$16,890	$16,064	$8,487
Utility	$927	$836	$745	$567	$3,684	$1,150	$1,359	$2,228	$343
Total	$114,292	$118,942	$100,572	$98,064	$161,161	$109,102	$116,587	$198,607	$26,414

Notes:
(a) Candidate Build Alternatives do not include Base Case costs or impacts
(b) Displaces two support units of University of Virginia
(c) These areas do not include "Agricultural/Forestal Districts"

Figure No. S-2

Virginia. The initial loss in local annual property tax revenue (for the land removed from tax rolls) would range from $45,000 for Alternative 7A to $163,000 for Alternative 10.

The alternatives would affect community cohesion in several neighborhoods. Impacts include the taking of land and homes, dividing established neighborhoods, and relocating access roads. The alternatives would impact a number of areas where future residential or commercial development is being planned, but not any major development sites that have obtained County approval.

Two of the alternatives go through public parks. Alternative 7A takes a part of McIntire Park. Alternative 6 goes through Rivanna Park and Pen Park. A Section 4(f) Evaluation, included in this document, addresses the park impacts of those alternatives in detail. The proposed alternatives will have no other major impacts on community facilities.

Cultural Resources. Seven standing structure historic sites on or eligible for the National Register would be affected by one or more of the Candidate Build Alternatives. Most of these would only be affected visually and none of the structures would be displaced. Alternative 11 would require the use of property from two sites. Alternative 12 would require the use of property from one site. Use of these properties constitutes Section 4(f) involvement.

Archaeological surveys located 17 sites recommended for Phase II investigation. Alternative 6 affects 6 sites, Alternative 6B - two sites, Alternative 7 - 10 sites, Alternative 7A - six sites, Alternative 10 - one site, Alternative 11 - two sites, and Alternative 12 - one site.

Air Quality. While carbon monoxide concentrations would increase slightly at several locations, in all cases the concentrations would remain well below the National Ambient Air Quality Standards. The project area is designated "attainment" for all automotive related pollutants and the State Implementation Plan contains no transportation control measures for the area. The project conforms with the State Implementation Plan and will not interfere with attainment and maintenance of the National Ambient Air Quality Standards.

Noise. A noise analysis at 35 representative sites showed potential impacts at 32 of the sites. Future noise levels would exceed existing noise levels by two to 23 decibels. Twenty-five sites would potentially experience substantial increases (10 decibels or more). Twenty sites would potentially experience noise levels equalling or exceeding the Federal Highway Administration Noise Abatement Criteria. Potential noise impacts would also occur at McIntire Park, Rivanna Park, Pen Park, and Chris Greene Lake Park, and several churches and schools. If the total numbers of impacted receptors represented by the sites are counted, the alternatives have the following impacts: Alternative 6 - 138; Alternative 6B - 53; Alternative 7 - 172; Alternative 7A - 177; Alternative 9 - 48; Alternative 10 - 56; Alternative 11 - 43; Alternative 12 - 46.

A variety of noise abatement measures was considered, including rerouting through trucks, shifting alignments, depressing the roadway, and constructing sound barriers. The only measure found feasible and reasonable is depressing the roadway at several locations.

Energy. In considering energy impacts, there is little difference among the alternatives except in the construction energy category. For maintenance energy, there is a maximum difference among the alternatives of two percent, for operational energy, a maximum difference of five percent. For construction energy, the maximum difference from the Base Case is 942 percent with Alternative 12.

Aquatic Resources and Water Quality. The Expressway Alternative would cross four streams. The number of stream crossings on the new-location alternatives is roughly proportional to length, ranging from 13 for Alternative 10, to 41 for Alternative 12. Only the western alternatives cross the South Fork Rivanna River Reservoir or its watershed. Alternative 10 does not cross the reservoir but has 4.2 miles in its watershed. Alternatives 11 and 12 cross the reservoir and have 7.4 and 8.4 miles, respectively, in the watershed. Modeling for pollution loads of highway runoff showed that no violations of water quality standards would occur as a result of the project.

Wetland impacts are minimal, with Alternative 6 impacting the most, 1.5 acres. Other alternatives impact between 0.1 and 0.6 acres of wetlands.

Costs. Total costs of each alternative were estimated, including construction, engineering, and right-of-way costs. Costs of the Candidate Build Alternatives range from a low of $98 million for Alternative 7A to a high of $199 million for Alternative 12. The Expressway alternative is estimated to cost $161 million.

AREAS OF CONTROVERSY

Through a series of public information meetings, discussions with local interest groups, and guidance from the Joint Transportation Committee, the major areas of local concerns were determined.

Many people have objected to any highway crossing the South Fork Rivanna River Reservoir or its watershed. Their concerns are pollution, loss of reservoir capacity from siltation, and the potential effects of toxic spills. Some have expressed concern regarding potential toxic spills near schools.

Impacts on residential communities by the new-location alternatives are a major issue. Residents object to the displacements of homes and the noise, air pollution, and aesthetic impacts of a new highway. Other persons object to the accessibility problems and costs that the Expressway Alternative would have on the businesses along Route 29.

Secondary development brought about by a new highway is a concern of some people. Transportation, however, is only one of the factors influencing new development. Others include local land use regulation, provision of public utilities, and location of public services and facilities. In addition, control of access would restrict development pressures to a few areas along the length of the facility.

MAJOR UNRESOLVED ISSUES WITH OTHER AGENCIES

At this time, there are no known major unresolved issues with other agencies. An interagency coordination process was conducted during development of this document to identify pertinent agency concerns. Those concerns have been addressed in this document.

OTHER FEDERAL ACTIONS REQUIRED

Fill placement in wetlands will require appropriate approvals under Section 404 of the Clean Water Act. In addition, crossing of the Rivanna River may require approvals under Sections 9 and 10 of the Clean Water Act. If Alternative 6 through Pen Park is selected, approval of the Department of the Interior will be required under Section 6(f) of the Land and Water Conservation Fund Act. In addition, the Federal Highway Administration will be a signatory to a Section 106 Memorandum of Agreement with the Virginia Department of Historic Resources to be executed if the selected alternative affects any historic sites on or eligible for the National Register.

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I. PROJECT PURPOSE AND NEED

A. PROJECT PURPOSE

The purpose of the Route 29 Corridor Study is to find a solution to existing and future traffic congestion on a three-mile section of U.S. Route 29 between U.S. Route 250 Bypass and the South Fork Rivanna River in the City of Charlottesville and Albemarle County north of Charlottesville. A secondary purpose of the study is to complete a gap in ongoing improvements to U.S. Route 29 through central Virginia.

For most of its length through Virginia, Route 29 is a four-lane divided highway, with controlled access features on some sections. It connects the Washington, D.C. metropolitan area with other urbanized areas through central Virginia such as Warrenton, Culpeper, Lynchburg, and Danville. The section of Route 29 under study is an uncontrolled access, four-lane-divided highway with a grass median and at-grade signalized intersections. This facility provides direct access to the numerous businesses located along both sides of the road.

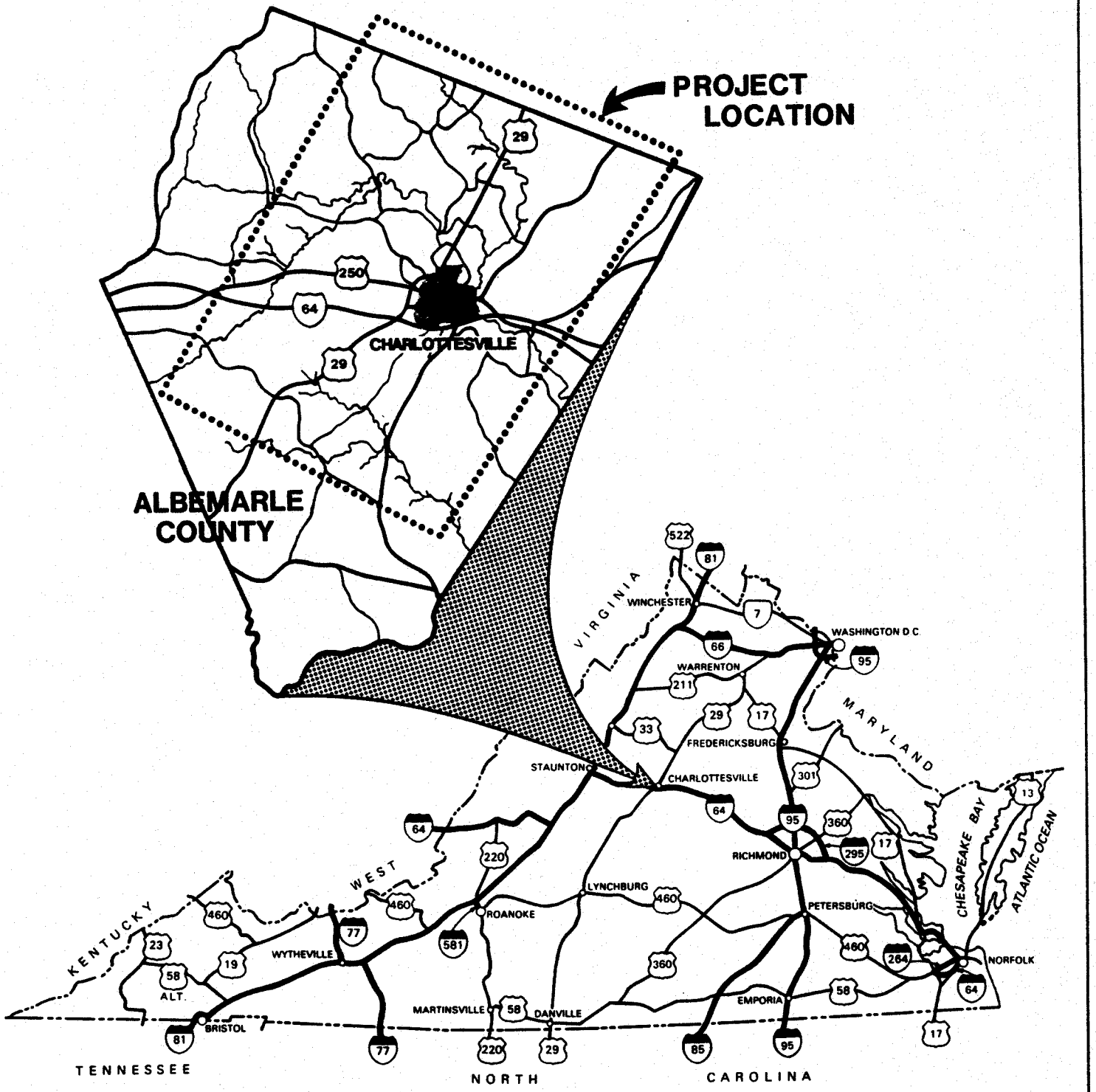
This section of Route 29 is the most heavily travelled highway in the Charlottesville area, carrying twice as much traffic as Interstate Route 64. It is the only major north-south highway serving the expanding development north of Charlottesville and surrounding portions of Albemarle County. Route 29 is the only major route connecting this development with other population and employment centers in Charlottesville. It also is the only route connecting points north of Charlottesville with points south of Charlottesville.

The growing development, increasing traffic volumes, and the inadequate capacity of the existing road are causing increasing congestion as this section of Route 29 has become overloaded.

Other factors also contribute to the congestion. For example, there are no bus turnouts along the existing route and buses stopping to pick up or discharge passengers interfere with traffic flow while they are stopped. Also, trucks (two-axle, four tire and larger) currently constitute approximately 17 percent of the total traffic. Tractor trailers make up approximately three percent of the total traffic. According to the Highway Capacity Manual, trucks can occupy five times the space of an average automobile on level or rolling terrain. Thus, the trucks use disproportionate amounts of available highway capacity which, when combined with slower truck accelerations and speeds, tends to increase congestion.

As a result of the above factors, local, interregional, and even interstate transportation is impeded on this important arterial route. A range of alternative solutions within the study area shown in Figures I-1, I-2, and I-3 have been evaluated and are addressed in this document.

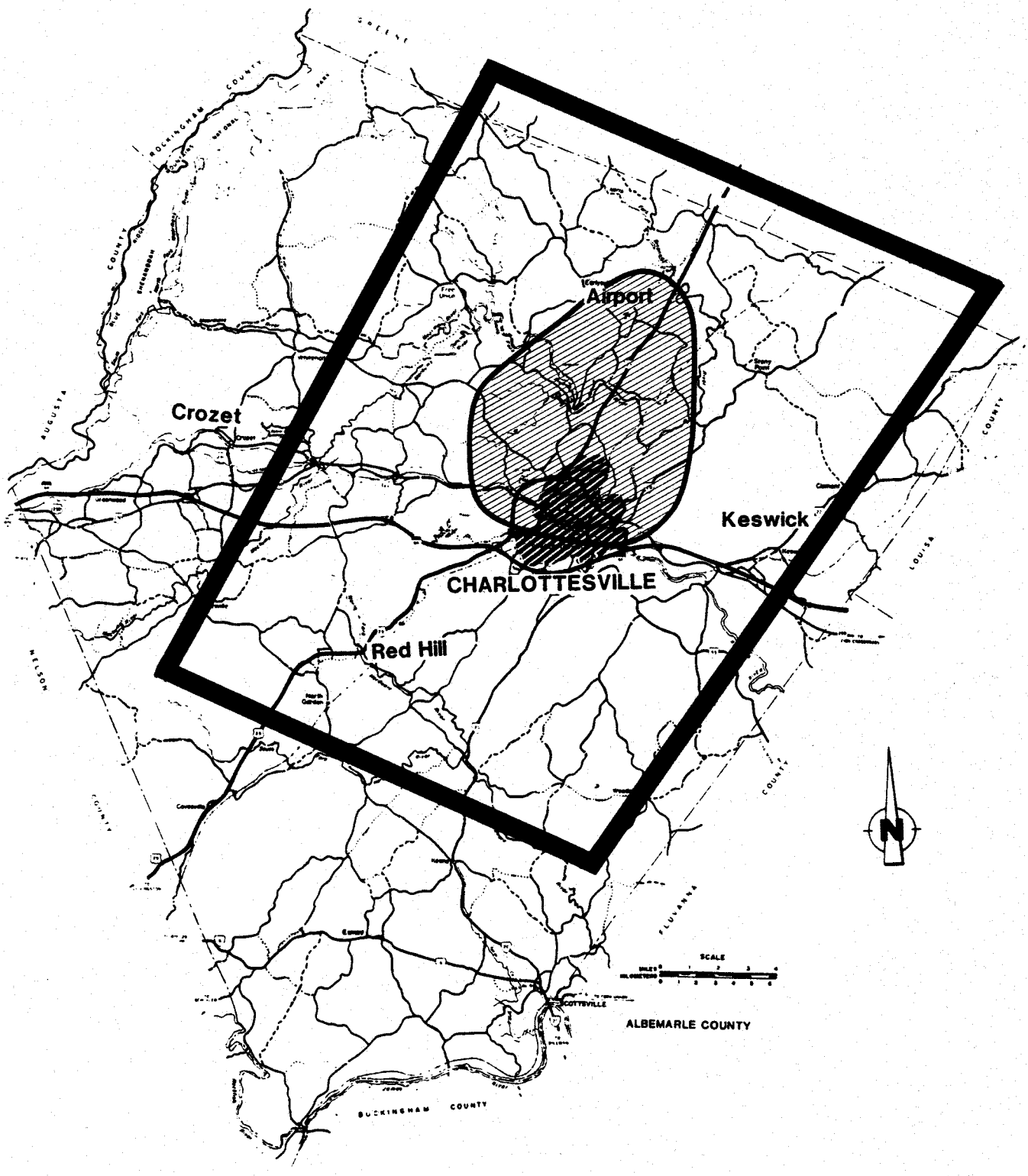
ROUTE 29
Corridor Study



Project Location

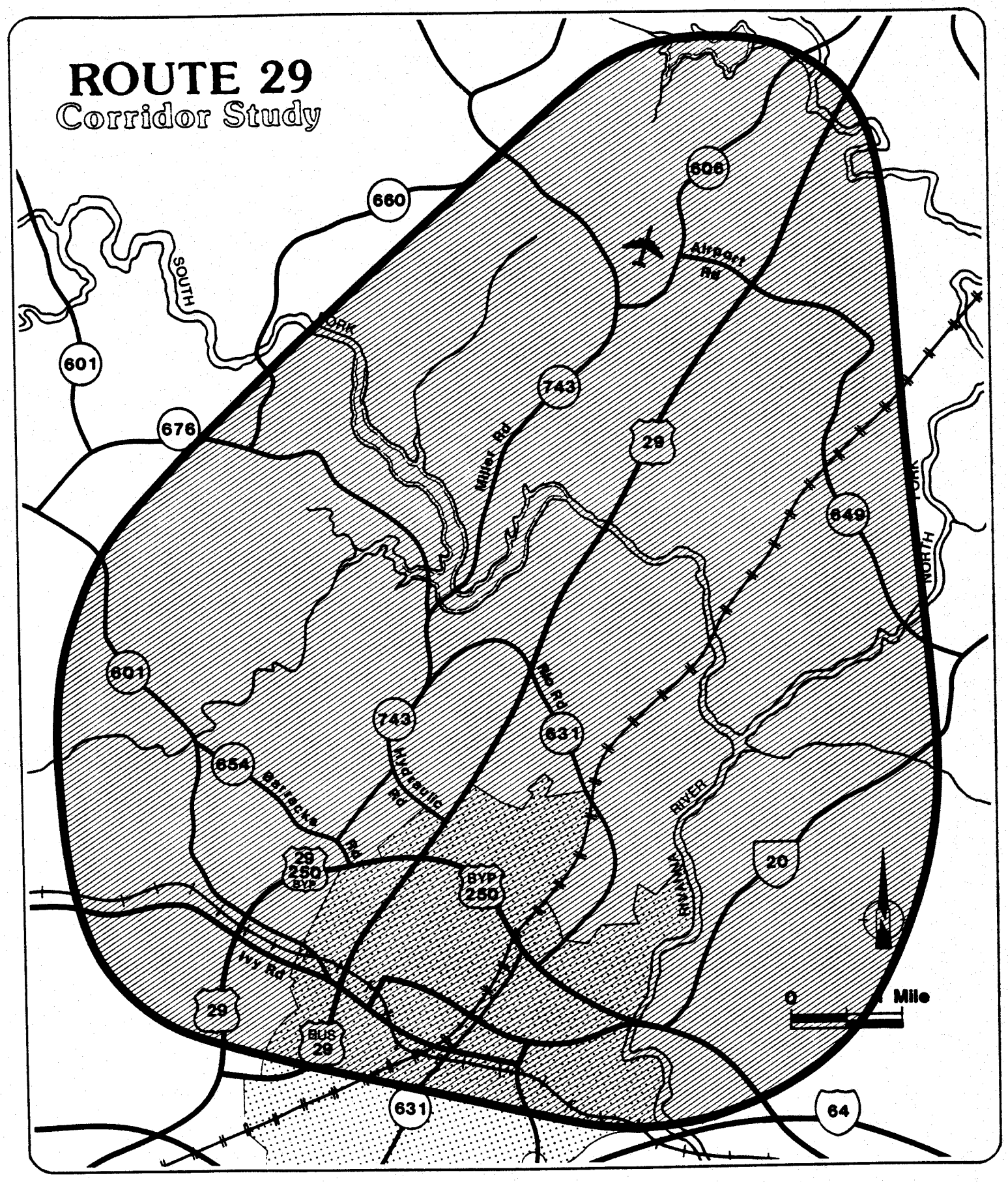
Figure No. I-1

ROUTE 29
Corridor Study



Initial Study Area

Figure No. I-2



Project Study Area

Figure No. I-3

B. NEED FOR THE PROJECT

1. Planning Background

Plans for improving and upgrading the Route 29 Corridor north of Charlottesville have been under discussion for nearly 20 years. An earlier Route 29 Corridor Study completed by the Virginia Department of Transportation (VDOT) in January of 1979 recommended widening Route 29 to six lanes, building an eastern residential collector (designated as alternatives 7 and 7A in the current study), and building a limited access western bypass. These recommendations were unanimously adopted by the Albemarle County Board of Supervisors in May of 1979. The Board of Supervisors later voted to rescind approval of the Western Bypass.

The Piedmont Highway Corridor Study was prepared by VDOT to identify the types and locations of improvements needed for north-south transportation through the central part of the state. The study, provided to county officials in 1984, included a 21- mile-long western bypass. When made public, this proposal drew strong opposition and was rejected by Albemarle County.

Between 1975 and 1985, the Charlottesville Area Transportation Study (CATS) Year 2000 Transportation Plan was prepared by VDOT through the cooperative efforts of the City of Charlottesville, Albemarle County, and the Federal Highway Administration. The major purpose of CATS was to update the 1967 Major Arterial Street and Highway Plan and define highway and public transportation improvements needed through the year 2000. The CATS Year 2000 Plan was approved by the Charlottesville-Albemarle Metropolitan Planning organization on August 28, 1985.

The initial CATS plan included both six-laning of existing Route 29 and the construction of a western bypass. However, the plan adopted in 1985 deleted the proposed western bypass.

Since 1982, other studies have attempted to refine the CATS plan by focusing on the Route 29 Corridor from the Route 250 Bypass to the Greene County line. VDOT completed an in-depth planning and engineering study in 1985. Nine alternatives involving various widening schemes, service roads, and an eastern bypass were considered. None of the nine alternatives considered at that time appeared to provide adequate capacity to accommodate projected year 2000 travel demands in the Corridor.

In April 1986, the City and Albemarle County made a joint presentation to the governor's Commission for Transportation in the Twenty-First Century, requesting funding for an eastern bypass. In May, 1986, in response to a request by the Commission, Albemarle County indicated support for widening existing Route 29.

In October of 1986, a location and design public hearing was held for the upgrading of Route 29 from the Route 250 Bypass north to the South Fork Rivanna River bridge. This proposal included reconstruction of existing Route 29 to six lanes, with continuous right turn

lanes between Hydraulic Road and Rio Road. North of Rio Road, a six-lane road was to have been provided to the South Fork of the Rivanna River. A grade-separated interchange was proposed at Rio Road. Due to concerns expressed at the public hearing regarding impacts of the interchange, this concept was put on hold pending further study.

At that time, Albemarle County developed an "expressway" concept utilizing the existing Route 29 Corridor. A traffic analysis of this concept indicated that traffic on the express lanes would flow smoothly but that congestion would occur on the service roads. Further evaluation by VDOT of this expressway concept and reaction from the public indicated that its costs and property damage were excessive in relation to its traffic service benefits and led to the conclusion that it was not feasible. After further consideration, discussions with local officials, and input from the public, VDOT decided to include a revised expressway alternative as part of the Route 29 corridor study.

The proposed upgrading of Route 29 to six lanes plus continuous right-turn lanes (known as "Base Case") was recommended to proceed without the grade-separated interchange because of impacts to properties and access. Subsequently, the City and County recommended that construction of the Base Case be held in abeyance until a comprehensive study of the Route 29 North (of Charlottesville) corridor could be performed. The study would include developing a complete traffic and land-use model for updating forecasts. The results would help determine the future traffic patterns and levels of service of different facilities and alternatives. This Draft Environmental Impact Statement (DEIS) summarizes the results of that study.

2. Highway Capacity and Traffic Demand

In 1987, traffic volumes on Route 29 between Route 250 Bypass and the South Fork Rivanna River ranged from 25,280 to 45,990 vehicles per day. The highest traffic volume was recorded between Hydraulic Road and Rio Road. Table I-1 presents a summary of growth in traffic volumes for the period 1982-1987, based on actual counts.

With no improvements, by the year 2010, Route 29 between the Route 250 Bypass and the South Fork Rivanna River is projected to carry between 53,200 and 57,700 vehicles per day. This represents a relatively modest increase in traffic volumes between the existing and design years. The reason is that the existing road is already near capacity and cannot handle substantial volume increases. In other words, the projected volumes reflect capacity limitations rather than demand. If the Base Case improvements are made, the added capacity will raise the projected volume to 67,300 on the busiest section, still less than demand.

At present during the afternoon peak hour, average travel speeds decline to 24 miles per hour and delays at some signalized intersections mount to more than three minutes per vehicle. By the year 2010, afternoon peak hour travel speeds are projected to be as low as 10 miles per hour with delays as long as 17 minutes per vehicle.

TABLE I-1

TRAFFIC GROWTH TRENDS

ROUTE 29, NORTH OF CHARLOTTESVILLE

	Hydraulic - Rio Roads		Rio Road- South Fork Rivanna River	
Year	Average Daily Traffic	Annual Percent Increase	Average Daily Traffic	Annual Percent Increase
1982	34,350	------	18,105	-----
1983	35,000	1.9	18,505	2.2
1984	38,755	10.7	19,830	7.1
1985	41,235	6.4	21,835	10.1
1986	43,430	5.3	23,220	6.3
1987	45,990	5.9	25,280	8.9
2010[a]	54,400	0.7[b]	57,700	3.7

Source: Virginia Department of Transportation, Average Daily Traffic Volumes on Interstate, Arterial, and Primary Routes

Notes: (a) Based on 2010 socioeconomic forecasts provided by MPO, without any improvements to Route 29, or the construction of any new roadways.

(b) Low traffic growth is the result of capacity limitations along Route 29, not a lack of demand. Overall areawide traffic growth is projected to be 2.2 percent annually.

Level of service is a letter designation which represents the operating efficiency of a particular roadway. It is based on traffic-related variables such as operating speeds and volume-to-capacity ratios. The level of service of a particular roadway is used as one measure of how well that roadway is performing and whether improvements might be needed.

Level of service A describes a condition of free flow, with low volumes and high speeds. Traffic density is low, with speed controlled by driver desires, speed limits, and physical roadway condition. There is little or no restriction in maneuverability due to the presence of other vehicles, and drivers can maintain their desired speeds with little or no delay.

Level of service B is in the zone of stable flow, with operating speeds beginning to be restricted somewhat by traffic conditions. Drivers still have reasonable freedom to select their speed and lane of operation. Reductions in speed are not unreasonable, with a low probability of traffic flow being restricted. The lower limit (lowest speed, highest volume) of this level of service has been associated with service volumes used in the design of rural highways.

Level of service C is still in the zone of stable flow, but speeds and maneuverability are more closely controlled by higher volumes. Most of the drivers are restricted in their freedom to select their own speed, change lanes, or pass. A relatively satisfactory operating speed is still obtained, with service volumes perhaps suitable for urban design practice.

Level of service D approaches unstable flow, with tolerable operating speeds being maintained though considerably affected by changes in operating conditions. Fluctuations in volume and temporary restrictions to flow may cause substantial drops in operating speeds. Drivers have little freedom to maneuver and comfort and convenience are low but conditions can be tolerated for short periods of time.

Level of service E cannot be described by speed alone, but represents operations at even lower operating speeds than level D, with volumes at or near the capacity of the highway. At capacity, speeds are typically, but not always, in the neighborhood of 30 mph. Flow is unstable, and there may be stoppages of momentary duration.

Level of service F describes forced flow operation at low speeds, where volumes are below capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. The section under study will be serving as a storage area during parts or all of the peak hour. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of the downstream congestion. In the extreme, both speed and volume can drop to zero.

With current traffic volumes, two of the six major intersections analyzed between Bypass 29/250 and the South Fork Rivanna River, including the 29/250 Bypass-Business 29 interchange, operate at level of service F during the afternoon peak period. Of the remaining four intersections, one operates at level of service C, and three at B. During the morning peak period, one intersection operates at level of service F, one at C, and three at B.

By the year 2010, assuming Base Case improvements will be in place, four of the intersections will operate at level of service F, one at E, and one at C during the afternoon peak. During the morning peak, four will operate at level F, one at C, and one at A.

If one considers the route as a whole from an arterial level of service aspect, the existing road operates during the afternoon peak, at level of service B with an average speed of 24 miles per hour. For the year 2010 Base Case, the overall level of service during the afternoon peak will be F with an average speed of 10 miles per hour.

Through traffic, as a percentage of total traffic, varies along the length of the study corridor from 19 percent at the northern end to 10 percent at the southern end. This change in percentage reflects the increasing volumes of automobile traffic generated by local development as one approaches the City.

Table I-2 shows the growth of truck traffic, including all trucks, and the growth of tractor trailer traffic over a five-year period. Excluding light trucks with only two axles and four tires, truck traffic accounts for seven to nine percent of the total traffic on Route 29. These heavier trucks account for 16 percent of through traffic, illustrating the routes's importance as a conduit of interregional commerce. Delays produced by congestion on Route 29 impede the flow of this commerce. In addition, the extra space occupied by these trucks (five times the space of an average automobile) reduces the capacity available for localized automobile trips.

The traffic factors described above show that the section of Route 29 under study currently functions more like a congested urban street than the arterial route it is intended to be. Increasing traffic volumes over the years will only worsen this situation if improvements are not implemented.

In 1986, the section of Route 29 from Hydraulic Road to the Albemarle-Greene county line had an accident rate of 252 per 100 million vehicle miles of travel, slightly higher than the state average for arterial highways. The injury and death rates were somewhat lower, probably due to low operating speeds.

Traffic on Route 29 is confronted with many right, left, and U-turns due to all the entrances, median breaks, and traffic lights. These present additional "opportunity" for conflicting traffic movements or varying speeds which increase the probability for accidents.

Another safety-related condition worthy of note is that the existing southbound lanes (the original two-lane Route 29) do not meet current standards for grades, sight distance, and lane width. The lanes are only 11 feet wide without adequate shoulders. Without improvements, these substandard conditions represent a continuing hazard to the travelling public.

TABLE I-2

TRUCK TRAFFIC GROWTH TRENDS

ROUTE 29, NORTH OF CHARLOTTESVILLE
(Rio Road to South Fork Rivanna River)

	All Trucks			Tractor-Trailers		
Year	ADT	Annual Percent Increase	Percent of Total Traffic	ADT	Annual Percent Increase	Percent of Total Traffic
1982	5175	0.0	15.1	900	0.0	2.6
1983	5340	3.2	15.3	950	5.6	2.7
1984	6370	19.3	16.4	1250	31.6	3.2
1985	6840	7.4	16.6	1250	0.0	3.0
1986	7320	7.0	16.9	1350	8.0	3.1
1987	7840	7.1	17.0	1318	(2.4)	2.9
2010[a]	8655	3.7	15.0	1731[b]	3.7	3.0

Source: Virginia Department of Transportation, Average Daily Traffic Volumes on Interstate, Arterial, and Primary Routes

Notes:

(a) Based on 2010 socioeconomic forecasts provided by MPO, without any improvements to Route 29 or the construction of any new roadways.

(b) Tractor trailer trucks can occupy the highway capacity of five automobiles on level or rolling terrain. The 1,731 trucks are the equivalent of about 8,655 automobiles in the traffic stream.

3. Land Use and Economic Development

In addition to being the site of a major state university, Charlottesville, along with surrounding Albemarle County, derives importance from its association with some of the most prominent figures of early U.S. history such as Thomas Jefferson and James Monroe. The growth of development in and around Charlottesville reflects the City's continuing importance as a center of education, research, culture, and commerce for this part of the Commonwealth of Virginia. Its proximity to the expanding Washington D.C. metropolitan area, a mere two-hour drive to the north, also enhances the growth opportunity of the area.

Most recent development has occurred north of Charlottesville within the U.S. Route 29 corridor. This development has included three major employment sites, several shopping centers, major residential subdivisions, and a plethora of motels, restaurants, and other businesses.

Albemarle County's Comprehensive Plan designates areas along Route 29 between the north corporate limits of Charlottesville and the North Fork Rivanna River as growth areas. The Plan's stated objective is to direct growth into those areas designated for development while conserving the balance of the County for agricultural and forestal uses and other resource protection purposes. Most of the land along Route 29 between the Corporate Limits and the South Fork Rivanna River has already been developed. On most of the few remaining undeveloped parcels, developments are under construction or being planned.

Development is also taking place north of the South Fork Rivanna River. The large Forest Lakes residential community is under construction on the east side of Route 29, near the airport. On the west side of Route 29, the University of Virginia has assembled two large tracts for development of a research/industrial park near the airport. Further expansion of the Hollymead subdivision is expected.

Projections for this study show population and employment growth in two traffic zones along Route 29 of 61% and 47% respectively between now and the year 2010. As this expanding development continues to generate increasing numbers of vehicle trips, the capacity of the existing transportation system becomes more and more inadequate. The numerous access points to businesses along the route contribute to congestion as vehicles entering and leaving those businesses interrupt traffic flow. In addition, many traffic signals are required to provide for cross flow on intersecting streets.

4. System Linkage

The City of Charlottesville, the "crossroads" of central Virginia, sits astride the intersection of U.S. Route 29, the major north-south highway and U.S. Route 250 and Interstate Route 64, the major east-west highways.

U.S. Route 29 is an important component of the statewide highway network. It is the only north-south link connecting urbanized areas of Central Virginia and for most of its length through Virginia, U.S. Route 29 is a four-lane divided highway.

Danville, Lynchburg, and the area north of Charlottesville, are the only areas where major improvements to alleviate congested conditions on Route 29 have not been made. At Danville and Lynchburg, there are committed projects to complete the upgrading of Route 29. The only remaining gap in the system is the section north of Charlottesville.

The Piedmont Corridor Study completed in 1985 by VDOT reflects a systems level overview of future north-south traffic needs in the central part of the state, parallel to Route 29. Representatives from Virginia, as well as Maryland and North Carolina counties, participated in the study which provided specific recommendations for the 308 mile corridor. Recommendations for the Charlottesville area, in light of the July 1984 Albemarle County rejection of any new Interstate corridor, included proceeding with improvements to Route 29.

The only alternative major north-south routes are Interstate 81 approximately 30 miles to the west across the Blue Ridge Mountains, and U.S. Route 15, a two lane road approximately 17 miles to the east. Neither of these routes are satisfactory substitutes for Route 29 because they are in different corridors and serve different traffic needs.

5. Transportation Plans

The comprehensive plans of Albemarle County and the City of Charlottesville do not specifically address the problem of congestion along Route 29, though both plans mention this Route 29 study. The regional transportation planning document, the CATS plan, recognizes the need for additional capacity in the Route 29 Corridor. CATS was adopted in 1985, by the Charlottesville-Albemarle Metropolitan Planning Organization. It includes widening of Route 29 between Bypass 29/250 and the South Fork Rivanna River and construction of grade separated interchanges at Rio and Hydraulic Roads. A proposed western bypass was dropped from the plan before adoption.

6. Modal Interrelationships

Alternate modes of transportation are not major elements of the area-wide transportation system. Nevertheless, improvements to Route 29 would complement and enhance the other modes available. For example, due to the proximity of the Charlottesville-Albemarle Airport to Route 29, any improvements to this route would improve travel conditions to and from the airport. Similarly, users of the bus system would share in the benefits of improved highway capacity and reduced travel delays.

II. ALTERNATIVES

A range of transportation improvement alternatives within the Route 29 Transportation Corridor have been evaluated. The alternatives include a "no-build" or Base Case alternative, transportation system management measures, mass transit, and eight "build" alternatives including western and eastern bypasses (including two 4(f) avoidance alternatives), and an expressway.

A. SELECTION OF ALTERNATIVES

1. Development and Screening of Preliminary Alternatives

The initial study area shown in Figure I-2 was large to ensure that all reasonable alternatives were evaluated. It stretched from the Greene County line on the north to below Red Hill on the south, and from Crozet on the west to Keswick on the east.

Using topographic maps and aerial photography, numerous possible bypass alternatives were considered. Numerous individual segments were evaluated; similar segments were compared and the least desirable were eliminated. Other segments were dropped because of engineering obstacles or excessive environmental impacts. The refinement process involved evaluations of potential alignment segments relative to traffic, environmental, engineering, and economic factors. Throughout the process, as additional information became available, further adjustments were made to avoid community impacts and environmentally sensitive areas.

2. Evaluation of Conceptual Alternatives

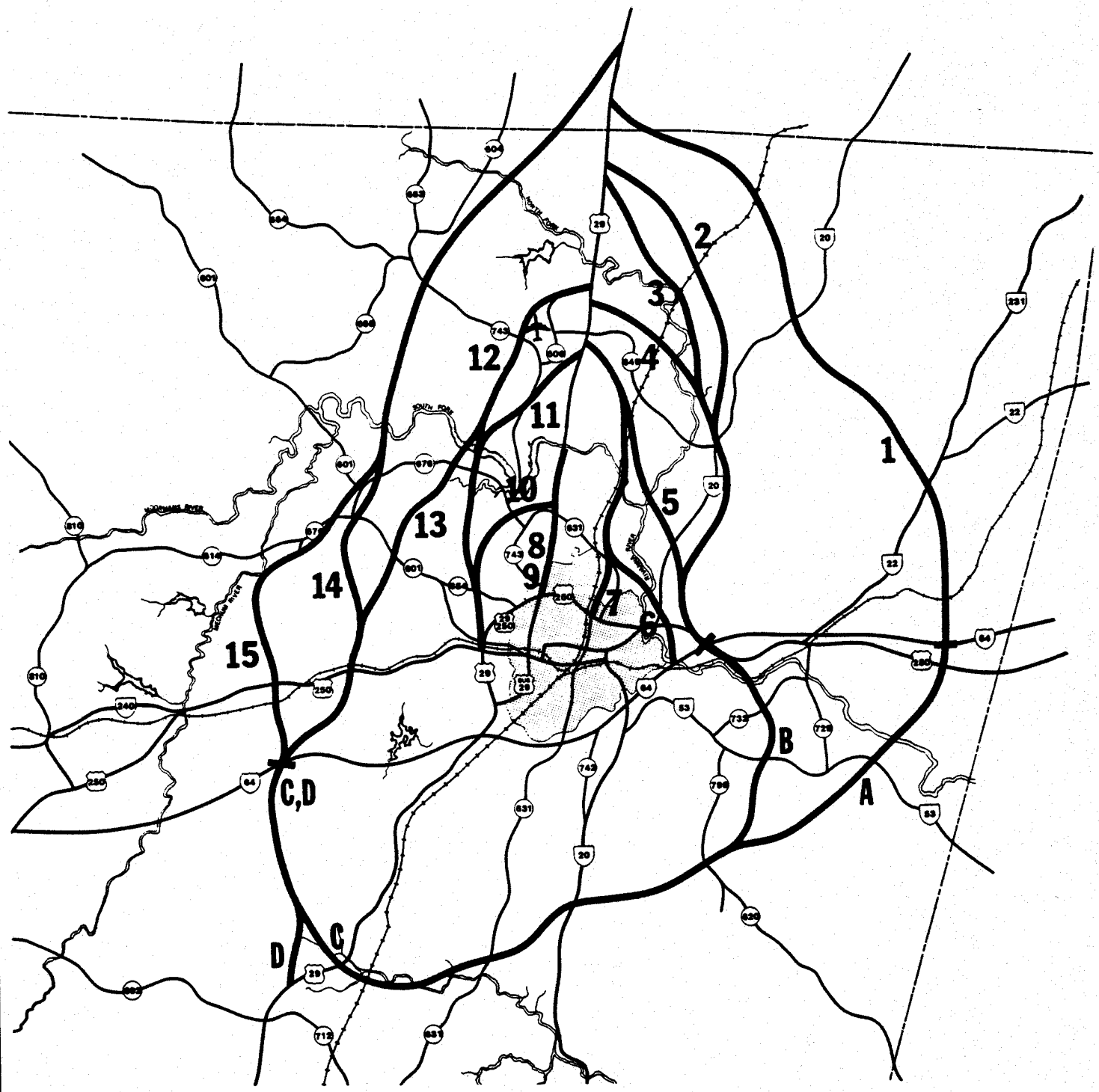
By the spring of 1988, the number of Build Alternatives was reduced to 27 "conceptual" alternatives, as shown in Figure II-1. The 15 numbered segments north of I-64 and the four lettered segments south of I-64 shown in Figure II-1 combined to form the 27 different alternatives. Two of these 27 alternatives were "expressway" alternatives, consisting of a limited access expressway along existing Route 29. The remaining alternatives were bypasses on new location alignments either to the east or the west of Route 29.

Each of the conceptual alternatives was evaluated in greater detail relative to the previously mentioned list of screening factors covering traffic, the socio-economic environment, the natural environment, and engineering considerations. (See Appendix A.)

3. Selection and Refinement of Candidate Build Alternatives

The quantitative evaluation matrix and maps of the 27 conceptual alternatives were discussed with the Joint Transportation Committee (Route 29 Task Force) and were

ROUTE 29
Corridor Study



Conceptual Alternatives

Figure No. II-1

presented to the public at a public information meeting in June 1988. Based on the quantitative comparison, the Route 29 Study Team recommended that six of the conceptual alternatives be carried forward for consideration in the Draft Environmental Impact Statement. These included two bypass alternatives to the east of Route 29, Alternatives 6 and 7A; three bypass alternatives to the west, Alternatives 10, 11, and 12; and one expressway alternative along existing Route 29, Alternative 9.

In response to the comments of local officials and the general public, all of the six recommended alternatives were retained as "Candidate Build Alternatives," to be addressed and analyzed in the DEIS. Two additional Alternatives, 6B and 7, were included to avoid publicly owned parks on the eastern alternatives. The Candidate Build Alternatives are Shown on Figure II-2.

As preliminary design of the alternatives progressed, numerous refinements and shifts in the alternatives were made in response to community concerns and to further reduce environmental impacts.

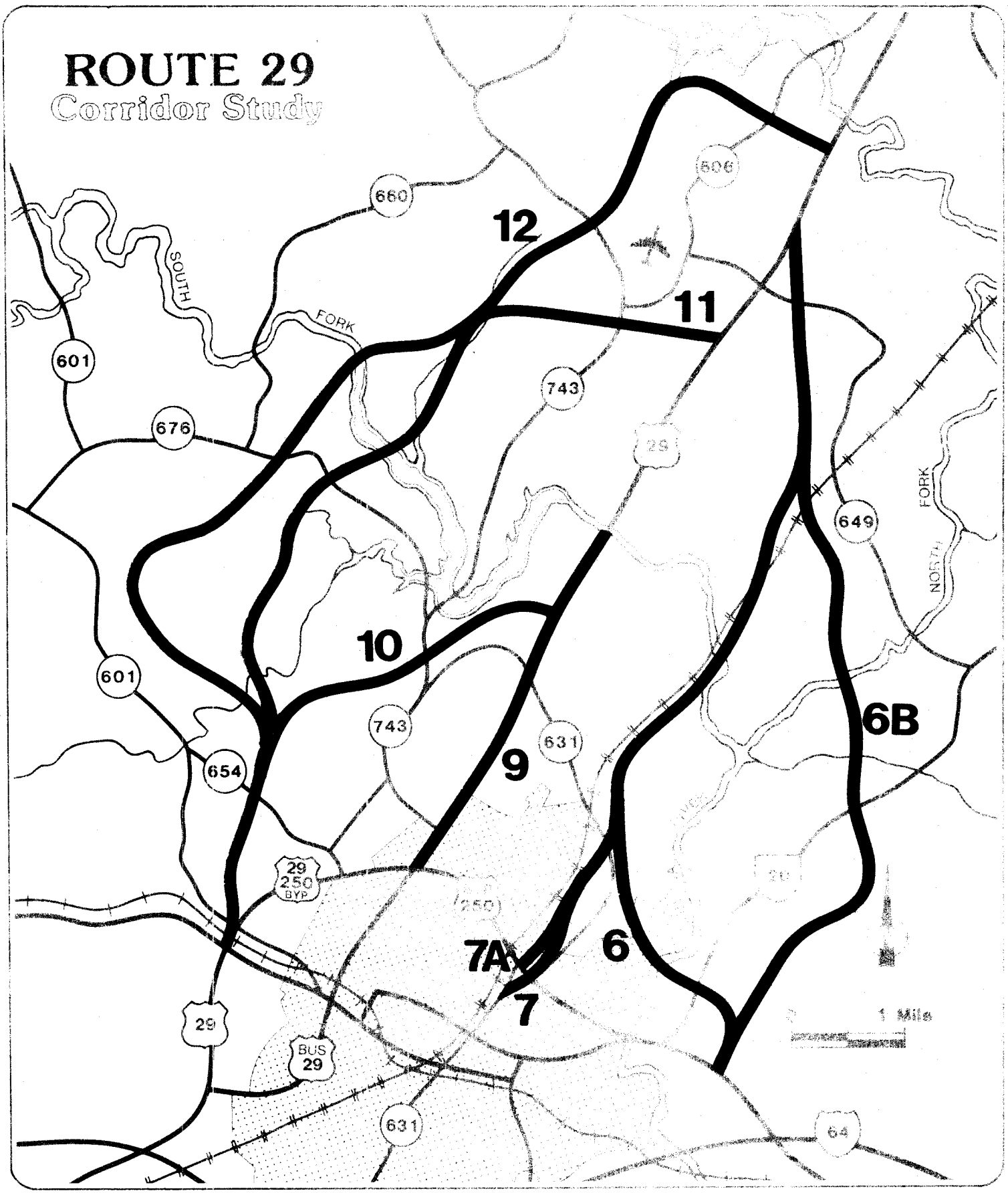
B. NO-BUILD OR BASE CASE ALTERNATIVE

The "no-build" alternative provides a benchmark against which to gauge the impacts of the various project alternatives. Here, the No-Build Alternative is also referred to as the "Base Case." It includes improvements currently planned and programmed for Route 29--widening to six lanes plus continuous right-turn lanes and at grade intersections between the Route 250 Bypass and the South Fork Rivanna River. For traffic analysis purposes, the Base Case also includes all other improvements contained in the Charlottesville Area Transportation Study (CATS). These Base Case improvements were included in the traffic analysis of the build alternatives, except for the Expressway Alternative, which excludes the Route 29 Base Case improvements.

C. TRANSPORTATION SYSTEM MANAGEMENT

Transportation System Management (TSM) refers to relatively low-cost actions designed to maximize efficiency of the existing transportation system. Such actions include ridesharing, fringe parking lots, signal optimization, turn lanes, intersection improvements, and high-occupancy vehicle lanes. Several TSM actions have already been implemented. For example, traffic signals are now synchronized to permit smoother traffic flow. Improvements have been made at the Hydraulic Road intersection with Route 29. Turn lanes have been added or expanded at several locations.

Some types of TSM actions would be of limited effectiveness. For example, use of commuter parking lots or HOV lanes would not be effective. Only about 17 percent of trips are home-based work trips with an average trip length of approximately 3.86 miles. Parking at work locations is ample and cheap or free. Therefore, there is little incentive for ridesharing.



Candidate Build Alternatives

Figure No. II-2

Opportunities for additional TSM actions and improvements to existing roads will be taken when possible. However, the projected traffic volumes on Route 29 are such that these types of actions will produce minimal improvements in traffic flow at best, and will not produce a major increase in capacity or travel speed along Route 29.

D. MASS TRANSIT ALTERNATIVE

This alternative addresses the ability of an improved mass transit system to ease future traffic conditions in the Route 29 north corridor. Currently, there are three major transit systems serving the study area, the University Transit System (UTS), Charlottesville Transit System (CTS) and a paratransit service for elderly and handicapped persons known as the Jefferson Area United Transportation, Inc. (JAUNT). The UTS and CTS principally serve the City portion of the study area with several fixed bus routes. Recently, a study has been initiated to examine the potential for consolidating the University of Virginia (UVa) operated service, UTS, with the CTS.

The existing bus services are generally oriented toward UVa and downtown, and are principally used by the residents of the City and UVa students. According to the 1980 Census, only 5.7 percent of commuters within the Charlottesville urban area used the bus mode. The findings of a recently completed CTS and UTS passenger survey (CTS/UTS Comprehensive Transportation Study, Interim Report No. 1, January 1989) indicate that approximately 3/4 of the CTS ridership could be classified as transit dependent (based on auto availability), and 60 percent of total riders have annual incomes below $15,000. Similarly, UTS users are predominantly students (64 percent undergraduate and 18 percent graduate).

Available operating statistics suggest that the systemwide ridership of CTS is stable and not growing. During the FY 1988 CTS carried 747,985 passengers. Two out of 10 regular fixed routes of CTS (Routes 7 and 9) currently serve areas along Route 29 north. Route 7, serving Albemarle Square and Downtown, runs buses with 30 minutes headway and carries almost 30 percent of systemwide ridership. The second route, Route 9, serving Albemarle Square and the University, runs with 60 to 120 minutes headway. It carries only four percent of systemwide ridership, and displays less than optimum performance in terms of passengers per bus-mile.

The above referenced study identified the need for expanding CTS services along Route 29 principally to service UVa students and City residents. Considering the continued strong growth of the County population with higher rates of auto availability and the difficulty of serving this population with transit, the study indicated the need for establishing park-and-ride lots near the urban fringe, which could be linked to major trip attractors by transit. However, experience suggests that park-and-ride based transit services have limited impact on auto-using commuters unless commuters are heavily dissuaded from using auto (e.g., charging high parking fees at the destination, limiting supply of parking spaces, etc.). Moreover, for shopping trips, transit use is often observed to be extremely low.

In view of the above factors and the travel characteristics of peak period Route 29 users, it was determined that the Mass Transit alternative consisting of transit served park-and-ride lots could be considered as an alternative travel option for commuters or shoppers, but it will not be a viable solution to traffic needs Route 29.

With regard to commuter rail service or other uses of railroad rights-of-way, the following factors would tend to make this mode infeasible in the Charlottesville urbanized area: high capital and operating costs; revenue-to-operating cost ratios below those typically found on fixed-route bus systems; potential conflicts with scheduled freight operations; the lack of sufficiently high demand density; and the reluctance of riders to transfer to shuttle service at the terminal points.

E. CANDIDATE BUILD ALTERNATIVES

The eight Candidate Build Alternatives considered in this study include four alternatives to the east of Route 29, Alternatives 6, 6B, 7, and 7A; three to the west, Alternatives 10, 11, and 12; and the expressway along existing Route 29, Alternative 9. Two of the eastern alternatives, 6B and 7, are 4(f) avoidance alternatives. Figure II-2 depicts the general location of each alternative.

1. Design Criteria

To provide for comparison among the Alternatives, it was assumed that all of the build alternatives would be fully limited-access facilities. The standards used in the preliminary design of the bypass alternatives are shown in Table II-1. The Expressway Alternative along existing Route 29 was designed to the standards in Table II-2. Table II-3 shows the standards used in the design of the interchange ramps. Typical sections are presented in Figures II-3 through II-5.

2. Description of Alternatives

a. Alternative 6

Alternative 6, 8.1 miles long, begins at Route 250 east of Charlottesville, approximately 1,200 feet west of State Farm Drive. A partial cloverleaf interchange is provided to accommodate traffic entering and exiting the bypass without any Route 250 median openings or traffic signals. The alignment heads in a northwesterly direction, crossing over Route 20 about 900 feet south of Franklin Drive, continues westerly through Rivanna Park, over the South Fork Rivanna River on a structure that spans the flood plain, and through the southwest portion of Pen Park.

TABLE II-1

DESIGN STANDARDS

BYPASS ALTERNATIVES

Design Year	2010
Level of Service	"C"
Access Control	"Limited"
Terrain	Rolling
Design Speed	60 MPH
Maximum Degree of Curvature	4°30'
Maximum % of Grade	4%
Stopping Sight Distance:	
Desirable	650'
Minimum	525'
Lane Width	12'
Right Shoulder Width:	
Fill	15'
Cut	12'
Median Shoulder Width"	
Graded	8'
Independent:	
Fill	15'
Cut	12'
Minimum Median Width	84'
Maximum Right-of-Way	300'

TABLE II-2

DESIGN STANDARDS

EXPRESSWAY ALTERNATIVE

Design Year	2010
Level of Service:	
Desirable	"C"
Minimum	"D"
Access Control (Through and ramp lanes)	"Limited"
Terrain	Rolling
Design Speed	60 MPH
Maximum Degree of Curvature	4°30'
Maximum % of Grade	4%
Stopping Sight Distance:	
Desirable	650'
Minimum	525'
Lane Width	12'
Right Shoulder Width	10'
Median Shoulder Width"	
4 lanes	8'
6 lanes	12'
Minimum Median Width:	
4 lanes w/o barrier	40'
4 lanes w/barrier	10'
6 lanes w/barrier	22'
Right-of-Way Width	Varies

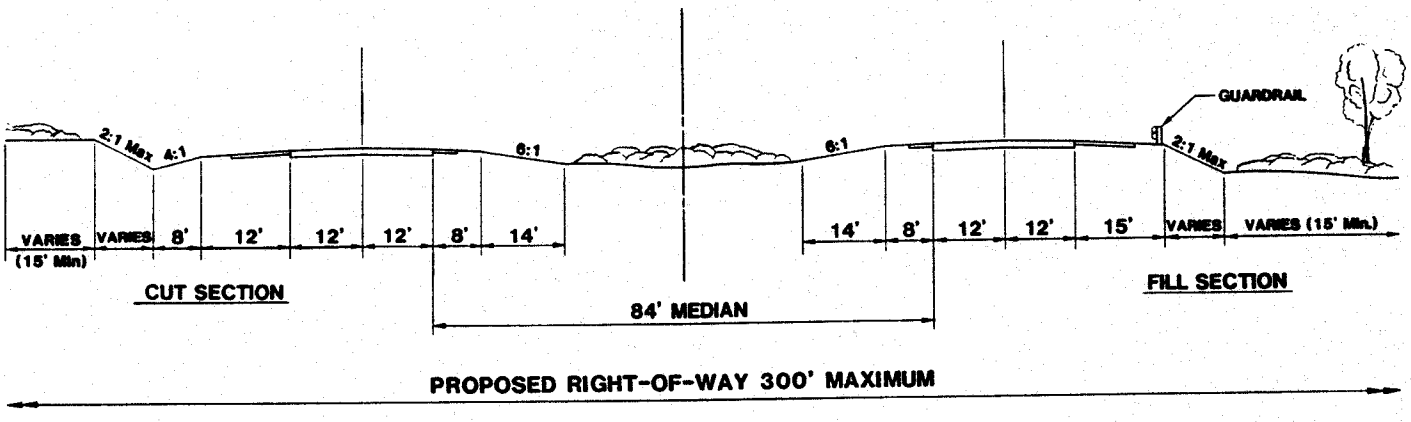
TABLE II-3

DESIGN STANDARDS

INTERCHANGE RAMPS

Interchange Ramp Type	Design Speed (MPH)	Maximum Radius (Feet)	Maximum Grade (%)
Directional (US 29, Bypass 250)	50	690	5
Major Loop (US 29, 250)	40	430	6
Minor Loop	30	230	7
Diamond (At Gore)	40	---	6

ROUTE 29
Corridor Study

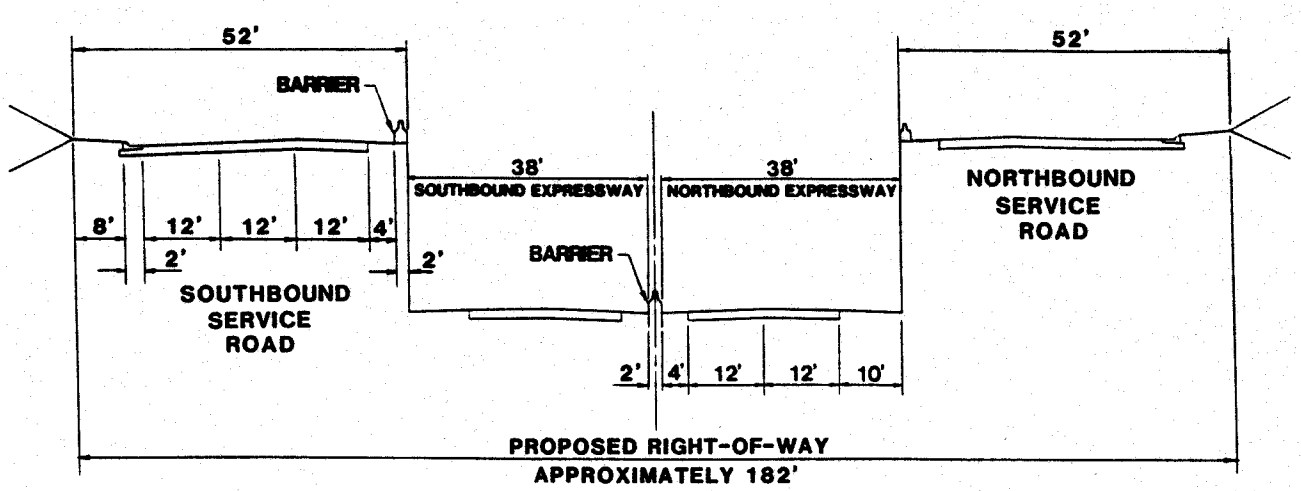


NEW LOCATION ROADWAY
Alternatives 6,6B,7,7A,10,11, and 12

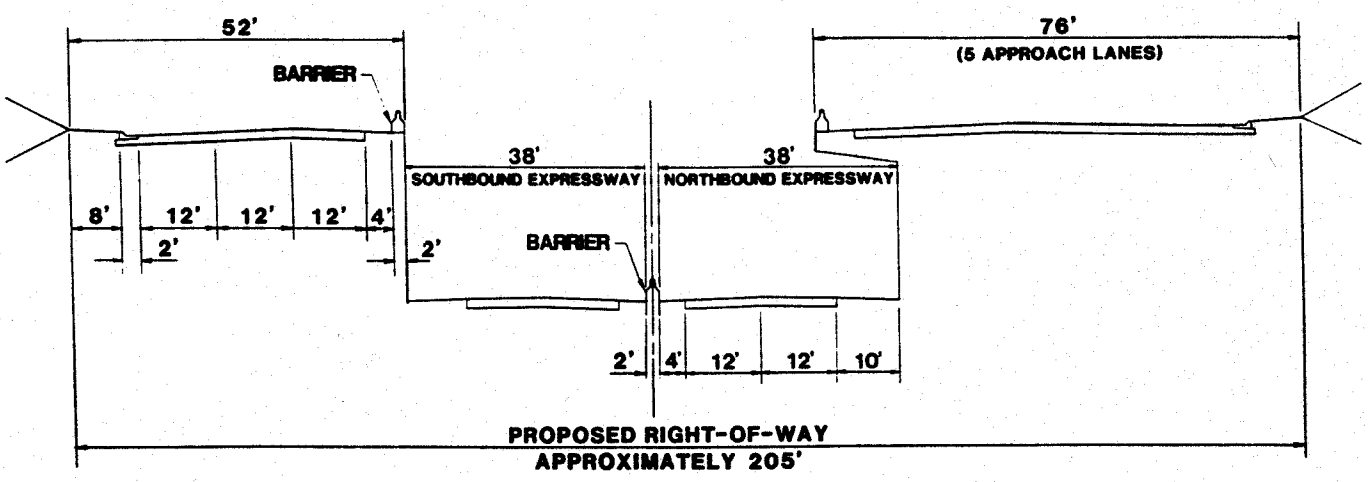
Typical Sections

Figure No. **II-3**

ROUTE 29
Corridor Study



EXPRESSWAY



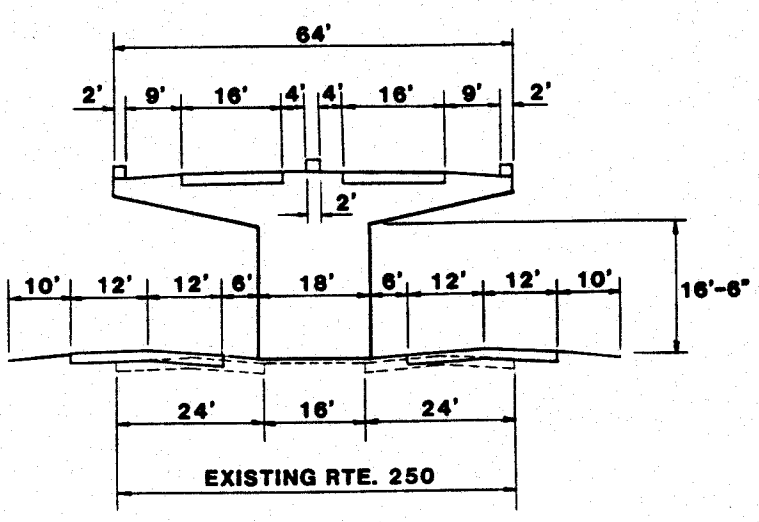
EXPRESSWAY INTERSECTION APPROACH

Note: Bus turnouts will be provided on Route 29 Service roads as appropriate.

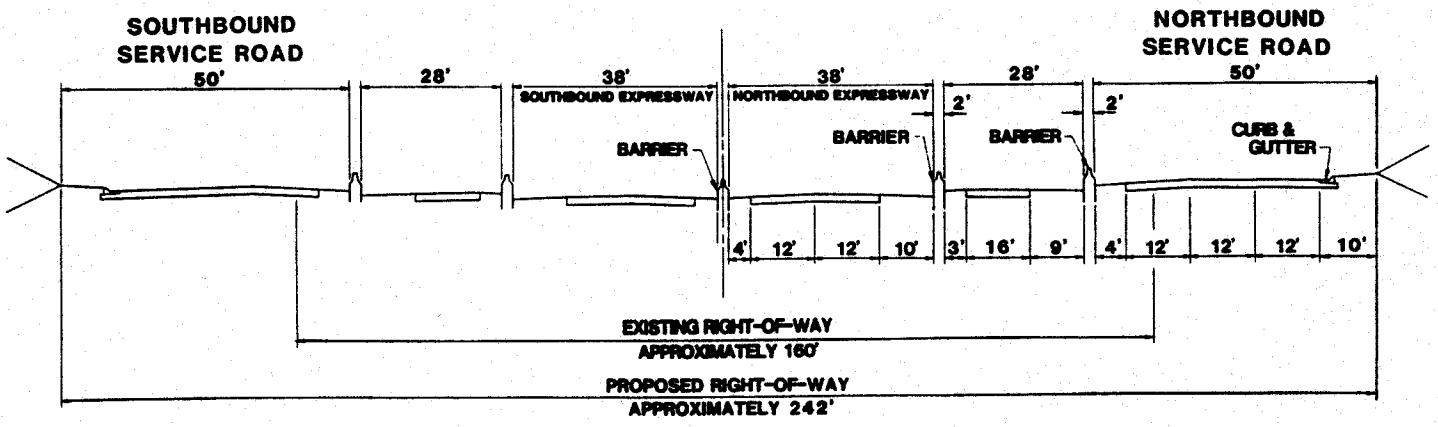
Typical Sections

Figure No. **II-4**

ROUTE 29
Corridor Study



EXPRESSWAY FLYOVER



EXPRESSWAY WITH SLIP RAMPS

Note: Bus turnouts will be provided on Route 29 Service roads as appropriate.

Typical Sections

Figure No. **II-5**

A partial cloverleaf interchange is provided north of Pen Park with a connection to Rio Road. The alignment heads northerly, crossing under Free State Road and then paralleling the Southern Railroad to north of South Fork Rivanna River, where it crosses under the railroad. Continuing northerly, the alignment connects to realigned Route 643 with a diamond interchange. The alignment continues northerly along the Southern railroad, crossing under a private road, and then crosses through the proposed Forest Lakes development, passing under Timber Wood Parkway. Continuing northerly, it passes under Route 649 just west of the old Laurel Hill Baptist Church and then connects at its northerly end to existing Route 29 North, 1,600 feet south of Northside Drive and 3,200 feet north of Route 649 (Airport/Proffit Road).

b. Alternative 6B

Alternative 6B, 7.8 miles long, begins at Route 250 east, at the same location and with the same interchange concept as Alternative 6. The alignment generally parallels Route 20 and is located some 700 feet west of the major telephone transmission line. It crosses over Franklin Drive and Route 769, and then heads in a northwesterly direction where it connects to Route 20 north of Chapman Grove with a diamond interchange. It then heads westerly, underpassing a private road, crosses North Fork Rivanna River north of Bentivar, and passes under Route 643 with a diamond interchange providing traffic connections. The alignment continues westerly overpassing the Southern Railroad and connects to the previously established Alignment 6 just south of Hill Lane. Alternative 6B avoids encroachment upon two Section 4(f) properties, Pen Park and Rivanna Park. Major residential areas and historic sites, between the Rivanna River and Route 20, caused this avoidance alternative to be aligned in its proposed configuration.

c. Alternative 7

Alternative 7, 7.3 miles long, follows the general corridor planned for the Meadowcreek Parkway, a controlled access facility included in the regional transportation plan. It begins approximately 1,600 feet south of U.S. Route 250 Bypass, providing a new connection for McIntire Road, running east of the City-owned tennis courts and providing a relocated at-grade, signalized intersection with U.S. 250 Bypass. North of U.S. 250 Bypass, the alignment widens to meet the design criteria for new location facilities. It then runs just east of McIntire Park passing over Melbourne Road and heads generally northward. At the intersection of Rio Road (Route 631) a diamond interchange is planned just east of the Charlottesville Albemarle Vocational Technical Center. Less than half a mile north of this interchange the alignment follows the same path as Alternative 6 to Route 29.

It should be noted that this alternative is consistent with the Meadowcreek Parkway. The southern terminus is an at-grade intersection with Route 250 Bypass, similar to what has been planned for a Route 250 Bypass terminus of the Meadowcreek Parkway. However, Alternative 7 is proposed to have freeway design standards with an open cross section, wider than the typical section currently planned for the Meadowcreek Parkway. This alternative avoids encroachment onto McIntire Park, a Section 4(f) property.

d. Alternative 7A

Alternative 7A, 7.0 miles long, is identical to 7 except for the southern section. Instead of remaining to the east of McIntire Park, this alternative traverses McIntire Park and connects with U.S. 250 Bypass, just opposite McIntire Road.

e. Alternative 9

Alternative 9, the "Expressway Alternative", 3.3 miles long, follows the existing corridor of Route 29. It begins just south of the intersection of Route 29 and the Route 29/250 Bypass and continues north to the South Fork of the Rivanna River. The facility consists of two separate roadways. One is a 50 mph limited access freeway which runs in the middle of the facility and is generally depressed. The other roadway consists of a northbound and southbound service road, on each side of the freeway. Access to businesses on the west side of Route 29 is from the southbound service road, and to businesses on the east from the northbound service road. Intersections between the service roads and the cross streets occur at 10 major cross streets. The freeway facility in the center passes under these intersections. At the southern terminus, the freeway lanes become elevated on structures and turn off the Route 29 corridor to join the Route 29/250 Bypass corridor to the west. The freeway lanes come back to grade in the median of the Route 29/250 Bypass in the vicinity of the Barracks Road interchange.

f. Alternative 10

Alternative 10, 5.4 miles long, begins approximately 2,500 feet south of the existing Route 29/250 Bypass and Route 250 interchange. The Route 29/250 Bypass lanes are realigned easterly in order to construct an improved inner loop ramp at Route 250 and to provide 60 mph connections from the new alignment to existing Route 29/250 Bypass. Traffic patterns at Route 250 Business are continued.

The alignment heads northerly, crossing over the entrance road to Belfield School, and then passes over Barracks Road while providing access with diamond ramps. The alignment proceeds easterly along the northern property line of Mary Greer Elementary School and passes under Lambs Road, Rosslyn Ridge Road, and Route 743. An urban diamond interchange is provided at Route 743 due to the close proximity of the alignment to Hydraulic Road and to minimize right-of-way requirements on the Squirrel Ridge subdivision and the Church of Jesus Christ of Latter Day Saints.

The alignment heads easterly, crossing over the private drive beside the Centel Company facility and crossing under Woodburn Road. As the alignment continues easterly it crosses over the proposed extension of Berkmar Drive. The alignment ends between the Rio Hills Shopping Center and Kegler's Bowling Alley, with a three level interchange and 60-mph directional ramps for the north-south bypass connections to existing Route 29. This alternative avoids two historic properties under the purview of Section 4(f).

g. Alternative 11

Alternative 11, 9.4 miles long, is the same as Alternative 10 at its southern terminus. It heads north along an alignment similar to Alternative 10 to about one-half mile north of Barracks Road. From there it heads northwesterly crossing Ivy Creek east of Stillhouse Road, crosses under Ivy Farm Drive between Stillhouse Road and Wingfield Road, and crosses under Route 676 with diamond interchange ramps at Wyngate Road. It proceeds northerly over the South Fork Rivanna River Reservoir, goes between Naked Creek and the westerly property lines of Ardwood, Clover Hill, and Ridgefield, and then turns easterly, crossing under Miller Road (Route 743). Given existing terrain and the alignment profile, Alternative 11 will not interfere with the Charlottesville-Albemarle County Airport runway approach clearance restrictions. A partial cloverleaf interchange with Miller Road is provided. The alignment continues easterly, ending with a three-level directional interchange at Route 29 immediately south of Hollymead Memorial Gardens. This alternative involves use of lands from two properties determined by the Virginia Department of Historic Resources to be eligible for the National Register which constitute Section 4(f) involvements.

h. Alternative 12

Alternative 12, 12.9 miles long, is the same as Alternative 11 from its southern beginning to one-half mile north of Barracks Road. From there it heads westerly, paralleling the north side of Ivy Creek, and then turns northerly crossing under Route 658. The alignment continues northerly to the west of Jumping Branch, crosses under Route 676 between Clearview Meadows and Logan Village, providing a diamond interchange. It then continues northerly along the rear lot lines of Clearview Knolls. It crosses the South Fork Rivanna River Reservoir west of Panorama Farms Cemetery and proceeds northerly along Naked Creek, crossing over Route 743, where there is a proposed diamond interchange. It then continues northerly between Earlysville Heights and Charlottesville-Albemarle Airport west of the proposed new airport runway. It then heads easterly immediately south of Chris Green Lake Park, crossing under Routes 850 and 606, and ends at Route 29, about 1,300 feet south of North Fork Rivanna River, with a three-level interchange having 60-mph directional ramps connecting with existing Route 29 north. The transition into existing Route 29 extends to approximately 0.3 miles north of the North Fork Rivanna River. This alternative involves use of land from a property determined by the Virginia Department of Historic Resources to be eligible for the National Register which constitutes a Section 4(f) involvement.

3. Costs of Alternatives

Details of design features and criteria are presented in the Engineering Report and shown on 1" = 200' scale plan sheets. Vertical profiles for the mainline, ramps, and cross-streets have all been prepared to meet the appropriate standards.

Cost calculations have been compiled using VDOT unit costs and applying the features and quantities specific to each alternative. Construction, right-of-way, and utility adjustment costs are summarized in Table II-4.

F. OTHER ALTERNATIVES.

Base Case With Grade-Separated Interchanges - The Base Case improvements to Route 29 are described in Section B of this chapter. These improvements, as originally presented at a location and design public hearing in October, 1986, included a grade-separated interchange at Rio Road. The interchange was deleted as a result of public concerns expressed at the hearing.

During the course of this study, officials of the City of Charlottesville, Albemarle County, the Metropolitan Planning Organization, and the Albemarle-Charlottesville-University of Virginia Joint Transportation Committee requested an evaluation of the traffic consequences of incorporating grade-separated interchanges with the Base Case. The Route 29 Base Case improvements could be expanded to include interchanges at the major intersections such as Rio road, Greenbrier Drive, and Hydraulic Road. The addition of interchanges would eliminate bottlenecks at these existing at-grade signalized intersections and could thereby help improve the overall capacity and level of service along Route 29 as discussed in Chapter IV.

Meadowcreek Parkway - The Meadowcreek Parkway is a proposed new-location, controlled access, four-lane divided highway which is included in the CATS plan. This facility would have a design speed of 40 miles per hour, a right-of-way width of 120 feet, and curb and gutter on both sides. Previous studies include a Draft Environmental Impact Statement prepared in 1985 for the McIntire Road Extension, the segment of the Meadowcreek Parkway within the City of Charlottesville. A public hearing for the Extension was held in 1986. Concerns of the City for impacts to McIntire Park and for traffic impacts to downtown Charlottesville have kept the project in abeyance.

Alternatives 7 and 7A generally follow the proposed Meadowcreek Parkway conceptual alignment. The impacts of these two alternatives are presented in this document. Therefore, a separate evaluation of the Meadowcreek Parkway is not necessary.

Ivy Creek Parkway - The Ivy Creek Parkway is a concept proposed by the City, in the autumn of 1989, which closely follows combinations of several segments previously considered in the early stages of the Route 29 Corridor Study. Like the Meadowcreek Parkway, but located to the west of Route 29, the Ivy Creek Parkway would have a reduced design standard. This conceptual alignment was rejected in this study due to the fact that the connection at Route 29/250 Bypass near the North Campus of the University of Virginia cannot be provided due to the closeness of nearby interchanges and access ramps. The alignment is placed in a heavily populated area, integrates Hydraulic Road traffic with the new facility, and appears unable to adequately improve the levels of service on Route 29.

TABLE II-4

COST SUMMARY

Alternative	Cost ($1000) Construction & Engineering	Right of Way	Utility	Total
Base Case	$ 17,584	$ 8,487	$ 343	$ 26,414
6	103,287	10,078	927	114,292
6B	108,304	9,802	836	118,942
7	87,732	12,095	745	100,572
7A	89,395	8,102	567	98,064
9	133,859	23,618	3,684	161,161
10	77,523	30,429	1,150	109,102
11	98,338	16,890	1,359	116,587
12	180,315	16,064	2,228	198,607

Notes: Costs of Candidate Build Alternatives do not include Base Case Improvements.

Numbers may not add due to rounding.

Combination of Alternatives - The Project Study Team received several requests to evaluate combinations of alternatives such as providing both an eastern bypass and a western bypass. Such combinations have been looked at but are not addressed explicitly in this document because the cumulative impacts and costs appear to be prohibitive. Those wishing to contemplate the costs and impacts of various combinations may do so by adding the numbers in the summary matrix in the Summary at the front of this document.

III. AFFECTED ENVIRONMENT

A. TRAFFIC

Origin-destination surveys that were conducted in the Charlottesville area in October 1987 served as a basis for determining both the volumes and the nature of existing traffic. Additional traffic counts and surveys were conducted in the spring of 1988. The results of these data collection activities along with demographic, socioeconomic, and housing characteristics were utilized in the calibration and application of the future year traffic forecasting models.

As illustrated in Table III-1, the results of the 1987 roadside origin-destination surveys show that on Route 29 at the North Fork of the Rivanna River, 19 percent of the total traffic is through traffic. At Hydraulic Road, the through traffic comprises only 10 percent of the total traffic passing that location.

Traffic counts that were previously available and those collected for this study were encoded into a network to allow evaluation and calibration of the travel model. The model was implemented using the MinUTP software package, which included trip generation, trip distribution, auto occupancy, and traffic assignment components. Thus, existing travel conditions were established to serve as a basis from which to forecast future traffic.

Existing average daily traffic volumes are shown in Figure III-1.

B. SOCIOECONOMIC CONDITIONS

This section presents population and employment data for the Charlottesville area. Existing and projected land use patterns are described. Residential communities and community facilities are identified.

1. Population Characteristics and Trends

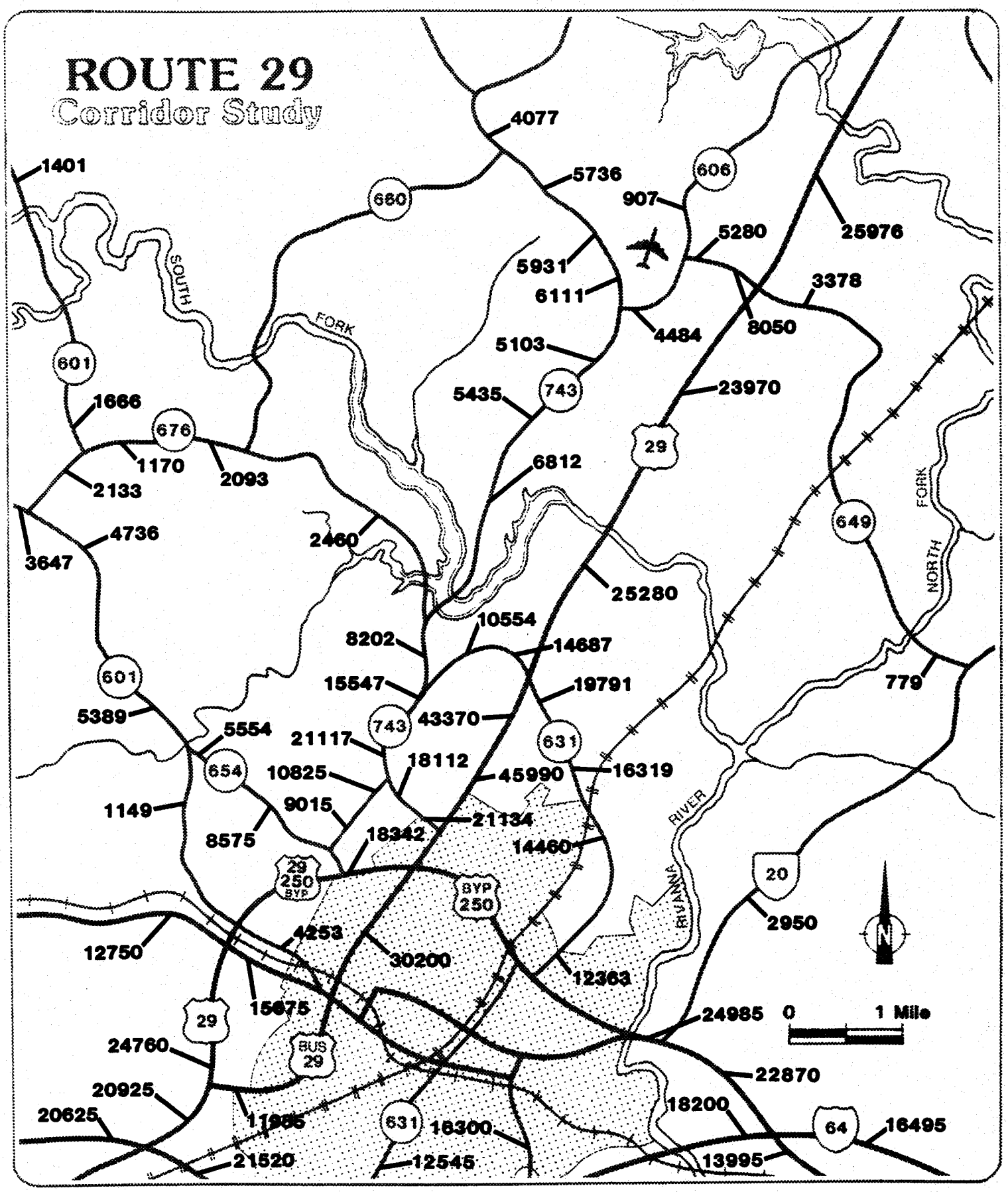
The Charlottesville "Standard Metropolitan Statistical Area" (SMSA), as designated by the Census Bureau, includes Albemarle, Fluvanna, and Greene Counties, and the City of Charlottesville.

The City of Charlottesville and Albemarle County combined have about 100,000 residents. Most of the recent growth in the metropolitan area has taken place in Albemarle County. In 1970, the County's population was just under that of the City. By 1985, the County had one and one-half times as many residents as the City. The metropolitan statistical area population is projected to grow to about 166,000 in 2010, an increase of 46,000 over 1985. The City is projected to have about 45,000 people in 2010, and the County about 94,000. Data developed for the traffic forecasting element of this study show that the greatest

TABLE III-1

VEHICLE TRIPS PER DAY 1987

	Total Vehicles	Through Vehicles	Percent Through
Route 29 at North Fork Rivanna			
Autos	23,638	4,143	18%
Trucks	2,338	792	34%
Total	25,976	4,935	19%
Route 29 at Hydraulic Road			
Autos	46,117	4,143	9%
Trucks	3,525	792	22%
Total	49,642	4,935	10%



000 AVERAGE ANNUAL DAILY TRAFFIC (1987)

Existing Traffic

Figure No. III-1

growth will occur along Route 29 North. Figure III-2 shows population growth for the various traffic districts included in the traffic study.

In part because of the presence of the University of Virginia, the median age of the Charlottesville and Albemarle County population is about three years below that of the rest of the state. The Charlottesville area has fewer racial minorities than the state as a whole. According to the 1980 census, about five out of six persons are white. Blacks constitute 15 percent of the metropolitan population, compared to about 19 percent statewide. Other races account for only about one percent in the Charlottesville area, and about two percent statewide. Persons of Spanish origin, which can include any race, make up less than one percent of Charlottesville's population. No unique minority or ethnic neighborhoods have been identified in the study area.

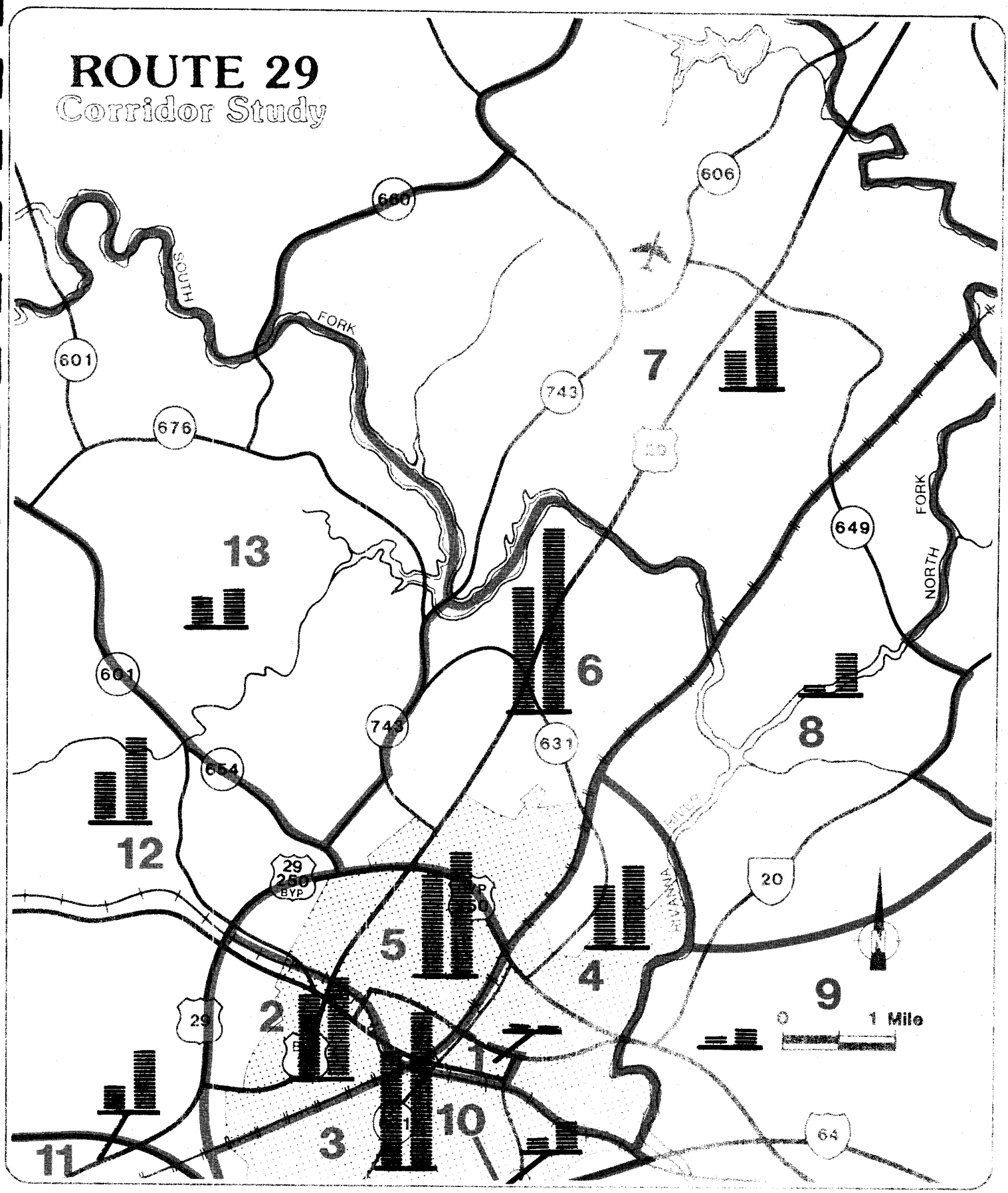
2. Economy and Employment

The economy of the Charlottesville area is characterized by stability and a low rate of unemployment. Median household income for 1979, as reported on the 1980 census, was lower in the City and the metropolitan area than for the state as a whole, in part due to the large numbers of college students included in the census counts. Median family income for the City and County, as well as the entire metropolitan area, was close to the overall state median.

Between 1980 and 1986, the civilian work force for the metropolitan area grew about 20 percent, almost exactly the same as the statewide increase in that period. Unemployment in the area reported for April 1989 was 2.3 percent. This was below the statewide rate of 3.3 percent and represented virtual full employment.

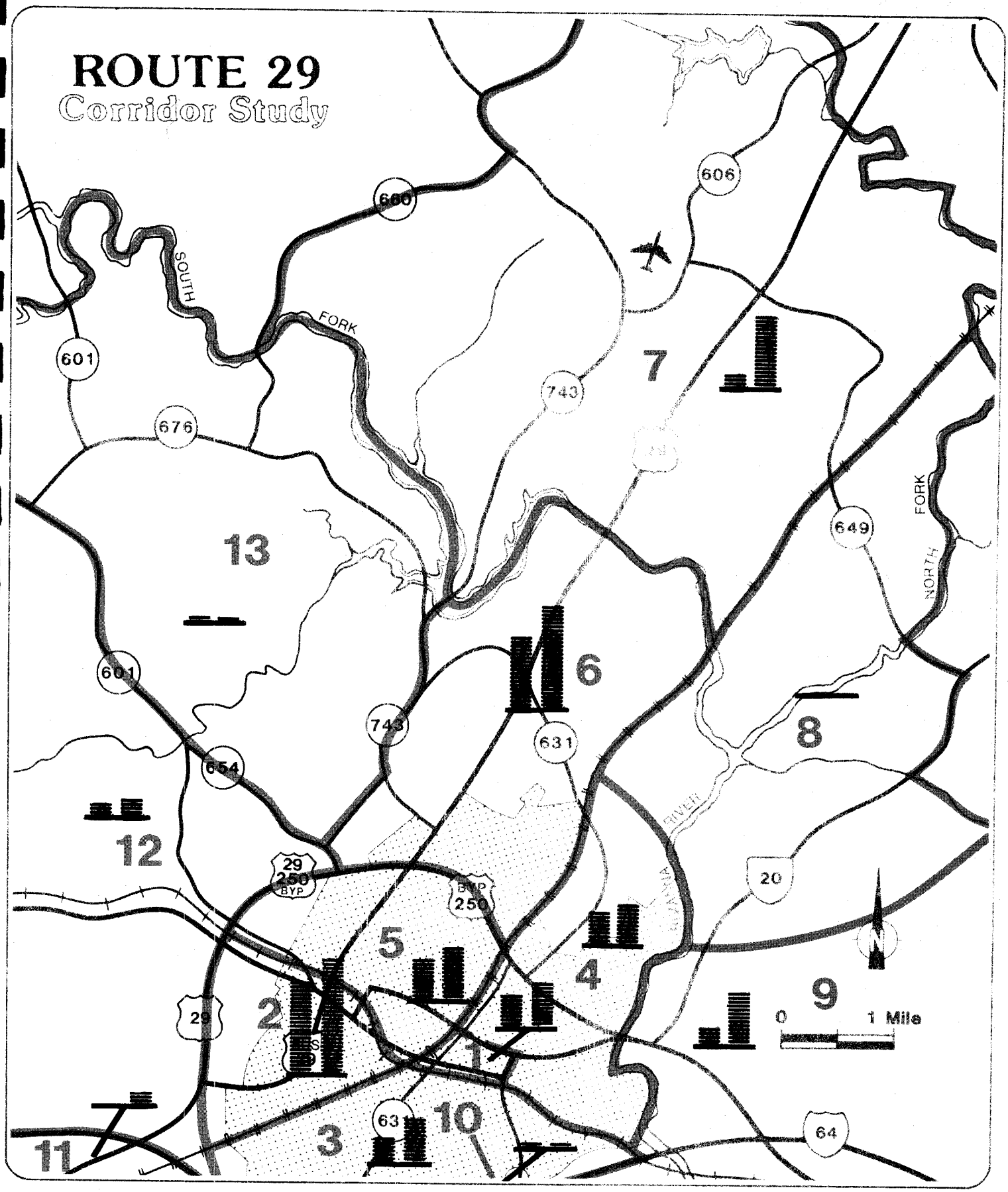
The University of Virginia is a major component of the Charlottesville area's economic base, with 17,000 students and more than 10,000 employees. Tuition payments from students, most of them from out of the area, and state funding pay the salaries of the University's faculty and staff. Additional spending by students for room, board, and goods and services contributes to the local economy. Research institutions associated with the University also contribute. The University Medical Center employs many professionals and attracts patients from a broad region. One important aspect of the University is the stability it contributes to the local economy, for the number of students is limited and varies little from year to year.

Other major employers in the area include State Farm Insurance, whose Eastern Regional office in the Pantops area employs about 600. Comdial, with about 1,300 employees, and Sperry Marine, with about 1,000 employees, have plants located along Route 29 just north of Hydraulic Road. A GE Fanuc facility along Route 29 north of the North Fork Rivanna River employs about 900. The greatest employment growth is expected along Route 29 North, near the University of Virginia, on the south side of the city, and in the Pantops area. Figure III-3 shows employment growth by traffic district. The employment growth projected along Route 29 North of the South Fork Rivanna River is especially dramatic.



Population Growth

Figure No. III-2



Employment Growth

Figure No. III-3

3. Land Use

a. Existing Land Use

Figure III-4 is a map showing generalized existing land use patterns in the study area. Commercial and industrial uses are concentrated in central Charlottesville, near the rail corridors, and along Route 29 North. Another focus of commercial uses is in the Pantops area, and of industrial uses, the Interstate 64 Corridor.

The area along Route 29 on the north side of Charlottesville between Route 250 Bypass and the South Fork of the Rivanna has a major concentration of the region's retail businesses. Fashion Square just south of Hydraulic Road is a modern enclosed shopping mall. Other shopping centers along this section of Route 29 include Albemarle Square Shopping Center, Charlottesville Shoppers World, and the new Rio Hills Center across from Woodbrook.

A number of smaller strip centers and free standing stores and restaurants are located along this section of Route 29. It also has the greatest concentration of motels in the Charlottesville area and is the location of two of the area's largest manufacturing plants, Comdial and Sperry Marine.

The Charlottesville-Albemarle Airport is located approximately 5.5 miles north of the City and about a mile west of Route 29.

The University of Virginia occupies a large area of western Charlottesville and adjacent Albemarle County. Schools and other public uses are distributed throughout the study area. Large recreation areas include McIntire Park, Rivanna Park, Pen Park, the Ivy Creek Natural Area, and Chris Greene Lake Park.

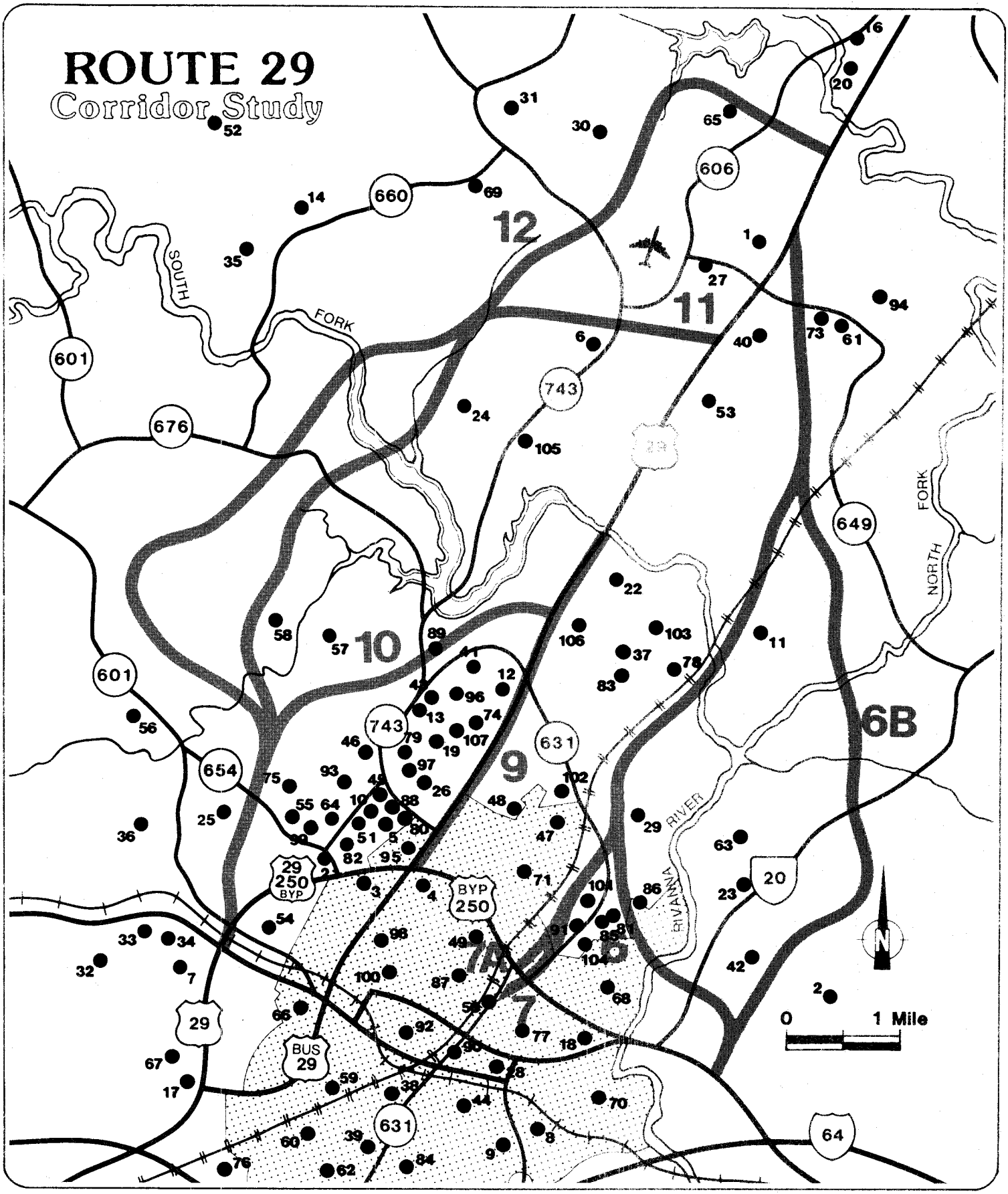
Residential uses fill in most of Charlottesville and several adjacent areas of surrounding Albemarle County. Along Route 29 North, beyond the commercial and industrial strip, is a wide band of residential communities. Scattered throughout the rest of the study area are residential areas and subdivisions of varying size. The greater density residential areas are concentrated in central Charlottesville, near the University, and in Albemarle County south of the Reservoir and west of Route 29 North.

Figure III-5 shows locations of residential communities which are listed in Table III-2. These include Charlottesville neighborhoods identified in the City's Comprehensive Plan, and subdivisions with approximately 25 homes or more in Albemarle County. In the newer suburban areas, subdivisions generally function as neighborhoods because of the restricted access and the common facilities often provided by the developer for the homeowners.

AGRICULTURAL AND OPEN
RESIDENTIAL
COMMERCIAL
INDUSTRIAL
PUBLIC AND SEMI-PUBLIC
PARKS AND RECREATION

Generalized Existing Land Use

Figure No. III-4



● CITY OF CHARLOTTESVILLE NEIGHBORHOODS AND ALBEMARLE COUNTY SUBDIVISIONS WITH 24 OR MORE HOUSES OR LOTS

Residential Communities

Figure No. III-5

TABLE III-2

RESIDENTIAL COMMUNITIES* IN STUDY AREA

Neighborhood or Subdivision	Reference on Map
Airport Acres	1
Ashcroft	2
Barracks Road	3
Barracks - Rugby	4
Barterbrook	5
Bedford Hills	6
Bellair	7
Belmont Northeast	8
Belmont South	9
Bennington Woods	10
Bentivar	11
Berkeley	12
Birnam Wood	13
Blue Ridge Forest	14
Branchlands	15
Briarwood	16
Buckingham	17
Burnley-Moram	18
Camellia Garden	19
Camelot	20
Canterbury Hills	21
Carrsbrook	22
Cedar Hills	23
Clover Hill	24
Colthurst Farm	25
Commonwealth Drive	26
Deerwood	27
Downtown	28
Dunlora	29
Earlysville Forest	30
Earlysville Heights	31
Ednam Forest	32
Ednam	33
Ednam Village	34
Fairgrove	35
Farmington	36
Fieldbrook	37
Fifeville	38
Forest Hills - Prospect	39
Forest Lakes	40
Four Seasons	41
Franklin	42
Garden Court	43

TABLE III-2 (cont.)

Neighborhood or Subdivision	Reference on Map
Garrett - Sixth Streets	44
Georgetown Court	45
Georgetown Green	46
Greenbrier	47
Greenbrier Heights	48
Greenleaf Terrace	49
Harris Street	50
Hessian Hills	51
Hickory Ridge	52
Hollymead	53
Huntington Village	54
Huntwood	55
Inglecress	56
Ivy Farm (east of Ivy Cr.)	57
Ivy Farm (west of Ivy Cr.)	58
Jefferson Park Avenue	59
Jefferson Park Avenue South	60
Jefferson Village	61
Johnson's Village	62
Key West	63
Knollwood	64
Lake Acres	65
Lewis Mountain-Alderman Rds	66
Liberty Hill	67
Locust Grove	68
Loftland Wood	69
Meade Avenue	70
Meadowbrook Heights	71
Meadow Creek	72
Meadowfield	73
Minor Townhouses	74
Montvue	75
Nob Hill	76
North Downtown	77
Northfields	78
Oak Forest	79
Oak Terrace	80
Pen Park	81
Queen Charlotte	82
Raintree	83
Ridge Street	84
Rio Heights	85
Riverrun	86
Rose Hill	87
Solomon Court	88
Squirrel Ridge	89

TABLE III-2 (cont.)

Neighborhood or Subdivision	Reference on Map
Star Hill	90
Stonehenge	91
Tenth and Page	92
Terrell	93
Terrybrook	94
The Meadows	95
Townwood	96
Turtle Creek	97
University Circle	98
University Commons	99
Venable	100
Village Square	101
Wakefield	102
Westmoreland	103
Wildwood	104
Windsor Estates	105
Woodbrook	106
Wynridge	107

* Charlottesville neighborhoods and Albemarle County subdivisions with 24 or more lots or housing units.

Sources: Charlottesville Department of Community Development; Albemarle County Department of Planning and Community Development

b. Future Land Use

An update of Albemarle County's 1982 Comprehensive Plan was the subject of public hearings and debate during 1988 and 1989. It was adopted in July 1989. The plan revisions expand the designated growth areas somewhat and also revise the land use regulations in an attempt to restrict the development in the rural areas of the County.

The previous plan for the City of Charlottesville was adopted in 1984. A revision of the City's plan has also been prepared and was adopted in January 1990.

Figure III-6 presents a map of generalized land use patterns in the study area for the year 2010. This map is based upon the land use plan of the 1988-2008 Albemarle County Comprehensive Plan and the City of Charlottesville's comprehensive plan. Along Route 29 North, the existing pattern of commercial and industrial development is expected to continue and intensify. Away from Route 29, except where noted as growth areas, most of the land is projected to remain rural or open space.

Because most of the land in the City is already developed, Charlottesville's land use plan does not anticipate land use patterns substantially different from those now existing. In the County, the major areas of expected development shown on this map include both commercial and residential uses in the Pantops area, low-density residential west of the Southern Railroad tracks and south of the Rivanna River South Fork, low and medium density residential north of the South Fork and east of Route 29 north, and a large industrial area between the Charlottesville-Albemarle Airport and Route 29. Much of this latter area is being planned for development by the University Real Estate Foundation, as a University-affiliated research park.

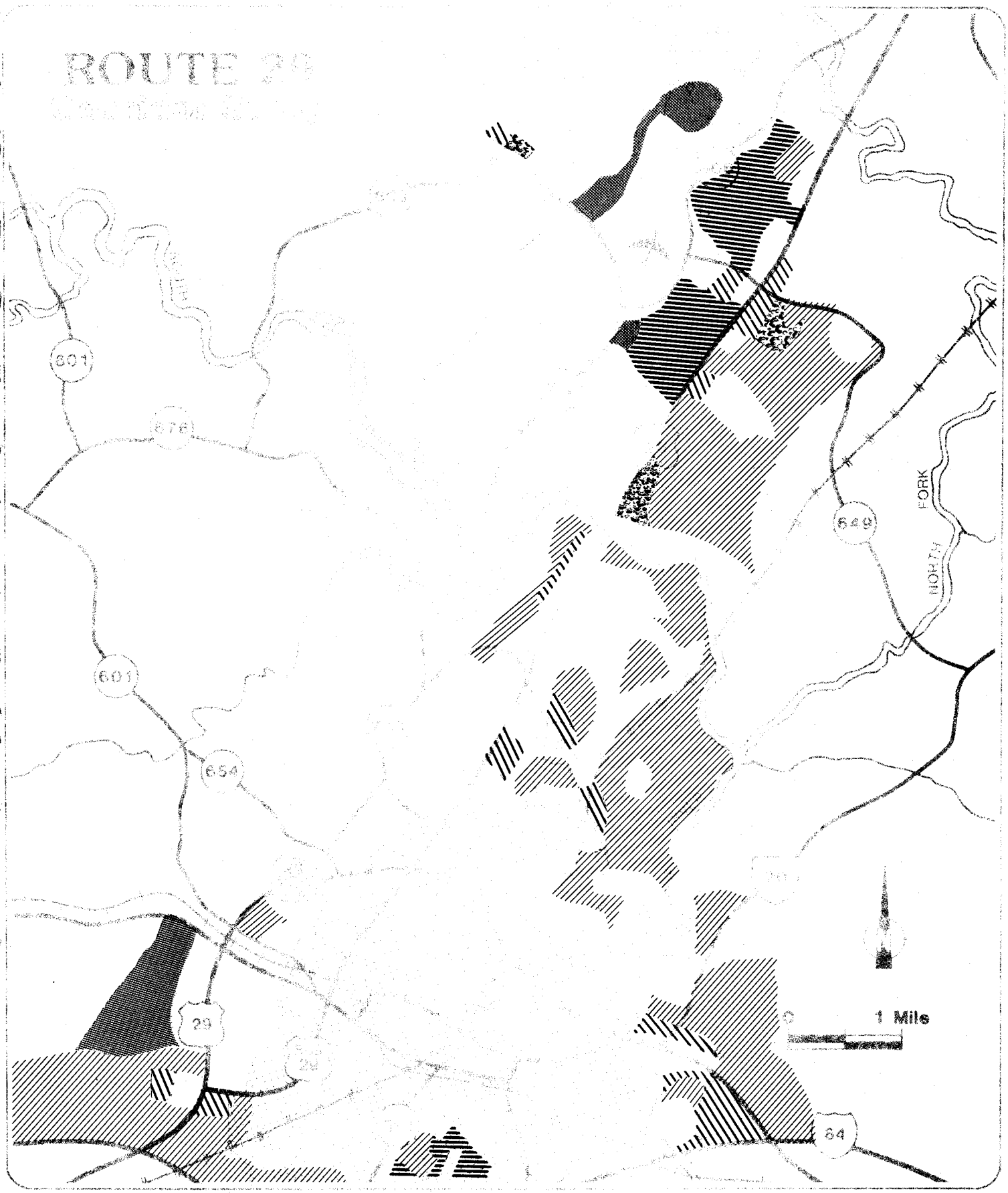
The Charlottesville-Albemarle Airport's master plan does not currently show any additional land acquisition. However, this plan is being updated and airport planners are considering expanding the Airport's boundaries to both the north and the west. Additional land on the north would permit the lengthening of the existing runway and on the west would provide for a possible parallel runway for general aviation and development of additional aviation and airport-related facilities.

4. Community Facilities and Services

The location of community facilities in the study area is shown in Figure III-7.

a. Public Safety

The City of Charlottesville has two fire stations. One is on Ridge Street near downtown. The other is on Route 250 Bypass adjacent to McIntire Park. Albemarle County has seven volunteer fire departments which receive funding support from the County. One of these stations is in the study area--the Seminole Trail Volunteer Fire Department, west of Route

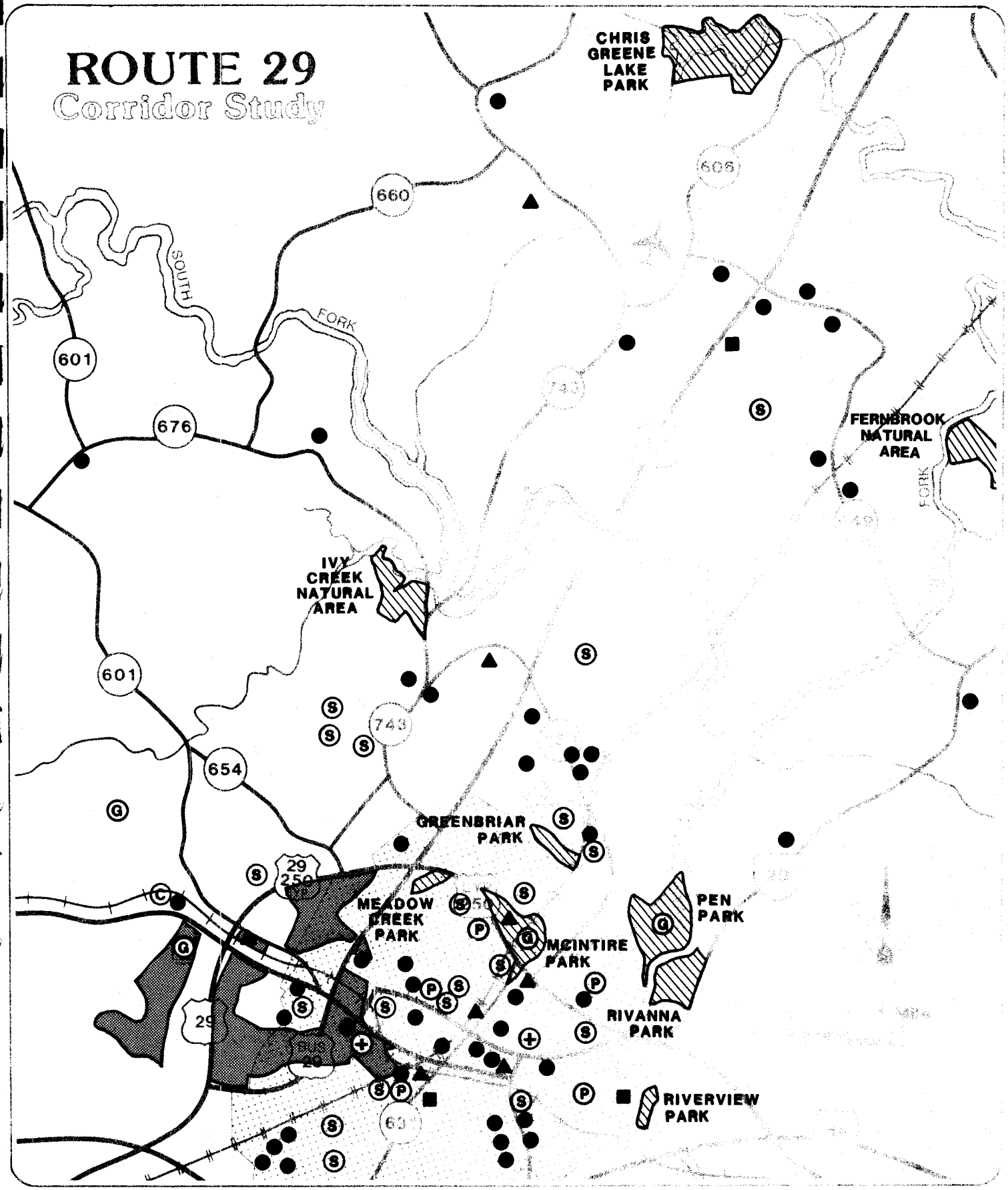


- AGRICULTURAL AND OPEN
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- PUBLIC AND SEMI-PUBLIC
- PARKS AND RECREATION

Generalized Future Land Use

(Where Different From Existing)

Figure No. III-6



Community Facilities

Figure No. III-7

29 near Rio Road. The County also has a cooperative agreement with the City for fire protection in the urban ring around the City.

There are three rescue squads that provide rescue and emergency medical service in the City and County. The entire study area is served by the Charlottesville-Albemarle Rescue Squad, located at Route 250 Bypass and McIntire Road.

The City and County each have their own police department. The Charlottesville Police Department headquarters is at City Hall on Market Street downtown. The County Police Department operates out of the County Administration Building at McIntire Road and Preston Avenue. The University of Virginia also operates its own police department. All three police departments share a joint dispatch center at Charlottesville City Hall.

b. Schools

The City of Charlottesville and Albemarle County each operate a public school system, with elementary schools, middle schools, and high schools. The two systems also operate a combined vocational-technical school. Within the study area are all or parts of the districts of seven County elementary schools, four middle schools, and both County high schools.

The main campus of the University of Virginia, a public state university, is located on the west side of the City of Charlottesville and adjacent parts of Albemarle County. The University currently has about 17,000 undergraduate and graduate students. The University is planning to increase the number of students by about 12 percent between now and 2004.

c. Parks and Recreation

Major parks and recreation facilities on the east side of Route 29 include McIntire Municipal Park and Golf Club, a City park; Pen Park and Golf Club, another City park; and Rivanna Park, a new park currently being constructed jointly by the City and County. West of Route 29 is the Ivy Creek Natural Area, owned by both the City and County, and Chris Greene Lake Park, a County park. Parks impacted by project alternatives are discussed at length in the Section 4(f) Evaluation in Chapter VIII of this document.

Private golf courses, major stadiums and other facilities are also shown on Figure III-7.

d. Hospitals, Churches, Cemeteries

Figure III-7 shows the location of churches, hospitals and large cemeteries. The two major hospitals in Charlottesville are the University of Virginia Medical Center and Martha Jefferson Hospital.

e. Utilities

Utility services in the study area are supplied by a variety of private companies and public agencies. Telephone service is provided by Central Telephone Company of Virginia and electricity by Virginia Power. The City's Gas Division provides natural gas service to the City and surrounding areas of Albemarle County. Sewage treatment and water supply is the responsibility of the Rivanna Water and Sewer Authority. Distribution and service of water and sewer is provided by the City for Charlottesville and immediately adjacent locations in the County. In the rest of Albemarle County, the Albemarle County Service Authority provides water and sewer service.

The water supplied in the study area is obtained from the South Fork Rivanna River Reservoir and the Ragged Mountain reservoir. The reservoir and watersheds are discussed in more detail in Section III-F.

C. CULTURAL RESOURCES

1. History of the Area

The prehistoric background is similar to that for other areas of Virginia and the middle Atlantic region. The prehistoric sequence is divided into seven periods: Paleo-Indian (11,000 to 8000 B.C.), Early Archaic (8000 to 6500 B.C.), Middle Archaic (6500 to 3000 B.C.), Late Archaic (3000 to 1000 B.C.), Early Woodland (1000 to 500 B.C.), Middle Woodland (500 B.C. to A.D. 900), and Late Woodland (A.D. 900 to 1600).

The first contact between the local Indians and the Europeans took place in the early 1600s. In the 1720s and 1730s, the first European settlers moved into the area - tobacco planters from the Tidewater area of Virginia.

In 1744 Albemarle County was established. The site of the county courthouse, Charlottesville, was selected in 1787. In 1819 the University of Virginia was started in Charlottesville. The coming of the railroad around 1850 paved the way for new growth, much of which took place during the 1880s.

2. Historic Sites

In cooperation with the Virginia Department of Historic Resources, Phase I historical, architectural, and archaeological surveys were performed. A literature search was done to research past historic studies and to locate known historic sites and landmarks. Sites were identified throughout the broad initial project study area, i.e. from Keswick to Crozet and Greene County Line to Red Hill. Subsequent field surveys were performed by qualified architectural historians and archaeologists in the vicinity of the project alternatives, as described in Chapter IV.

The best known historic buildings are Monticello, the home of Thomas Jefferson, located southeast of Charlottesville, and the University of Virginia buildings which were designed by Mr. Jefferson.

D. SCENIC RESOURCES AND AESTHETICS

The study area is located in Virginia's Piedmont Plateau in the foothills of the Blue Ridge Mountains. The topography is rolling to hilly with elevations from 350 feet to about 800 feet above sea level. Higher mountains are nearby and the Blue Ridge Mountains lie about 10 miles to the west.

The development along Route 29 north is indistinguishable from the highway commercial strips along the approaches to almost any city in the United States, and much of the nearby residential area comprises typical suburban housing. Away from the developed areas, large estates and farms with rolling green fields and pastures are interspersed with forested tracts.

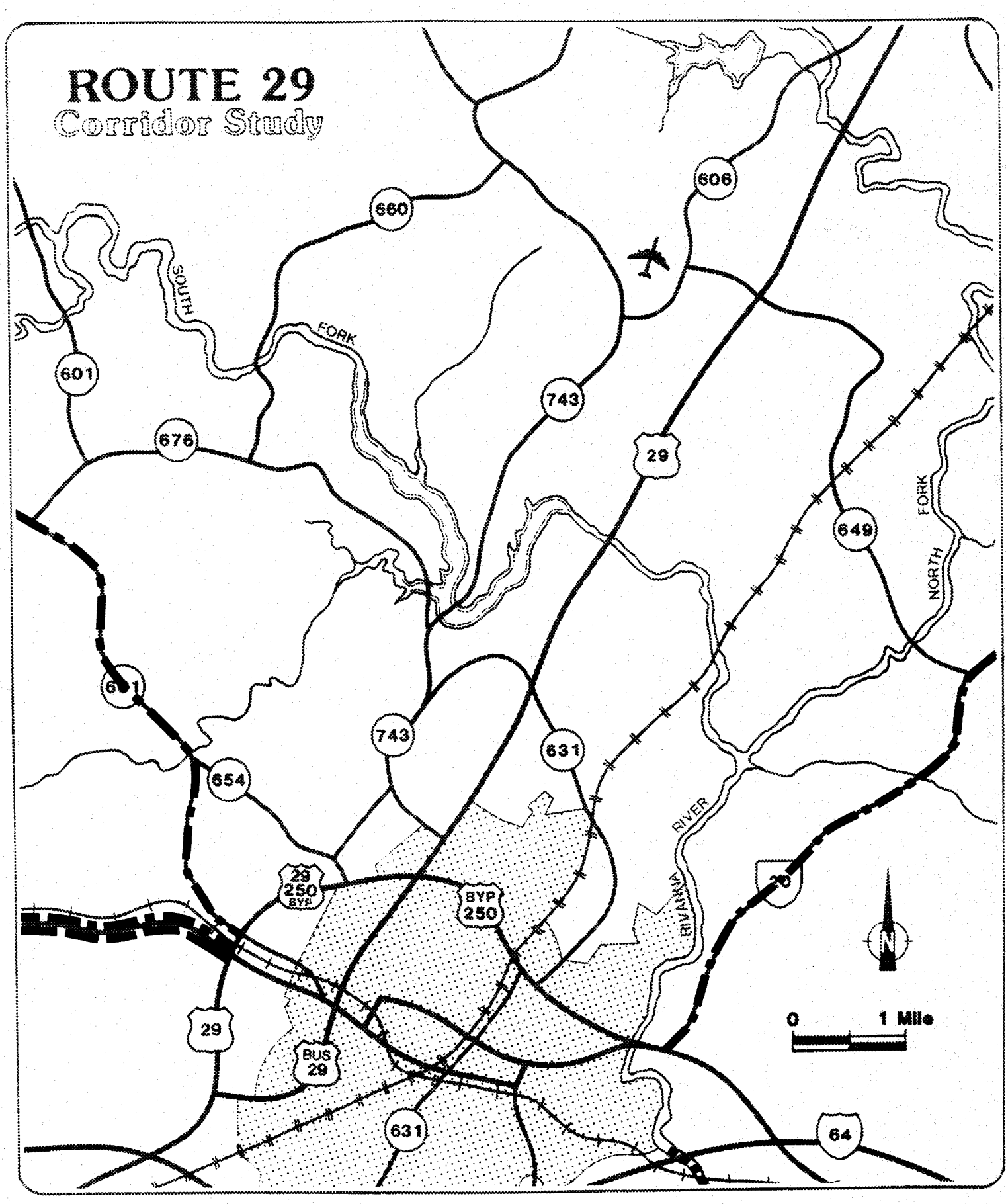
The hilly terrain, the nearby mountains and the combination of open and wooded areas afford many scenic vistas. A number of attractive residential developments have been located to capitalize on these views. The Rivanna River, the South Fork Rivanna Reservoir and several creeks provide another dimension of scenic beauty to the area.

The Commonwealth of Virginia recognizes scenic resources such as roads and streams. Figure III-8 identifies the several scenic resources noted in the study area. A designated Virginia Byway is defined as a road with noteworthy aesthetic and cultural values. It travels to or through an area of historic, recreational or natural importance. The designation does not place any restrictions on the road or its right of way. On the west side of the study area, Route 601, Old Garth Road, is a Virginia Byway. On the east side, Route 20 from U.S. 250 north to Orange County is a Virginia Byway.

Route 250 west of Charlottesville is designated a County Scenic Highway and has been placed under the scenic overlay district in the Albemarle County zoning ordinance. This designation provides for protection of vistas through increased setback requirements and additional sign regulations.

There are no designated wild and scenic rivers in the study area. Portions of two rivers have been designated state scenic rivers: the Rivanna River from the Woolen Mills Dam (near I-64) to the Fluvanna County line, and the Moormans River, from the South Fork Rivanna River Reservoir to its junction with the Mechum's River west of the study area. Neither of these is affected by any of the project alternatives.

Open space easements, also called conservation or scenic easements, were authorized by the Virginia General Assembly in 1966. These easements are given by landowners to the Virginia Outdoors Foundation to preserve part or all of a property as open space. None of the alternatives affect any properties under the open space easement program.



VIRGINIA BYWAY
COUNTY SCENIC HIGHWAY
STATE SCENIC RIVER

Scenic Resources

Figure No. III-8

E. AIR, NOISE AND ENERGY

1. Air Quality

In accordance with the Clean Air Act of 1970 and its 1977 amendments, the U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for six atmospheric pollutants: particulate, carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, and lead. The NAAQS were designed to protect public health and welfare.

States were required to develop State Implementation Plans to comply with the NAAQS. The plans were to designate regions in compliance with the NAAQS as "attainment" and regions not complying as "nonattainment".

Virginia's State Implementation Plan, developed by the Virginia Department of Air Pollution Control and approved by EPA, addressed air quality in seven regions. Charlottesville and Albemarle County are located in Region IV, Northeastern Virginia. The entire region has been given a status of "attainment" for all six pollutants.

The Virginia Department of Air Pollution Control monitors only particulate in the Charlottesville area. Measured particulate concentrations are well within the standards. Although monitoring data for other pollutants are not available, overall air quality in the area is considered good due to the rural character of the surrounding area and the lack of heavy industry.

2. Noise

In accordance with the Federal-Aid Highway Act of 1970, the Federal Highway Administration has established noise standards to protect public health and welfare. These standards include noise abatement criteria, which are noise levels that represent a balancing of desirable noise levels with achievable noise levels. The criteria apply only to areas having regular human use and where lowered noise levels are desireable. They do not apply to the entire tract of land on which an activity is based, but only to that portion where the activity occurs.

Table III-3 shows the noise abatement criteria for various land uses. Federal Highway Administration regulations require that noise abatement measures be considered if a proposed project causes traffic noise levels to approach or exceed the noise abatement criteria or to exceed substantially (by 10 decibels or more) existing noise levels.

Noise abatement criteria are given as equivalent noise levels measured in units of decibels. The equivalent noise level (L_{eq})is defined as a constant level of sound which would generate the same amount of energy as the varying levels recorded over a specified period of time. The decibel measure is a logarithmic scale for measuring sound pressure levels.

TABLE III-3

FHWA NOISE ABATEMENT CRITERIA

Category	Noise Level L_{eq}(hourly)	Description of Land Use Category
A	57 dB(A) (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, parks, or open spaces which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	67 dB(A) (Exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sport areas, and parks.
C	72 dB(A) (Exterior)	Developed lands, properties, or activities not included in categories A and B above.
D	--	Undeveloped lands
E	52 dB(A) (Interior)	Residences, motels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: FHPM 7-7-3

One decibel represents roughly the smallest change in loudness that can be perceived by the human ear. An increase of ten decibels corresponds to a doubling of perceived loudness. Because the human ear is most sensitive to frequencies in the middle and upper audible range, these frequencies must be given greater weight than others in averaging sound contributions from all audible frequency bands to arrive at a total noise level value. Sound level values adjusted in this manner are designated "A-weighted." Sound levels measured in decibels and A-weighted are denoted dB(A).

Existing noise levels ranging from 45 to 74 decibels were determined for 35 representative sites. Each site represents an area or number of receptors estimated to experience similar noise conditions. Noise levels at most sites are currently below the FHWA noise abatement criteria. As expected, the lowest noise levels occur in rural areas while the highest occur near major highways. Sites near the airport receive substantial noise contributions from aircraft. Sites near railroads receive periodic noise contributions from passing trains. The noise section in Chapter IV gives the site locations, existing noise levels, and projected future noise levels. The Noise Analysis Technical Memorandum provides details on how noise levels were determined.

3. Energy

Transportation accounts for a major portion of both direct and indirect energy consumption in America. Direct consumption entails the energy consumed by vehicles operating on roadways. Indirect consumption refers to energy consumed in building and maintaining roads. Energy consumption is measured in British Thermal Units (BTU's). One BTU is the energy required to raise the temperature of one pound of water one degree Fahrenheit at 39.2 degrees F. Other measures of energy consumption used in transportation studies are gallons of fuel or barrels of oil consumed. One gallon of fuel is equivalent to approximately 125,000 BTU's and a barrel of oil is equivalent to approximately 5.8 million BTU's.

Existing energy consumption was calculated for maintenance of existing roads and for vehicles operating on those roads. A consumption factor of 1.2×10^8 BTU's per lane mile per year was used to estimate annual energy consumption for maintenance of existing roads. Consumption for vehicle operations was calculated based on vehicle miles traveled, operating speeds, and fuel consumption rates.

There are approximately 1061 miles of highways in Albemarle County. Applying the consumption factor, approximately 255×10^9 BTU's of energy are required each year to maintain existing roads.

In 1987, there were approximately 384,710 miles traveled per day in Albemarle County. The average fuel consumption rate based on all vehicle types and speeds is estimated to be approximately 26.9 miles per gallon. This results in daily fuel consumption of approximately 14,311 gallons with a BTU equivalent of approximately 1.79×10^9. On an annual basis, this amounts to approximately 653×10^9 BTU's.

Adding the maintenance and operational energies results in total base year energy consumption of 908 x 10^9 BTU's. Expressed in terms more easily understood, this figure is equivalent to approximately 157,000 barrels of crude oil per year.

F. NATURAL ENVIRONMENT

1. Physiographic Features

Albemarle County lies in two physiographic provinces: the Blue Ridge physiographic province and the Piedmont physiographic province. The Piedmont province covers about 82 percent of the land area of the county and includes the Route 29 study area. This province is characterized by gently sloping to moderately steep landscape. It is well dissected by many small streams and rivers that flow in narrow, meandering valleys. Soils are a variety of moderately deep to deep, well drained to excessively drained, loams with red clay subsoil. Details of the area's geology, topography, and soils are presented in the Terrestrial Ecology Technical Memorandum, which is available for review.

2. Wildlife and Habitat

The forests and farmlands of the county contain a typical complement of game and non-game summer, winter, migratory, and permanent resident fauna. Deer, bear, turkey, squirrel, rabbits, quail, grouse, and dove are commonly hunted species. Wood ducks, mallards, and Canada geese are found along the major streams and on the South Fork Rivanna River Reservoir.

Other species that are known to inhabit the county include: beaver, bobcat, mink, Virginia opossum, muskrat, raccoon, river otter, striped skunk, woodchuck, various species of voles and mice, numerous species of snakes and amphibians, and over 175 species of birds.

Habitat includes factors such as food, cover, water, and the space required for an animal to survive and reproduce. There are several general categories of habitat in the study area, each of which has a relative value. Areas that are primarily urban/suburban in character (including roadways), or composed of barren land and/or open water are generally poor wildlife habitat. Agricultural lands generally have a moderate habitat value. In some cases, small patches of agricultural land interspersed with escape and shelter habitats can be of exceptional value to wildlife. The highest quality wildlife habitats in the study area include forested areas, old fields, and the few existing wetlands.

There are no officially designated wildlife management areas in Albemarle County. However, there are two Natural Areas: the Ivy Creek Natural Area by the South Fork Rivanna River Reservoir and the Fernbrook Preserve along the North Fork Rivanna River near Proffit. These are County-owned lands which are preserved in a natural state with limited visitor amenities. Neither of these areas is affected by any of the alternatives.

3. Threatened and Endangered Species

The federal list of endangered and threatened species indicates that four threatened or endangered animal species could potentially occur in Albemarle County: Indiana bat, eastern wood rat, eastern cougar, and the James River spiny mussel. Only one, the James River spiny mussel, is known to occur in the County.

There are no habitats within the study area considered critical to threatened or endangered species of wildlife within Albemarle County. The Virginia Natural Heritage Program reviewed its files for any rare, threatened, or endangered species within the proposed alternates. This database revealed no populations of rare, threatened, or endangered plants, animals, or natural communities in the project area.

The only known Indiana bat cave hibernacula are in the Southwest corner of the State. The eastern wood rat is likely to occur in areas of rocky terrain within forested areas in the Blue Ridge province, although no specific locational data exists at the present time. Locational information for the eastern cougar lists two unverified sightings of the animal in Albemarle County since 1970. Populations of the James River spiny mussel have been located in the Mechum's River and Rocky Run in Albemarle County, upstream of the study area.

4. Surface Water

Many small streams drain the study area into three main river basins of the middle James River: the South Fork Rivanna River, North Fork Rivanna River, and the Rivanna River. A large portion of the study area drains into the South Fork Rivanna River Reservoir.

Surface waters in Albemarle County serve many purposes: drinking water supplies; recreation (swimming, fishing, boating); agriculture (irrigation, livestock); industrial and commercial uses; scenic beauty and open space; aquatic and shoreline habitat; and drainage. Fishing and boating are permitted in all county reservoirs. All the major lakes have self-sustaining fish populations. In the project area, the South Fork Rivanna River and the Rivanna River are designated by the state as natural trout waters.

Monthly water quality sampling in 20 streams from January 1988 to January 1989 showed that surface water quality in Albemarle County is quite good. Only a few streams flowing through large agricultural areas showed elevated nutrient levels. For the compounds tested, concentrations were below those considered harmful to aquatic life. Detailed water quality data can be found in the Aquatic Resources and Water Quality Technical Memorandum.

5. Groundwater Resources

Groundwater resources within Albemarle County are generally good. Availability and quality are relatively consistent throughout the county. Water bearing zones are generally

encountered within 200 feet of the land surface. Yields of less than 10 gallons per minute (gpm) are typical, though yields up to 145 gpm have been recorded in some areas. No major areas of groundwater contamination have been identified, though some local problems exist, with underground petroleum spills the most common problem. There are no known sole-source aquifers or wellhead protection areas as defined under the Safe Drinking Water Act.

The majority of Charlottesville area residences are connected to the city's water distribution system. However, numerous small communities and private homes in and around Charlottesville have wells that serve their water needs.

6. Reservoir

There are five drinking water reservoirs within the county, all within the Rivanna River basin. Water quality monitoring by the state within the Rivanna River sub-basin has disclosed no problems based on the parameters of temperature, dissolved oxygen, and pH. Levels of coliform bacteria are also usually within acceptable levels. Monitoring of metals and pesticides on the James River below the confluence of the Rivanna River has also revealed no problems.

The South Fork Rivanna River Reservoir currently supplies the drinking water for much of the population of Charlottesville and Albemarle County. In the past, this reservoir has experienced problems resulting from early eutrophication. Runoff from agricultural areas has elevated nutrient levels, and construction activities within the watershed have increased sedimentation. This has caused concern within the county due to estimates that the working life of the reservoir may be reduced. A bathymetric survey conducted during the course of this study confirmed suspected higher sedimentation rates and a decreased working life for this reservoir.

7. Wetlands

Due to the topography of the study area, and the well drained nature of soils in Albemarle County, few wetland areas exist in this region. The few sites encountered along the study alternatives are small seeps at the bases of hills, narrow strips along creeks resulting from regular flooding, or shallow ponds that could support emergent vegetation. The classifications are palustrine forested, palustrine emergent, palustrine scrub/shrub, palustrine open water, and riverine sand flat.

Wetlands are of particular concern because of their functions in providing essential breeding, rearing, and feeding grounds for many species of fish and wildlife, recreation, flood protection, and pollution control. Because of these values wetlands are protected by laws and executive directive.

Wetlands were identified and delineated using the three-parameter method set forth in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands. The three parameters are prevalence of hydrophytic vegetation, hydric soil, and positive hydrologic indicators. All three must be present for an area to be wetlands.

A variety of sources were used to determine the presence of the three parameters and to map the wetlands both in the study corridor and along each specific alignment. These included: U.S.G.S. topographic maps at a scale of 1":2000', on-site field investigation, 1988 Wetlands Plant List Northeast Region, Munsell Soil Color Charts, aerial photographs, and Classification of Wetlands and Deepwater Habitats by Cowardin, et al.

In addition to delineating and defining wetlands along the alignments, a wetlands functional assessment was made for each wetlands area. The method used is commonly referred to as "WET", the Wetland Evaluation Technique developed by Paul R. Adamus (1987). This method consists of ranking wetlands based on the functional values of various aspects of hydrology, wildlife, and recreational uses.

Hydrological parameters include the ability of a wetland to recharge or discharge groundwater, function as an area to buffer floodwaters, anchor and trap sediments, and remove and export nutrients. Wildlife values address overall diversity and abundance as well as a wetland's ability to function as breeding, migration, and wintering grounds for sensitive species. The ability to provide habitat for fish and benthic invertebrates is also considered. Finally, a wetlands value to society for it's uniqueness (heritage value) and recreation is considered.

The small, isolated wetlands encountered along the Route 29 Study alignments rated low in terms of social significance (considering special designations, potential economic value, and strategic location) and effectiveness (considering the capability of a wetland to perform a particular function) for all wetland functions addressed by the WET method.

More detailed information on existing wetlands in the area is available for review in the Aquatic Resources and Water Quality Technical Memorandum.

F. AGRICULTURAL AND FORESTAL RESOURCES

1. Agriculture/Prime Farmland

Agriculture has traditionally contributed to the quality of life in Albemarle County and has also provided the rural character and scenic quality which distinguishes this county by preserving the natural landscape and open space. Most of the county's agricultural lands are used as grassland, either for hay production or pasture.

In 1982, the U.S. Department of Agriculture Forest Service classified 201,409 acres or 43 percent of the total County acreage as "land in farms." The value of the average farm property (land and building) is almost twice the state average, yet the value of products per

farm is 15 percent lower than the state average, indicating that the "average" farmer in Albemarle County may not be wholly dependent on market forces of the agricultural economy to maintain financial stability.

The major activity on the farms is cattle production. Also recognized on the national level is the Albemarle horse industry. According to the Albemarle Extension Agent, Albemarle has 35 breeding farms, 30 boarding farms, 20 stud farms and five training stables. Vineyards and orchards are important agricultural enterprises in the County. Hay is an important crop. Albemarle County is among the top 20 percent of counties in Virginia in the value of agricultural products sold. Total value of these sales exceeded $20 million in 1982, including $17 million in livestock and livestock products and $4.7 million in crops.

Prime farmlands have been identified through the use of the Soil Conservation Service survey. About 103,530 acres or 22 percent of the soils in Albemarle are prime agricultural soils, as defined by the U.S. Department of Agriculture. Unique farmlands, or farmlands of statewide or local importance have not been designated by the Soil Conservation Service within the County.

2. Forestry

In 1986, the U.S. Department of Agriculture Forest Service classified 275,629 acres or 58 percent of the total County acreage as timberland (capable of producing 20 cubic feet of industrial wood per acre per year). The majority of the acreage is second growth hardwoods, Virginia pine, and Loblolly pine. Most of the original woodland was cleared and the soil was cultivated as the lands were settled and consolidated into farms. Gradually the soils became eroded, fertility was depleted, and the woodland was allowed to return. The present stands of mixed hardwoods, Virginia pine, and Loblolly pine are mostly in areas that were farmland. Corporations, including farm corporations, own 16 percent, and the forest industry owns 8 percent of the timberland. Four pulp and paper companies have substantial land holdings in the County. Eighteen Albemarle County businesses are related to the timber industry for home components, logging, plywood, pulpwood, saw milling, and wood treatment.

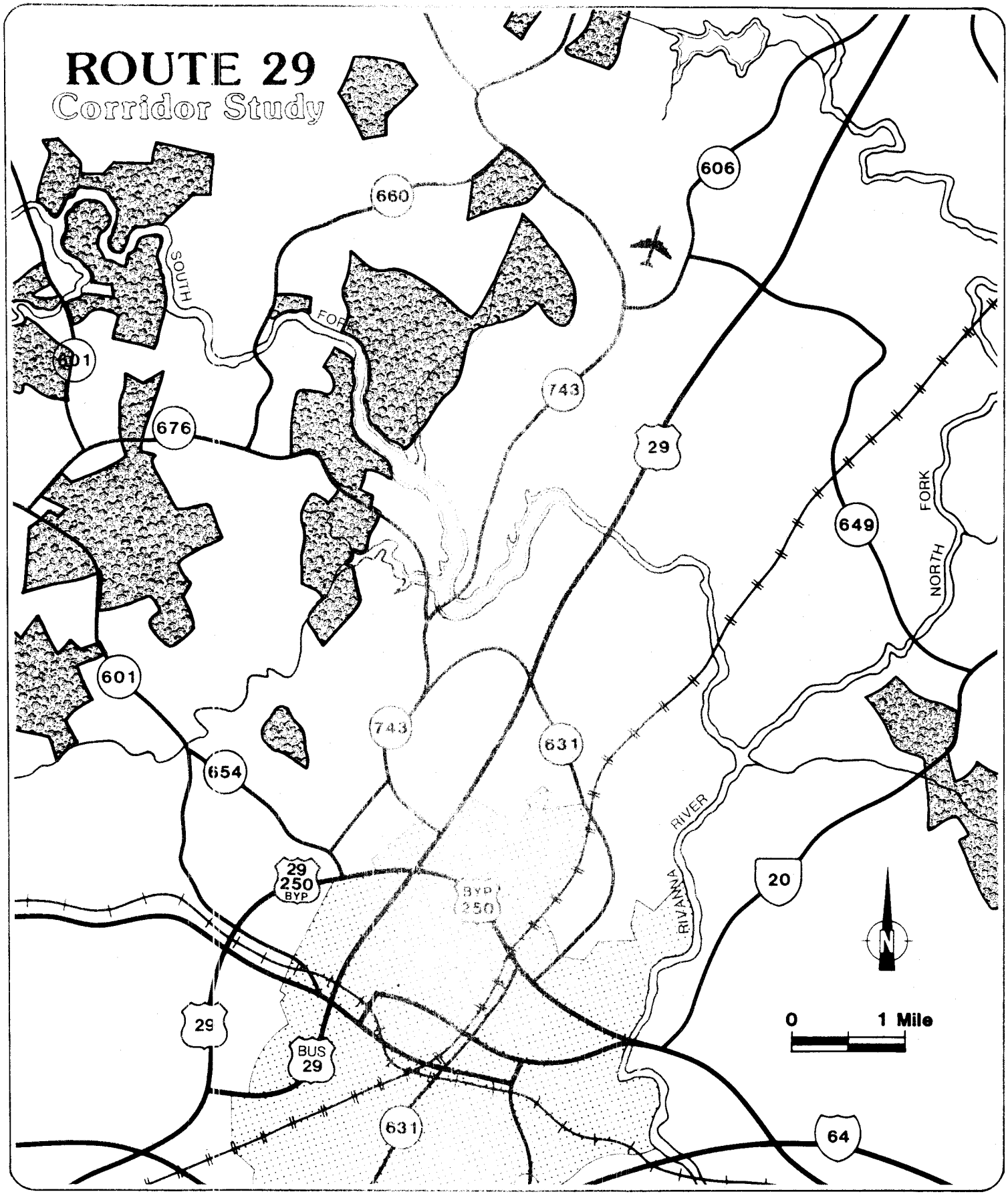
3. Agricultural/Forestal Districts

Virginia's Agricultural/Forestal Districts program was established to preserve areas of agricultural and forestal land. Districts are created by voluntary action of landowners who approach the local government requesting that a district be formed. The landowners must present a core of 200 acres of predominantly agricultural or forest land. Through a four-step process that includes, among other things, a public hearing, an option for others to join, and adoption of the district by the local government, the district is created for a period of from four to ten years. During that period, the district is subject to provisions encouraging farming, forestry, and conservation, including use value taxation, relief from nuisance laws, and restrictions on subdivision, special use permits, and rezonings. Among other requirements are the notification of pending state eminent domain action within the district and the prohibition of any new sewer, water, and utility assessments against property owners in the district. During the time period of its existence, the district may not be changed. At

the end of this period it is subject to review, after which it may be continued, modified, or terminated.

There are several Agricultural/Forestal districts approved as of May 1989 by Albemarle County, as shown in Figure III-9.

Analysis of residential growth indicates that current County efforts to preserve agricultural and forestal lands, primarily through restrictions on rural development, are insufficient. Residential development in rural areas has averaged better than 50 percent of total County residential growth since 1984, rising to 65 percent in 1987. Residential development in rural areas often conflicts with agricultural or forestal uses and has an adverse impact on the continuance of agriculture or forestry in an area.



Agricultural and Forestal Districts

Figure No. **III-9**

IV. ENVIRONMENTAL CONSEQUENCES

A. TRAFFIC IMPACTS

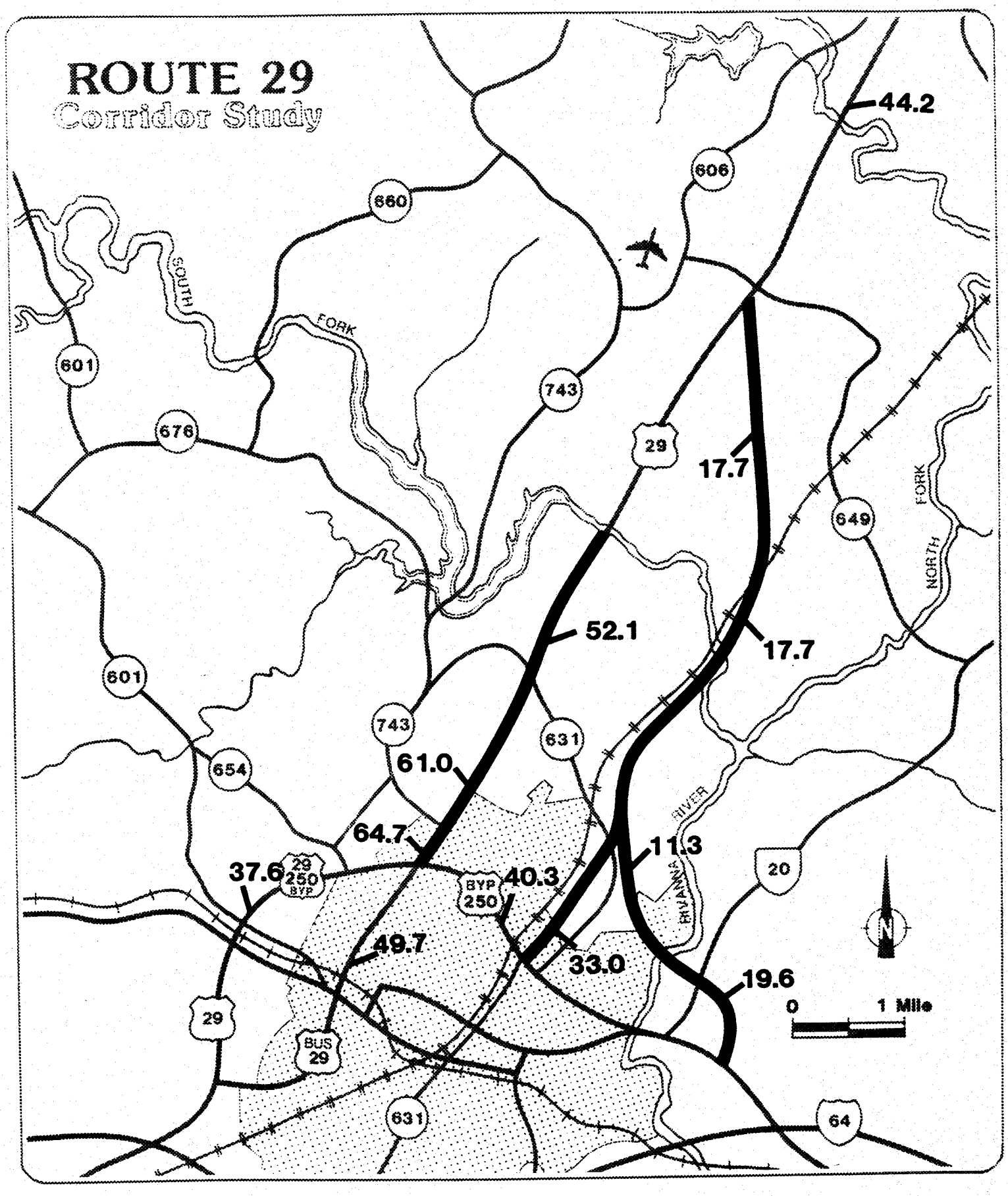
At a systemwide level, traffic in the Charlottesville area is projected to grow by 40 percent and the vehicle miles travelled by almost 68 percent between 1987 and 2010. Due to the concentration of future developments in the suburbs (Albemarle County) the average trip length of commutes will increase from 9.8 minutes to roughly 13 minutes by 2010, an increase of almost 31 percent. Trip lengths for other purposes of travel will also increase, 24 percent for non-home based trips and 17.3 percent for home-based other trips. These increases in trip lengths directly contribute to the overall increase in total vehicle miles of travel within the study area.

The roads serving the north, northwest and northeast suburbs of the study area, such as Routes 743, 676, 601, and 649, will experience higher than 60 percent growth in daily traffic by 2010. This increase in traffic is the result of the projected growth in population for areas served by these roads and the proposed University Research Park in the vicinity of the airport. Figure IV-1 shows projected traffic volumes on area roads under the Base Case alternative for the year 2010.

Table IV-1 shows the average annual daily traffic (AADT) along Route 29 north for 1987 and as projected for 2010 under each of the alternatives. Under the Base Case, traffic on the segment of Route 29 north of the 250 Bypass will increase to 64,700 vehicles per day. The increase represents almost 36 percent traffic growth between 1987 and 2010. The 2010 Base Case network considers Meadowcreek Parkway and the Rio Road/Route 250 Bypass Connector in operation. The northern section of Meadowcreek Parkway and the proposed extension of Rio Road to the Route 250 Bypass will carry nearly 17,700 and 19,600 vehicles per day, respectively.

Under the Base Case, 16 out of 25 selected intersections within the study area will operate below level of service (LOS) D during the evening peak. This clearly suggests that the traffic congestion in 2010 will be severe in the central city and the northern parts of the study area. Along Route 29 north of Hydraulic Road intersection, during the p.m. peak five out of seven intersections analyzed will experience severe delays at LOS F. Similarly, the ramp of Route 250 Bypass connecting Route 29, and the intersection of Hydraulic Road and Route 250, will be operating at LOS E and F, respectively. Farther south along Emmet Street, levels of service at Barracks Road, University Avenue and Jefferson Street intersections will deteriorate and reach LOS F.

Acknowledging that the principal objective of each Candidate Build Alternative is to ease traffic congestion along Route 29 north, a comparison between the Base Case and each alternative was undertaken. Table IV-2 summarizes the anticipated changes in traffic volumes at three locations along Route 29 that might result under each Build Alternative. The findings of this comparison are discussed below.



Proposed New Facility

00.0 AADT (Thousands)

Base Case 2010 Traffic

Includes All CATS Plan Recommendations

Figure No. **IV-1**

TABLE IV-1

1987 and 2010 TRAFFIC
(ANNUAL AVERAGE DAILY TRAFFIC IN THOUSANDS)

Alternative	On Route 29 North: Rte. 250 Bypass - Hydraulic Rd.	On Route 29 North: Hydraulic Rd. Greenbrier Rd.	Rio Rd. Woodbrook Dr.	On Candidate Build Alternatives: High	On Candidate Build Alternatives: Low
Exist. 1987	Not Available	45.99	25.28	X	X
Base 2010	64.7	61.0	52.1	X	X
Alt. 6 - 2010	63.3	58.7	49.5	25.3	14.4
Alt. 6B - 2010	62.7	58.4	50.1	22.3	5.0
Alt. 7 - 2010	62.0	58.3	47.2	36.4	23.2
Alt. 7A - 2010	64.0	59.6	47.8	33.9	22.7
Alt. 9 - 2010	75.2	73.3	61.9	See Route 29	
Alt. 10 - 2010	54.1	50.1	38.1	17.9	17.4
Alt. 11 - 2010	57.3	53.2	46.9	19.3	12.2
Alt. 12 - 2010	59.5	55.4	48.2	15.1	9.5

Source: Existing traffic from Commonwealth of Virginia Department of Transportation Average Daily Traffic Volumes on Interstate, Arterial, and Primary Routes.

Future traffic from MINUTP travel demand forecasting model.

TABLE IV-2

TRAFFIC IMPACTS OF EACH ALTERNATIVE ON ROUTE 29 IN 2010

Alternative	Change in Traffic Between Rte. 250 & Hydraulic Rd.		Change in Traffic Between Hydraulic Rd. & Rio Rd.		Change in Traffic Rio Rd. & South Fork of Rivanna	
	AADT	in %	AADT	in %	AADT	in %
Alt. 6	-1,400	-2.2	-2,300	-3.8	-2,600	-5.0
Alt. 6B	-2,000	-3.1	-2,600	-4.3	-2,000	-3.8
Alt. 7	-2,700	-4.2	-2,700	-4.4	-2,000	-3.8
Alt. 7A	-700	-1.1	-1,400	-2.3	-4,300	-8.3
Expressway	+10,500	+16.2	+12,300	+20.2	+9,800	+18.8
Express Lanes	+19,600		+43,200		+35,500	
Service Roads	-9,100		-30,900		-25,700	
Alt. 10	-10,600	-16.4	-10,900	-17.9	-14,000	-26.9
Alt. 11	-7,400	-11.4	-7,800	-12.8	-5,200	-10.0
Alt. 12	-5,200	-8.0	-5,600	-9.2	-3,900	-7.5

Alternative 6. This alternative functions as an eastern bypass for Route 29 and coincides with a portion of the proposed alignment of Meadowcreek Parkway. It will carry between 14,400 and 25,300 vehicles per day (vpd) in 2010 (Figure IV-2). The construction of this alternative will have minimal impact on Route 29 traffic. Within the most critical segment, between Hydraulic Road and Route 250 Bypass, it would reduce daily traffic by 1,400 vehicles (2.2%) in comparison with the Base Case. Due to the small reduction in traffic, all five critical intersections --Airport Road, Woodbrook Drive, Rio Road, Greenbrier Road, and Hydraulic Road-- along Rte. 29 will operate at an unacceptable LOS during the peak hours.

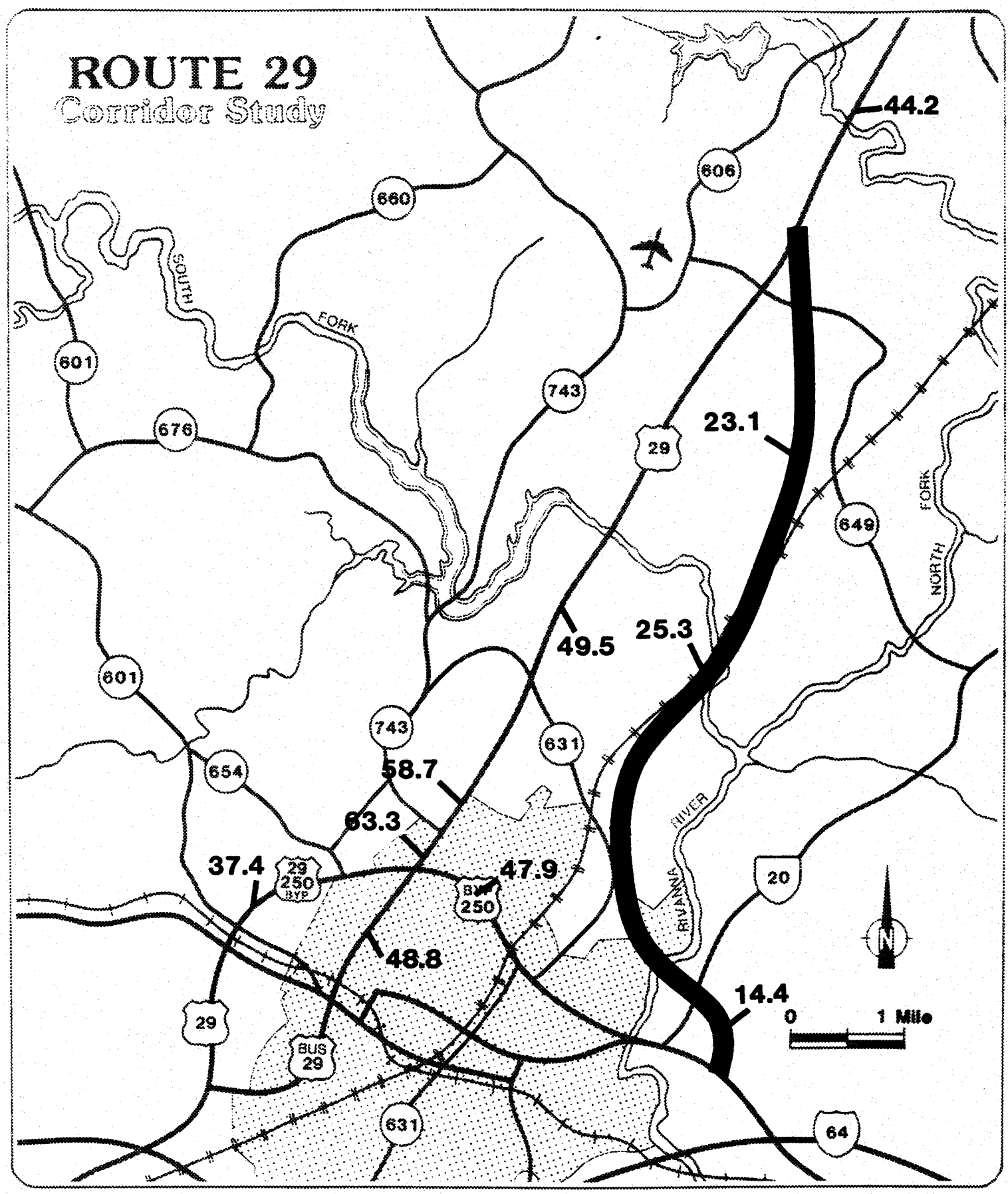
Alternative 6B. This alternative functions as an eastern bypass along with Meadowcreek Parkway. It is estimated to carry between 5,000 and 22,300 vpd in 2010 (Figure IV-3). The middle segment of this alternative, which runs parallel to Meadowcreek Parkway, carries the minimum traffic (around 5,000 vpd). Compared to the Base Case traffic on Route 29 in 2010, Alternative 6B would draw nearly 2,000 vpd from the segment north of Route 250 Bypass. This small reduction in Route 29 traffic will produce an insignificant impact on the operating conditions of the five intersections identified as critical (LOS F) under the Base Case.

Alternative 7. This alternative is an eastern bypass that overlaps the proposed alignment for Meadowcreek Parkway and terminates at Nelson Drive on McIntire Road. The traffic forecasts along this facility vary between 23,200 and 36,400 vpd in 2010 (Figure IV-4). The most travelled part of this alternative is the southern segment, which runs parallel to Rio Road and diverts significant traffic from it. In general, the impact of Alternative 7 on Route 29 traffic will be minor and of slightly higher magnitude than other eastern alignments (Alternatives 6, 6B and 7A). Most of the critical intersections north of the Route 250 Bypass will continue to be at LOS F during peak hours (except Woodbrook Drive in the p.m. peak).

Alternative 7A. This alternative is nearly identical to Alternative 7, but carries slightly less traffic due to its termination at the intersection of Route 250 and McIntire Road (Figure IV-5). Traffic destined to the central city finds Alternative 7 slightly more attractive compared to this alternative. Again, the construction of Alternative 7A will have only a minor impact on Route 29 traffic as shown in Table IV-2. The intersection LOS analysis indicates that the five critical intersections will still operate at LOS F, except for the p.m. peak period at Woodbrook Drive.

Alternative 9. This is an urban expressway with four "express" lanes and six parallel service lanes running along the existing alignment of Route 29. Being a high quality design (60 miles per hour), this alternative attracts even those who would use Meadowcreek Parkway under other Candidate Build Alternatives. The end result is that it carries the maximum traffic compared to other alternatives. Traffic forecasts along the express lanes vary between 19,600 and 35,500 vpd (Figure IV-6). Similarly, traffic in the service lanes is predicted to be in a range of 26,400 to 55,600.

The intersection LOS analysis suggests that the express lanes will operate at acceptable levels of service but severe traffic congestion is anticipated at several intersections of the

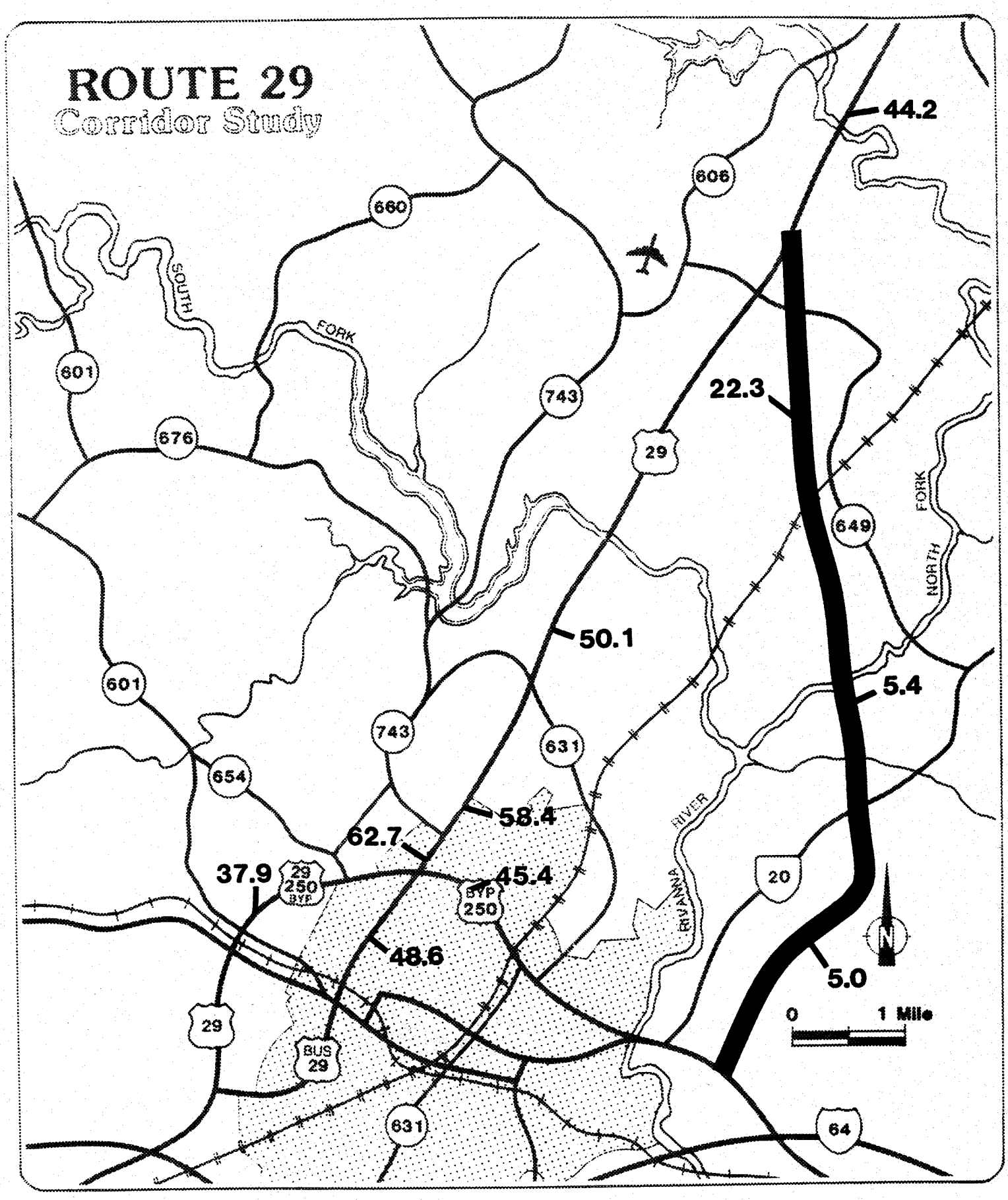


Alternative 6

00.0 AADT (Thousands)

Alternative 6 2010 Traffic

Figure No. IV-2

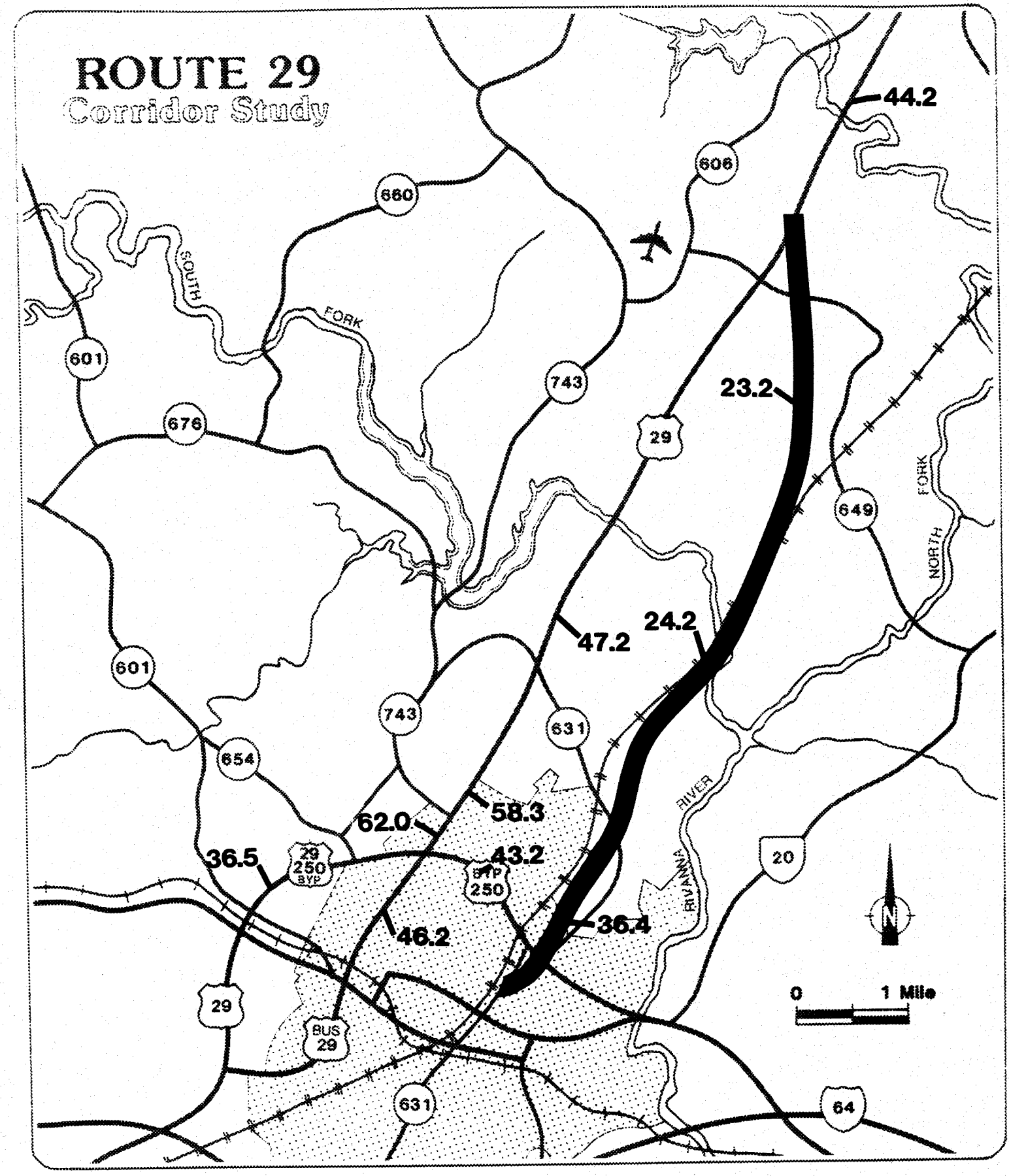


Alternative 6B

00.0 AADT (Thousands)

Alternative 6B 2010 Traffic

Figure No. IV-3

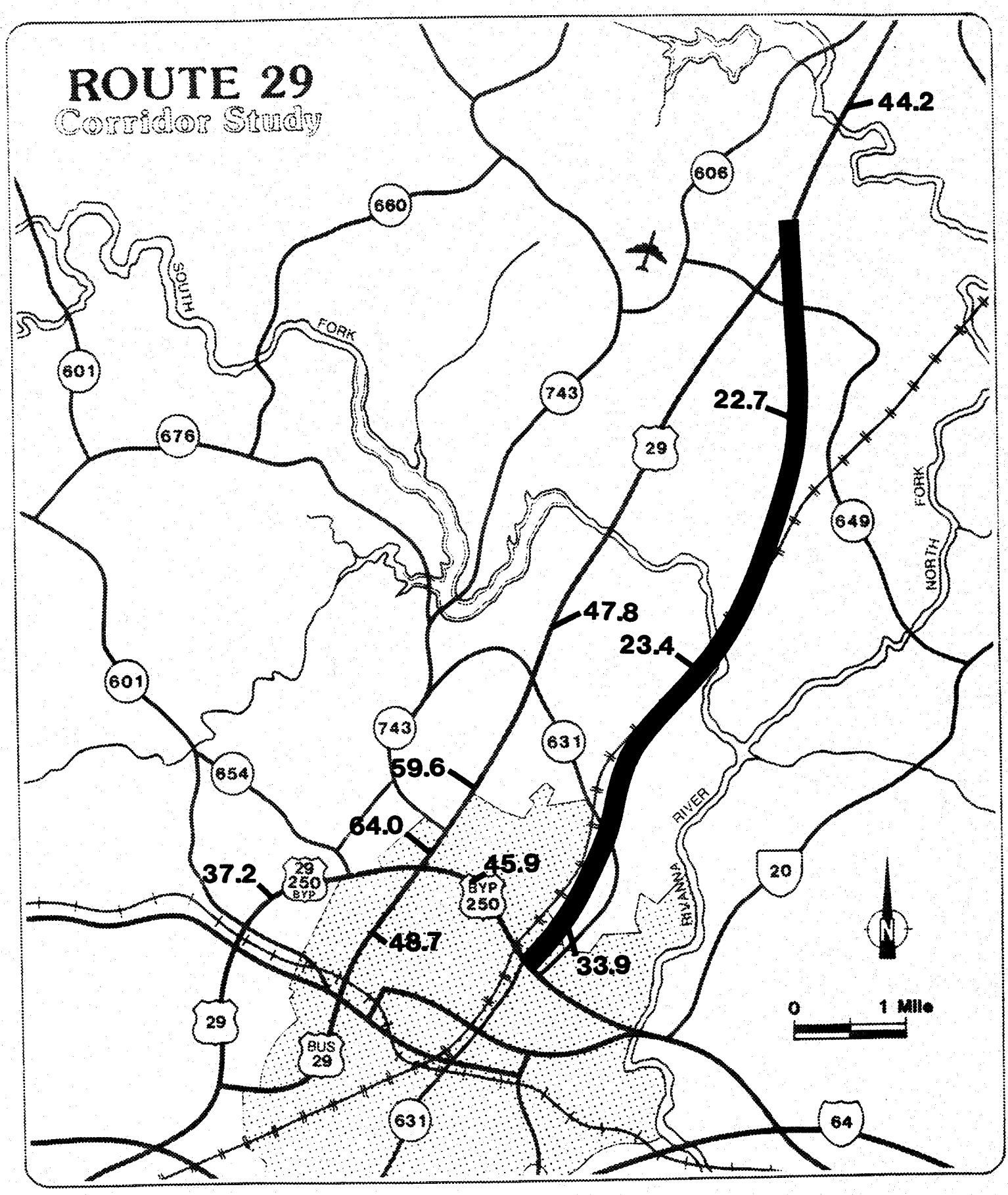


Alternative 7

00.0 AADT (Thousands)

Alternative 7 2010 Traffic

Figure No. IV-4

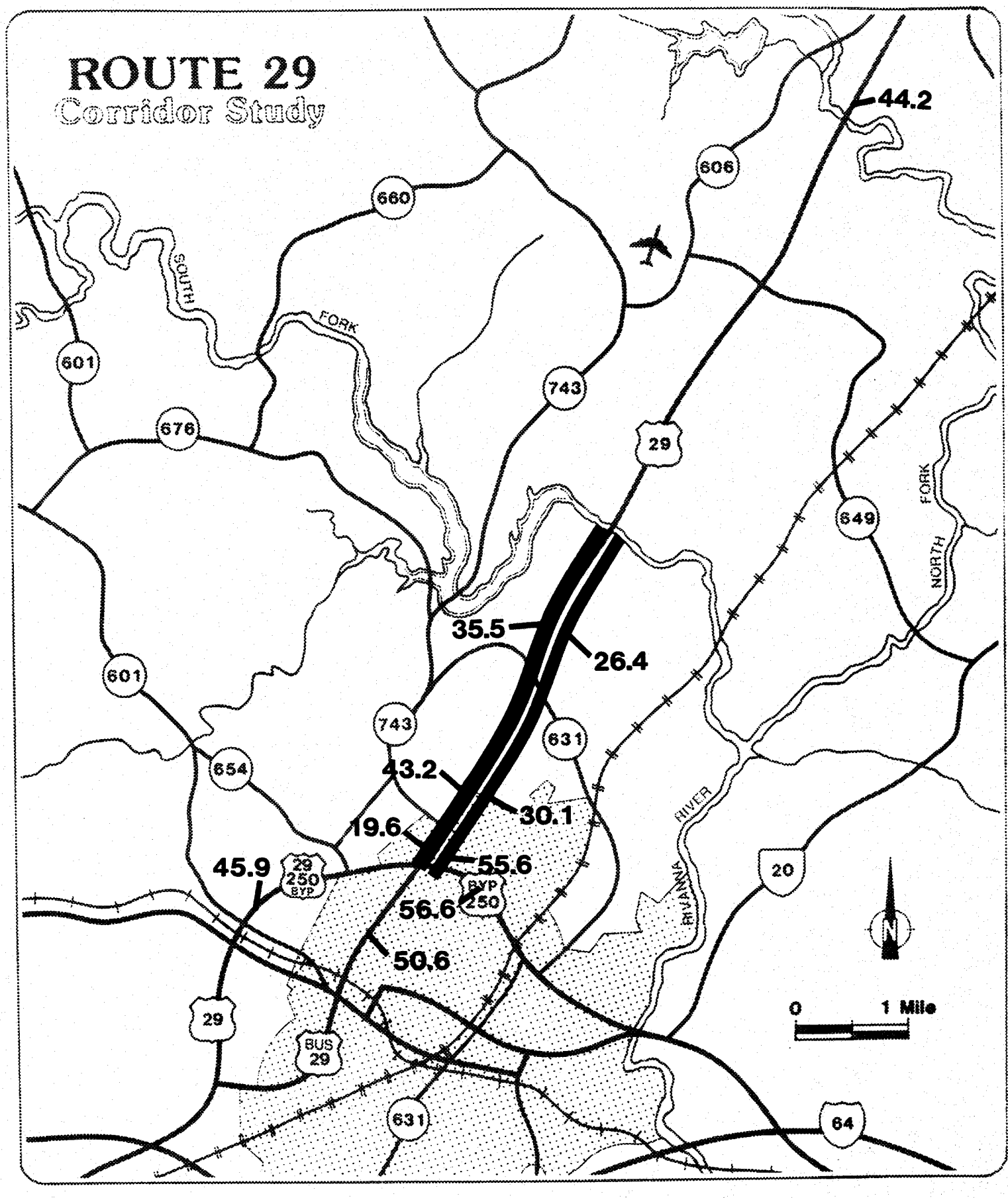


Alternative 7A

00.0 AADT (Thousands)

Alternative 7A 2010 Traffic

Figure No. IV-5



Expressway

Route 29 Service Roads

00.0 AADT (Thousands)

Alternative 9 (Expressway)
2010 Traffic

Figure No. IV-6

service roads and cross streets. The three at-grade intersections, Rio Road, Greenbrier Drive and Hydraulic Road, will operate at LOS F during peak hours. With the addition of through lanes on the service roads, the Greenbrier Drive intersection is found to attain LOS B during peaks but the intersections of Rio Road and Hydraulic Road maintain LOS F in the evening peak.

Alternative 10. This inner western bypass of Route 29 will carry between 17,400 and 17,900 vpd in 2010 (Figure IV-7). With Meadowcreek Parkway in the east, this alternative will produce the greatest impact on Route 29 in terms of the magnitude of traffic reduced. Construction of Alternative 10 will decrease by almost 11,000 vpd the traffic in the segment of Route 29 between Rio Road and Hydraulic Road. This reduction in traffic volume represents nearly 18 percent of the Base Case traffic. In spite of the reduction in trips along Route 29, the critical intersections continue to operate at unacceptable levels of service.

Alternative 11. This alternative western bypass will carry between 12,200 and 19,300 vpd in 2010 (Figure IV-8). It would have somewhat less impact than Alternative 10 on Route 29, as shown in Table IV-1. The reduction in traffic does not improve operations of the critical intersections.

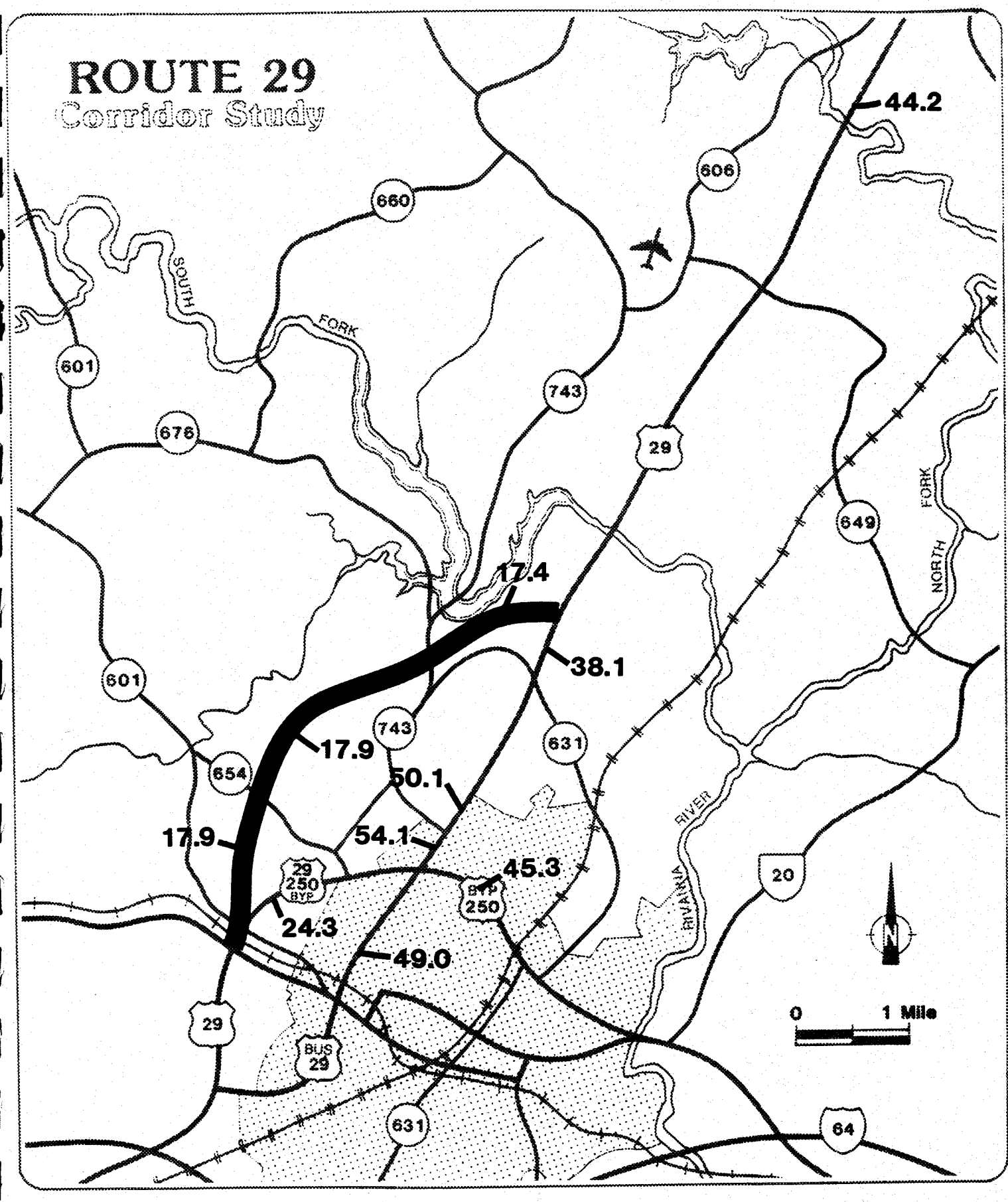
Alternative 12. This will be the longest and outermost western alignment. It is expected to service between 9,500 and 15,100 vpd (Figure IV-9). Compared to eastern alternatives, it would be more effective in decreasing Route 29 traffic. Alternative 12 will produce less impact on Route 29 than either Alternatives 10 or 11. As with other alternatives, the critical intersections do not exhibit LOS better than F except in the case of Woodbrook Drive.

Further analysis how the intersections along Route 29 would perform if they were made grade-separated interchanges by the year 2010. The arterial LOS was calculated for Route 29 between the Route 250 Bypass and Woodbrook Drive both with and without grade separated intersections. The procedures of the Urban and Suburban Arterial analysis technique as prescribed by the Highway Capacity Manual (1985) were applied. Several technical assumptions were made including the exclusion of Berkmar Drive, Dominion Drive and Seminole Drive from the analysis. The analysis was done for the direction carrying the maximum traffic during peak.

Table IV-3 shows the arterial LOS estimated for each alternative under consideration. The addition of grade-separated interchanges to the Base Case along Route 29 improves the northbound evening peak period LOS from F to A or B depending upon the alternative considered. The Base Case alone, with interchanges, would also improve the LOS from F to B in the year 2010.

B. SOCIO-ECONOMIC IMPACTS

Among the socio-economic impacts of the Candidate Build Alternatives would be the displacements resulting from acquisition of right-of-way for the highway facility. Also

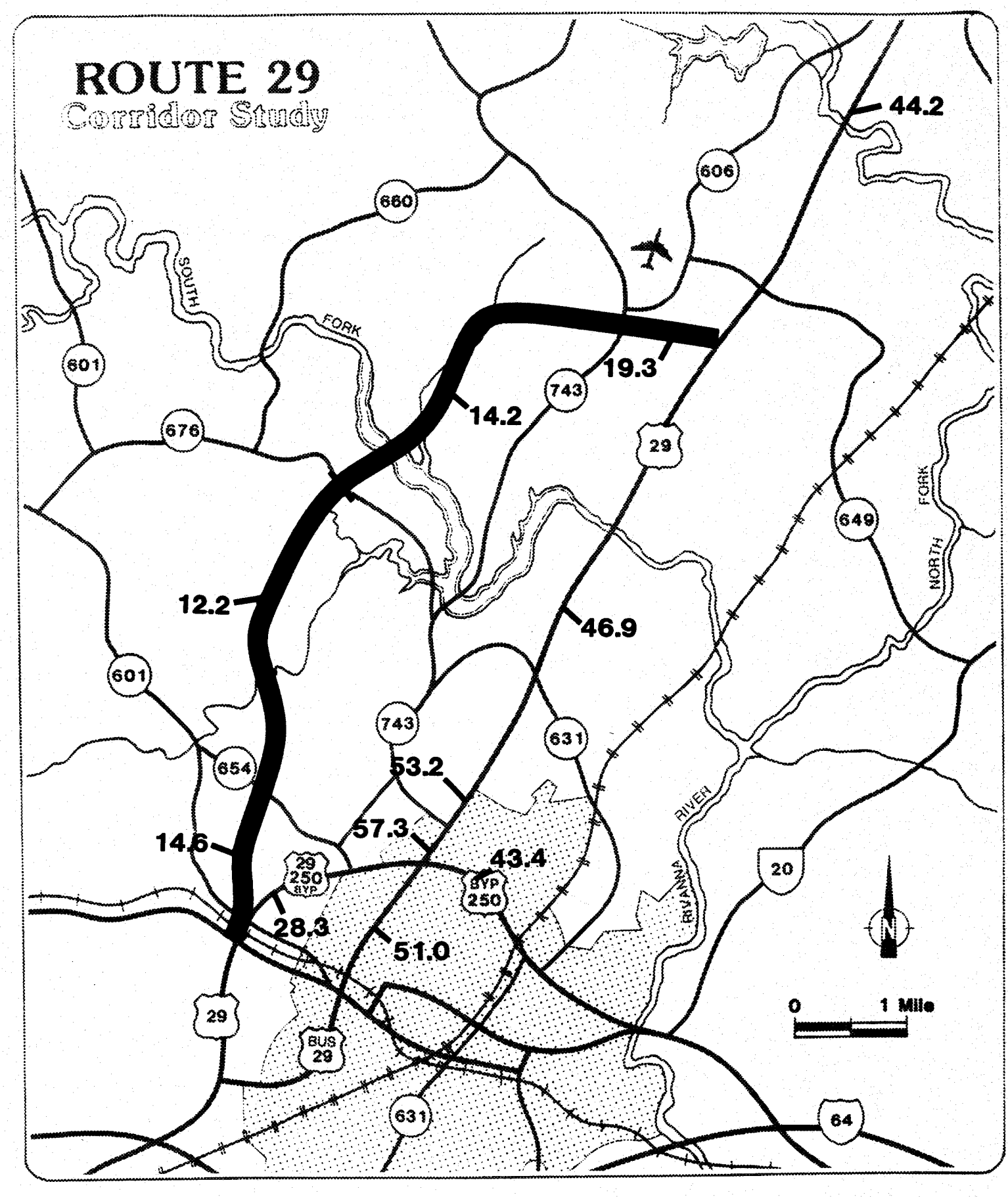


Alternative 10

00.0 AADT (Thousands)

Alternative 10 2010 Traffic

Figure No. IV-7

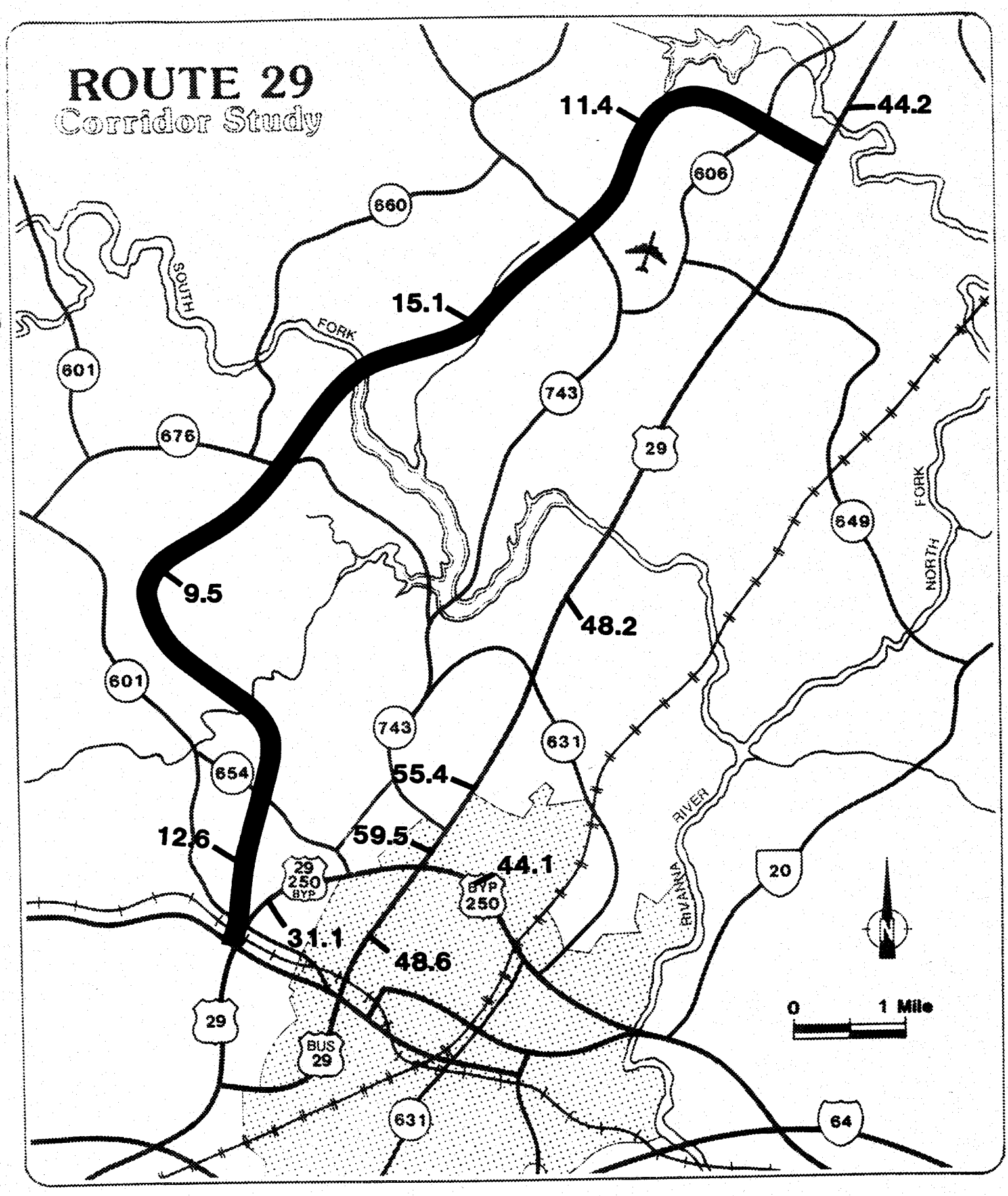


Alternative 11

00.0 AADT (Thousands)

Alternative 11 2010 Traffic

Figure No. IV-8



Alternative 12

00.0 AADT (Thousands)

Alternative 12 2010 Traffic

Figure No. IV-9

Table IV-3

ARTERIAL LOS ON ROUTE 29 NORTH

Alternative	Route 29 Configuration	
	All Intersections at Grade	Grade Separations at Rio, Hydraulic, Greenbrier
1987 Base	B (24 mph)	---
2010 Base	F (<10 MPH)	B (30 mph)
Alt. 6	F (<10 mph)	B (29 mph)
Alt. 6B	F (<10 mph)	A (32 mph)
Alt. 7	F (<10 mph)	A (32 mph)
Alt. 7A	F (<10 mph)	A (31 mph)
Alt. 9 (Service Lanes)	F (<10 mph)	---
Alt. 10	F (<10 mph)	A (33 mph)
Alt. 11	F (<10 mph)	A (33 mph)
Alt. 12	F (<10 mph)	A (33 mph)

considered are other impacts on property values, taxes, land use, residential communities and community facilities.

1. Relocations

a. Existing Conditions

Depending on the Candidate Build Alternative considered, this project will require the displacement of families, businesses and a nonprofit organization (NPO). No farms will be displaced. Some farm land will be impacted and on one alternative, two support units of another NPO will be displaced. These impacts will be discussed in the appropriate alternative sections. Table IV-4 summarizes the displacement impacts.

The information contained in this section is based on the Stage 1 Relocation Assistance Report prepared by VDOT in February and March, 1990. The field review was conducted without contacting any of the potential displacees. Contacts were made with local realtors and other appropriate representatives of the area.

The following information is applicable to displacees on any given alternative. It is estimated that five to ten percent of the families to be displaced are minorities or members of various ethnic groups. No handicapped or elderly persons were readily identified in the study. No areas of low income families were readily identified. It is estimated that the range of income for the families to be displaced is from $20,000 to $60,000. The size of the families is estimated to range from one to five persons. The estimated value of the homes for owner-occupant families is $50,000 to $500,000, and the estimated rental rates for tenant-occupant families is $300 to $800 per month.

The businesses being displaced range from small local operations with two to five employees to large commercial retail firms with 10 to 25 employees. Some of the businesses are newly established while others have been in their present locations for some time. All of the businesses appear to be owner-occupant.

Alternative 6. This alternative would displace 40 families and one business. The 40 families displaced by Alternative 6 include 39 owners and one tenant. Eighteen of the homes are single-family dwellings and 22 are townhouses. The houses are all in good condition and have about three to five occupants each. Most families are estimated to be in the middle income range of $30,000 to $60,000. The tenure of the displacees is estimated to be five to 10 years. The business is a real estate development firm located along Route 250 in the Pantops area. It appears that the business may not have adequate residue to relocate on.

Alternative 6B. This alternative would displace 33 families and one business. The 33 families include 31 owners and two tenants. Twenty-nine of the houses are single family dwellings and four are townhouses. All are in good condition and have about three to five occupants. Most families are estimated to be in the income range of $30,000 to $60,000

TABLE IV-4

RELOCATION IMPACTS

Alternative	Families			Businesses			Non-Profit Organizations
	Owner	Tenant	Total	Owner	Tenant	Total	
6	39	1	40	1	0	1	0
6B	31	2	33	1	0	1	0
7	31	20	51	2	0	2	1
7A	26	1	27	1	0	1	0
9	0	0	0	7	0	7	0
10	14	1	15	5	0	5	0
11	13	0	13	0	0	0	0
12	19	0	19	2	0	2	0

Notes: No farms will be displaced by any alternative.

Two University of Virginia support units will be displaced by Alternatives 10, 11 and 12.

Source: VDOT Stage 1 Relocation Reports, February and March 1990

with a tenure of five to 10 years. The business is the same real estate development firm that would be relocated with Alternative 6. This business may not have adequate residue to relocate and may be required to purchase, build or lease replacement facilities at other locations.

Alternative 7. This alternative would displace 51 families, two businesses and one non-profit organization. Twenty-four of the family units displaced by this alternative are located along the southern portion of the alternative, in the City of Charlottesville. Five of these families are owners of single-family homes, one appears to be a tenant of a single-family house, and 18 live in rented apartments. The owner occupied houses appear to be in good condition and the tenant-occupied house appears in poor condition. The families have about two to four members and an estimated income range of $20,000 to $30,000. The tenure of the displacees is estimated to be five to 20 years. The businesses are an electronics firm in Charlottesville and a plumbing firm in Albemarle County. The non-profit organization is the Charlottesville-Albemarle Rescue Squad. It appears that the businesses and non-profit organization being affected may not have adequate residue to relocate upon. Therefore they may be required to purchase, rebuild, or lease replacement facilities at other locations.

For the portion of Alternative 7 located in Albemarle County, there are 27 family units that would be relocated. Twenty-six appear to be owners and one a tenant. Fifteen of the units are single family dwellings and 12 are townhouses. All appear to be in good condition. The average family size is estimated to be three to five members and family income is estimated to be in the middle income range of $30,000 to $60,000. The tenure of the displacees is estimated to be five to 10 years.

Alternative 7A. This alternative would displace 27 families, and one business. None of the relocations are in the City of Charlottesville portion of this alternative. The business is the plumbing firm described under Alternative 7. The families to be relocated are identical to those in the Albemarle County section of Alternative 7, discussed in the previous section.

Alternative 9. The Expressway Alternative would displace seven businesses. The businesses include a bank, a realty firm, a restaurant, an oil change business, a car rental agency, a service station/convenience store, and one commercial building that was empty at the time the relocation report was prepared. It is estimated that each displaced business employs between five and 25 persons. The tenure of the displaced businesses is estimated to be five to 20 years. It appears that the businesses being affected may not have adequate residue to relocate upon.

Alternative 10. This alternative would displace 15 families, five businesses and two support units of the University of Virginia. Fourteen of the families are owners and one is a tenant. The support units are located near the southern end of this alternative in the section that is common to Alternative 10, 11 and 12. The support units are both a part of the University of Virginia. One is the University Police Headquarters and the other is the University Printing Services.

Along the portion of Alternative 10 north of this common section, there are 15 families to be relocated and five businesses. Fourteen of the residential relocations appear to be owner occupied and one tenant occupied. All of the residential displacements are single-family houses, with about three to five occupants each. The houses appear to be in fair to good condition. Family incomes are probably in the middle-income range of $30,000 to $60,000 and estimated tenure of the displacees is five to 10 years. The five businesses to be relocated are along Route 29 north. They include an animal hospital, a Lowes retail store, two large furniture stores, and an antique store. It appears that the businesses being affected may not have adequate residue to relocate upon.

Alternative 11. This alternative would displace 13 families and two support units of the University of Virginia. All of the families are owners. The support units are in the common section of Alternatives 10, 11, and 12 and were discussed in the preceding section.

The remaining section of Alternative 12 would displace 13 families, all of them in owner-occupied single-family homes, with about three to five occupants each. Eleven of the houses appear to be in excellent condition and two appear to be in fair condition.

Alternative 12. This alternative would displace 19 families, two businesses and two support units of the University of Virginia. All of the families are owners. The support units are located along the common section of Alternatives 10, 11, and 12 and are described under "Alternative 10" above.

For the rest of Alternative 12 there would be two business and 19 residential displacements. The 19 family displacees in the non-common section of Alternative 12 are all owner-occupied single-family residences, in fair to good condition. Each has an estimated three to five occupants. Family incomes are in the middle income range of $30,000 to $60,000 and the estimated tenure of the displacees is five to 10 years. The businesses are a fabric store and a mini-storage business along Route 29. It appears that the businesses being affected may not have adequate residue to relocate upon.

b. Relocation Plan

Contacts with local realtors and review of local newspapers indicate there is an active housing market with sufficient decent, safe, and sanitary housing available to accomplish an orderly relocation plan. Housing for sale ranges in price from $55,000 to $325,000 while rental units are available from $430 to $1000 per month. All available sales and rentals have one to five bedrooms. In addition there are homesites available for new construction.

Some owners of impacted houses may have sufficient residue to move their existing house onto or construct new. In the event that minority or other ethnic group, handicapped, low-income, or large family displacees are identified at the time of acquisition, VDOT will work closely with each family to ensure that an orderly and satisfactory relocation is accomplished. In the event housing of last resort is needed, assurance is given that it can and will be used.

Local realtors also indicate there is an active commercial and industrial market. Improved and unimproved sites are available. In the event rental sites are needed, there is market activity in this area also. Every effort will be made to work with displaced businesses, especially those that have strong community ties and reliance, to assist them in relocating in their respective localized areas. It is felt that all businesses can be relocated in an orderly and satisfactory manner.

If the two identified support units of the University of Virginia (UVa) are displaced, it is felt that their relocation can be accomplished satisfactorily. Indications are that these units can probably be relocated on UVa property. Should the rescue squad be displaced, every effort will be made to ensure its relocation is appropriate to its service and service area. Close coordination will be maintained to minimize any disruption to services that these units provide.

All housing and other replacement sites will be fair and open without discrimination. The acquisition of right-of-way and relocation of displacees will be in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

2. Economic Impacts

a. Employment

The businesses taken by the alternatives are expected to be able to relocate in the area and there would be no long-term loss of employment. With estimated construction costs ranging from $69 million to $172 million, the construction of each of the Candidate Build Alternatives would result in the employment of considerable numbers of people. The purchase of supplies and materials would indirectly result in additional employment by the suppliers. Secondary impacts of these employed persons and suppliers spending money on goods and services would have a multiplier effect on the economy.

If the unemployment rate in the Charlottesville area were to remain at its present low levels, most of the construction workers for the project would come from out of the immediate area. This could benefit areas of Virginia and nearby portions of West Virginia that have high unemployment.

b. Property Values and Taxes

Each of the Candidate Build Alternatives would have a direct impact on property tax revenue to Charlottesville and/or Albemarle County because of the removal of property from the tax base. The City of Charlottesville has an annual real property tax rate of $1.13 per $100 of assessed value and Albemarle County has a rate of $0.72 per $100. Table IV-5

TABLE IV-5

ANNUAL LOSS IN PROPERTY TAX REVENUES

Alternative	Tax Revenue Loss		
	Albemarle	Charlottesville	Total
6	$ 52,270	$ 0	$ 52,270
6B	49,658	0	49,658
7	39,662	37,575	77,237
7A	39,662	5,650	45,312
9	98,018	47,241	145,259
10	162,615	0	162,615
11	73,161	0	73,161
12	82,804	0	82,804

Source: VDOT Stage I Relocation Report, February and March 1990.

shows the initial loss in annual property tax revenue for each jurisdiction, as determined by the Stage I Relocation Report.

The value of the land would be lost permanently from the tax base. The value of the improvements on the land would represent only a temporary loss in tax revenue; because the project is not expected to cause any long-term regional changes in population or employment, the homes and businesses removed for construction of the project eventually would be replaced somewhere else in the area.

3. Land Use

Table IV-6 indicates the right-of-way requirements for each of the alternatives for various types of land uses.

Figure IV-10 shows the location of the Candidate Build Alternatives with respect to planned future land use. In several areas the alignments would impact planned developments or other areas where development is expected to occur.

On the east side, the common section of Alternatives 6, 6B, 7, and 7A would go through the planned Forest Lakes residential development. The road would not affect the initial phase of this project, currently under construction, but would impact later phases of this development and adjacent areas identified for residential development on county plans.

Alternatives 6, 7, and 7A would go through Dunlora, another large single-family residential development being planned. As of July 1, 1989, Dunlora had not received County subdivision approval. At the southern terminus at Route 250, both Alternatives 6 and 6B go through an area designated on County land use plans for low and medium density residential development. No subdivisions have been approved on this land.

On the west side, Alternative 10, near its intersection with Route 29 north, passes through an area designated for medium density residential and commercial uses. Alternative 11, at its northern terminus at Route 29, goes through an area designated for industrial development. Land required for these interchanges would take 30 to 40 acres away from these planned uses.

Alternative 12, near its interchange with Route 29, goes through land owned by the University of Virginia Real Estate Foundation, which is planning use of the site as a research and industrial park. This alternative would require the foundation to revise its plans for future phases of this development but would not affect the initial phase. Most of this property that the alternative goes through is not yet zoned and is not indicated on the County's Land Use Plan for this type of development.

Some residents have expressed the concern that the bypass alternatives would cause development in rural areas. It is true that alternatives in these areas could encourage additional residential development, but this development could be restricted to densities

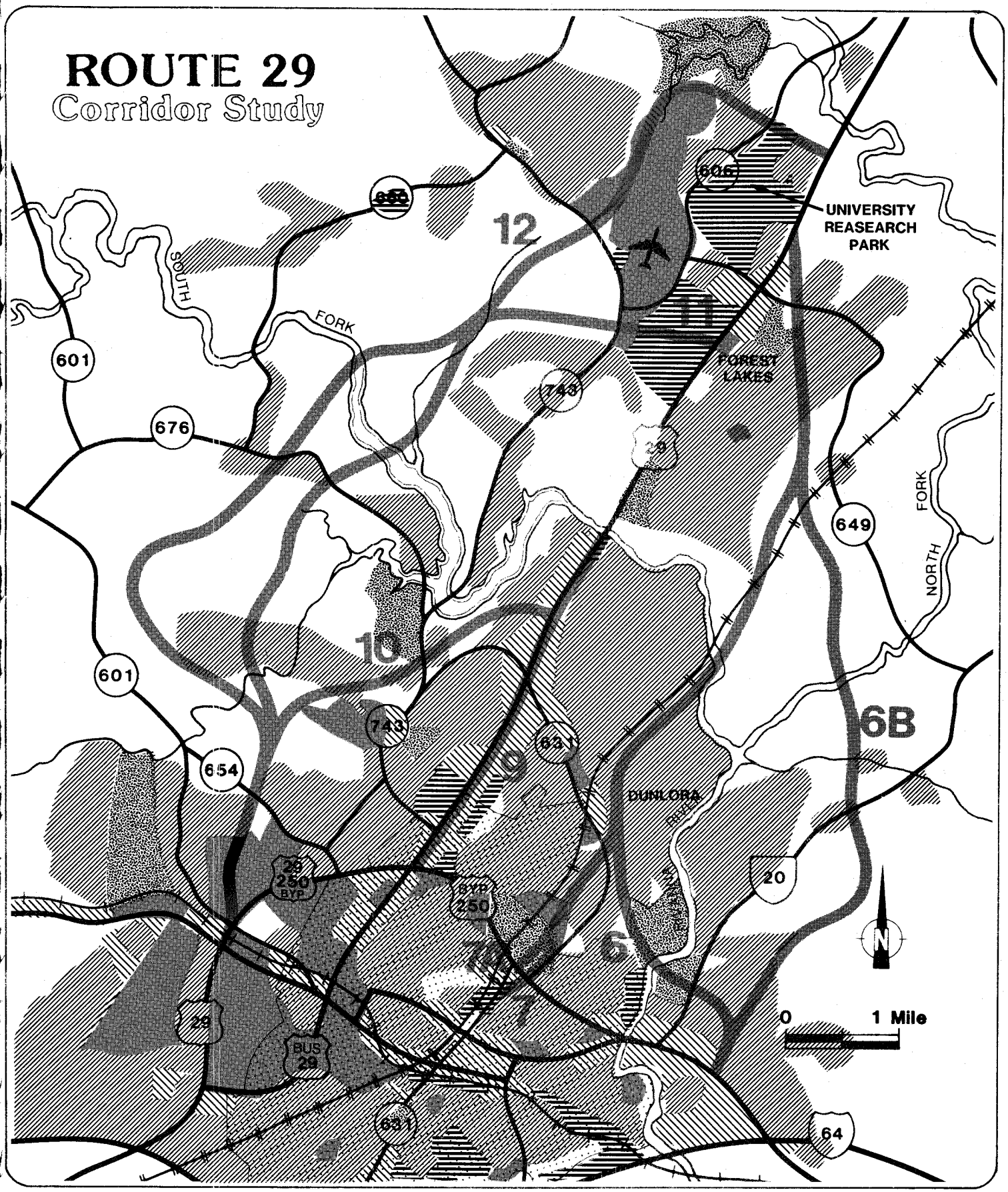
TABLE IV-6

LAND USE IMPACTS BY ALTERNATIVES

Alternative	Acres of Land			
	Residential	Commercial	Industrial	Total
6	341	32	0	373
6B	388	32	0	420
7	302	9	0	311
7A	297	9	0	306
9	0	23	1	24
10	288	33	4	325
11	471	2	0	473
12	495	2	3	500

Note: Numbers reflect total acquisition including remnants and land-locked parcels.

Source: VDOT Stage I Relocation Report, February and March 1990.



- AGRICULTURAL AND OPEN
- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- PUBLIC AND SEMI-PUBLIC
- PARKS AND RECREATION

Future Land Use Impacts

Figure No. **IV-10**

permitted under existing zoning and land use regulations. Highway facilities are only one of the factors influencing development patterns. If the County restricts utilities and enforces land-use regulations in these areas, it should be able to prevent unwanted commercial development and to limit the amount and density of residential development.

4. Community Cohesion

Impacts of the project alternatives on community cohesion can include the taking of land and homes, physical or psychological barriers dividing a community, or disruption of access within a community. The following paragraphs describe the community cohesion impacts of each of the Candidate Build Alternatives. (The No Build Alternative would have no direct impacts on residential communities.) The locations of the communities were shown in Figure III-5.

a. Alternative 6

Alternative 6 at its southern end begins at Route 250 in the Pantops area, a mostly commercial district. It passes through two parks, then would go through and divide the Pen Park subdivision. It would cut off a corner of Riverrun, but would not divide this new townhouse development. Alternative 6 then passes through Dunlora, a large new single-family development planned north of Rio Road. It traverses one edge of this community but would not divide it. However, it would cross above one of two planned access roads into Dunlora and would eliminate the other. The alternative takes a small portion of Northfields but across a set of railroad tracks from the residential area of this subdivision.

Farther north, the alternative traverses the edge of Bentivar, taking the back portion of several long lots but not dividing this subdivision or crossing its access road. It does go through Forest Lakes and would divide this large planned residential development. It would not affect Phase I of Forest Lakes, the only part approved and under construction. At its northern terminus, the interchange is located entirely on the east side of Route 29 and would not directly impact any residential communities.

b. Alternative 6B

Alternative 6B has the same southern terminus as Alternative 6. It soon diverges and goes through the Franklin subdivision, crossing over Franklin Drive where it would establish a visual barrier between several homes at the end of the cul-de-sac and the rest of the subdivision. The alternative then goes through Ridgemont subdivision, but it would only separate areas with their own entrances from Route 20. The alternative goes across an undeveloped corner of Redbud subdivision. North of Bentivar, Alternative 6B rejoins Alternative 6, and would have identical impacts in that northern section. This alternative was developed to avoid the impacts upon Pen Park and Rivanna Park.

c. Alternative 7

The southern terminus of Alternative 7 is at McIntire Road south of Route 250. This alternative would take several houses in one corner of the City's North Downtown neighborhood, but it would not divide this neighborhood. Across McIntire Road from the terminus is the Harris Street neighborhood, which would be affected by street relocations for this alternative. North of Route 250, Alternative 7 goes along an edge of the Locust Grove neighborhood. It would separate this neighborhood from McIntire Park, but would not otherwise divide the neighborhood.

Alternative 7 then goes into Albemarle County. It cuts across a corner of Stonehenge subdivision, where it would take some new townhouses, and across an undeveloped corner of Village Square subdivision. Alternative 7 then joins Alternative 6 in the proposed Dunlora development. It would have similar impacts upon Dunlora and identical impacts to Alternative 6 north of this point. This alternative was developed to avoid impacts upon McIntire Park. From just north of the park to the northern terminus of Route 29, Alternative 7 is identical to Alternative 7A.

d. Alternative 7A

The southern terminus of Alternative 7A is an at-grade intersection at the intersection of Route 250 Bypass and McIntire Road. This is the dividing point among three City neighborhoods, Harris Street, North Downtown and Locust Grove. The alternative goes through the edge of McIntire Park, but it would not otherwise divide the Locust Grove neighborhood. It then joins Alternative 7, and would have the same impacts as Alternative 7 for the rest of its length.

e. Alternative 9

Alternative 9 is the Expressway Alternative. It follows the alignment of existing Route 29 and therefore does not sever any residential communities. The northern section of the Expressway would pass near Woodbrook and Carrsbrook. Though it would not directly impact either neighborhood it would alter access to those neighborhoods.

f. Alternative 10

At its southern terminus with Routes 29 and 250, Alternative 10 begins near the Belair subdivision, where relocation of other roads would take a small amount of land. It traverses the edge of the Montvue subdivision. While it takes property, it was located so it would not divide the neighborhood or cross any subdivision streets.

Alternative 10 then curves to the south of Ivy Farm (the portion of this subdivision east of Ivy Creek) and Ivy Ridge. It passes between these subdivisions and the County schools complex comprising Mary Greer Elementary School, Jack Jouett Middle School and Albemarle High School. By separating this community from its neighborhood schools, this alternative could be seen as having a negative effect on community cohesion, although access is maintained to each of these school facilities.

Alternative 10 then cuts across a portion of Roslyn Heights and Roslyn Ridge, two new subdivisions. The alternative goes by the far end of the cul-de-sac of Roslyn Heights. It cuts across Roslyn Ridge near the entrance to the subdivision; it would pass under the subdivision road, though it would not divide the subdivision.

The right of way for the interchange with Route 743 would take a portion of Squirrel Ridge. The alternative has been located to minimize the extent of possible impacts upon the Squirrel Ridge neighborhood.

Finally, the interchange of Alternative 10 with Route 29 north is located near Woodbrook and Carrsbrook. The interchange has been designed so that all of the interchange ramps would be constructed on the west side of Route 29 and would not directly impact either of these neighborhoods east of Route 29, though street relocations would affect both neighborhoods.

g. Alternative 11

Alternative 11 has the same southern terminus and follows nearly the same alignment as Alternative 10 past Colthurst Farm and Montvue. It then passes through the Ivy Farm subdivision, crossing Ivy Farm Drive just west of Wingfield Road. This alternative has been located to minimize the number of houses taken. The new road would be designed to pass under Ivy Farm Drive, which would help to reduce its effect as a visual barrier.

North of Ivy Farm, the alternative passes through the small subdivision of Wyngate. The interchange with Route 676 would take about half the houses of this subdivision. After crossing the South Fork Rivanna River Reservoir, Alternative 11 goes along the edge of three subdivisions--Ardwood, Clover Hill, and Ridgefield. It would take a small bit of property near the end of the cul-de-sacs of each of these subdivisions but would not take any houses or divide the subdivisions. The alignment takes from Hidden Hills subdivision a small piece of land along Route 743 for an interchange.

At its terminus at Route 29 north, the entire interchange is located on the west side of Route 29 so as not to directly affect any residential communities, though it would affect access roads to Hollymead and Forest Lakes.

h. Alternative 12

Like Alternative 11, this alternative follows nearly the same alignment as Alternative 10 from the 29/250 Bypass past Colthurst Farm and Montvue. It then curves to the west to go around Ivy Farm. Alternative 12 was developed specifically to avoid the impacts of Alternative 11 upon this neighborhood. Alternative 12 would take some property along the backs of a few deep lots next to Ivy Creek, but otherwise would not directly impact Ivy Farm.

For its interchange with Route 676, Alternative 11 would take a portion of Logan Village, a small subdivision, but it would not divide it. It would take a small piece of land but no homes from the Arbor Park subdivision. West of the airport, the alternative would take a part of the common area along the edge of the Earlysville Forest planned unit development, but it would not divide this community or cross any of its streets.

North of the airport, Alternative 12 goes through the middle of Lake Acres, crossing under both streets of this subdivision, Routes 850 and 606. This subdivision could not be avoided, since the airport is on one side of it and Chris Greene Lake on the other.

Alternative 12 has its terminus at Route 29 North, just south of the North Fork Rivanna River.

5. Impacts on Community Facilities

a. Fire, Rescue and Public Safety

Alternative 7 would displace the Charlottesville-Albemarle Rescue Squad located at Bypass Route 250 near McIntire Road. Alternatives 10, 11, and 12 would displace the University of Virginia Police Headquarters. Replacements for these facilities would be provided.

Because the new-location alternatives would not close any local roads, they should not increase response time of emergency vehicles or have an adverse impact on public safety. In fact, several of the alternatives could be expected to reduce time for emergency vehicles responding to some areas. Alternative 7A would improve access between the Albemarle County Police Headquarters and several parts of the County. Alternatives 7 and 7A would also improve access from Charlottesville Fire Station 1, located on Route 250 Bypass. Alternative 7A would terminate very close to the Charlottesville-Albemarle Rescue Squad, improving response by emergency medical service teams to much of the area.

Other alternatives would improve access by other fire companies. Alternative 10 would improve response by the Seminole Trail Volunteer Fire Department to areas to the southwest. Alternative 12 would improve access by the Earlysville Volunteer Fire Department, particularly to areas south of the South Fork Rivanna River.

With the Expressway Alternative, emergency vehicle response time to some locations along Route 29 could be increased because some of the existing U-turn opportunities would be eliminated. The average increase in driving distance from a point on one side to a point on the other would be about 440 feet. Assuming a speed of 30 mph, this would be an average increase in response time of 10 seconds for an emergency vehicle having to make a U-turn to respond to a call.

The longest additional distance that would need to be driven from any point to get to the other side of the Expressway is approximately 3,700 feet. At 30 mph, this would add 1.4 minutes to the response time.

b. Schools

Alternatives 10, 11, and 12 would displace two support facilities of the University of Virginia, the University Police Headquarters and the University Printing Services. These alternatives would also displace the headmaster's house at St. Anne's Belfield School, a private school, and separate an athletic field from other parts of the school grounds, although access to the field would be maintained. No other schools, public or private, would be relocated and no other school facilities would be taken by these alternatives.

Because none of the alternatives would require closing or relocating any public roads, they would not affect school bus routes and access to the schools.

Several of the alternatives come within one quarter mile of public or private schools. Some of these schools could experience indirect impacts from the project, principally from vehicle noise. (See Section F.)

Alternatives 6 and 7 pass within 1,000 feet of the Charlottesville-Albemarle Vocational Technical School on Rio Road. Alternatives 7 and 7A pass within 1,000 feet of the Covenant School, a private school on Route 250, and the southern terminus of 7A is about 600 feet from that school. Alternatives 7 and 7A also run adjacent to the Charlottesville High School athletic field on Melbourne Road at the Southern Railway tracks. Shifts were made in this alternative to avoid directly impacting this athletic complex.

The Expressway Alternative and the Base Case include reconstruction of Route 29 about 900 feet from Woodbrook Elementary School. Alternative 10 passes alongside the County schools complex that includes Albemarle High School, Jack Jouett Middle School and Mary Greer Elementary School. Shifts have been made to minimize any impacts to these schools. This alternative would require a small piece of this property (a wooded area on the edge of the property) but would not directly impact any of these schools. It would pass about 600 feet from Greer School and within 1,200 feet of Jouett School.

c. Parks and Recreation

Alternatives 6 and 7A require use of property from public parks as discussed in detail in Chapter VIII. Other alternatives pass near parks, causing noise impacts as discussed in Section F of this chapter.

Alternative 6 goes through both Pen Park (a City Park) and Rivanna Park (a new City-County park). It would take about 13 acres of Pen Park's 267 acres, and go through a nine-hole golf course there. The right-of-way would take about 18 acres of Rivanna Park's 111 acres, including parts of several ball diamonds there. Alternative 6B was developed as a separate alternative to avoid impacts upon Pen Park and Rivanna Park.

Alternative 7A passes along the edge of the City's McIntire Park, taking about 11 acres of this 143-acre facility, including a portion of a nine-hole golf course. Alternative 7 was developed to avoid McIntire Park. It passes to the east of the park and avoids any encroachment. From just north of the park to the northern terminus at Route 29, Alternative 7 is identical to 7A.

Other alternatives have been designed to avoid taking any part of the other public parks and recreation facilities within the project area. Alternatives 7 and 7A have been shifted to avoid the Charlottesville High School athletic field complex on Melbourne Road. Alternative 10 avoids Ivy Creek Natural Area, a 215-acre nature preserve owned jointly by the City and County. Alternative 12 passes to the south of Chris Greene Lake Park, a County park.

d. Churches, Cemeteries and Hospitals

None of the Candidate Build Alternatives would take or require the relocation of any existing churches. The interchange of Alternative 10 with Route 743 would take a portion of the property of the Church of Jesus Christ of Latter Day Saints and would likely require some changes to the access and parking for this church. The widening of Hydraulic Road would take property from Union Ridge Baptist Church on the east side of Hydraulic Road.

Alternative 11 would take a part of the property adjacent to Pleasant Grove Baptist Church on Route 743 south of the airport. The interchange with Route 743 has been designed as a partial cloverleaf to avoid this church and to adequately serve the traffic.

Alternatives 6, 6B, 7, and 7A pass close to the old Laurel Hill Baptist Church building along Route 649. This building is no longer being used as a church. The right-of-way for these alternatives would not take any of this property or the adjacent cemetery. Across Route 649 is the site of the planned new Maple Grove Christian Church. These alternatives likely would require relocation of this church site.

Alternative 12 goes just west of Ivy Creek United Methodist Church and the adjacent cemetery on Route 676, but would not impact this church property.

No major cemeteries would be impacted by any of the alternatives, though it is possible that some small family plots could be discovered during surveying and right-of-way acquisition. Alternative 11 has its northern terminus just opposite Holly Memorial Gardens. This interchange has been located entirely on the west side of Route 29 to avoid any taking of this cemetery. However, service roads and local access will require some alteration.

Both of the major hospitals in Charlottesville are located far from any of the alternatives and would not be impacted. Each of the alternatives would improve access from certain areas for vehicles traveling to these hospitals' emergency rooms.

e. Utilities

The new location alternatives are not expected to have a major impact on utilities. The number of above-ground and below-ground utility lines that would need to be relocated or adjusted for each alternative are considered in VDOT's Relocation Report. Utility relocation costs were summarized in Table II-4.

The Expressway Alternative would be expected to have a much greater impact on utilities in terms of the number and cost of utility relocations. It would be located entirely in a developed corridor, requiring the relocation of the main utility lines as well as the connections to the many businesses in the corridor.

Some citizen groups have expressed concern over the impact that Alternatives 11 and 12 might have on the South Fork Rivanna River Reservoir and on the quantity and quality of the water supply to the study area. These concerns are discussed in Sections H and L.

C. CULTURAL RESOURCES

An historic standing structures survey and an archeological survey were performed to determine potential impacts of the alternatives on cultural resources. These surveys were conducted in accordance with the National Historic Preservation Act of 1966, as amended (36CFR800.4), The Secretary of the Interior's Standards for Evaluation, and guidelines established by the Virginia Department of Historic Resources (VDHR). A Phase I Cultural Resource Report was prepared; in addition, Phase II significance evaluations were conducted for historic architectural resources determined potentially eligible for the National Register of Historic Places (NRHP).

The Phase I architectural survey included a literature search and a field survey of structures in a half-mile-wide corridor centered on the conceptual alternatives. This survey is reported in a separate technical memorandum.

During the spring of 1990, a Phase II architectural evaluation was conducted for properties in the vicinity of the Candidate Build Alternatives, in cooperation with VDHR. A presentation of the results of the evaluation was made to VDHR upon which VDHR made determination of eligibility and effect.

The properties determined by VDHR to be eligible for the NRHP along with two properties and one historic district previously determined eligible are listed in Table IV-7, and located as shown in Figure IV-11.

As shown in Table IV-7, seven of the properties on or eligible for the NRHP would be adversely affected by one or more of the Candidate Build Alternatives. Most of the effects would be visual effects only. None of the historic standing structures would be displaced, but two of the properties would have a portion of their land taken for the highway right-of-way--the Schlesinger Farm for Alternatives 11 and 12 and The Barracks for Alternative 11. These effects are described in the Section 4(f)/106 Evaluation, Chapter VIII. Should an alternative involving historic sites be selected, an appropriate Memorandum of Agreement (MOA) will be executed among the VDHR, FHWA, and VDOT in accordance with regulations implementing the Historic Preservation Act. The MOA will outine measures to be taken to minimize adverse effects to the properties. These measures will be developed in close coordination with VDHR.

2. Archaeology

The Phase I archaeological survey included shovel tests along the entire length of each of the new-location Candidate Build Alternatives. The shovel testing was done at 140-foot intervals staggered 72 feet on either side of the centerline. Additional testing was done at interchange locations. The Phase I survey revealed 38 sites within the rights of way of the Candidate Build Alternatives. Including previously recorded archaeological sites, this brings the number of sites within the rights of way to 58. Seventeen sites were recommended for Phase II investigations, including 10 prehistoric sites and seven historic sites. Prehistoric components range in date from the Late Archaic through the Late Woodland periods. Historic components date from the nineteenth and twentieth centuries.

Table IV-8 indicates the number of archaeological sites impacted by each alternative. The sites recommended for Phase II investigation are located as shown on Figure IV-11. Phase II investigations will be done on the selected alternative to fully evaluate the importance of the affected sites. Data recovery (if necessary) to avoid adverse effects will be done in close coordination with the VDHR.

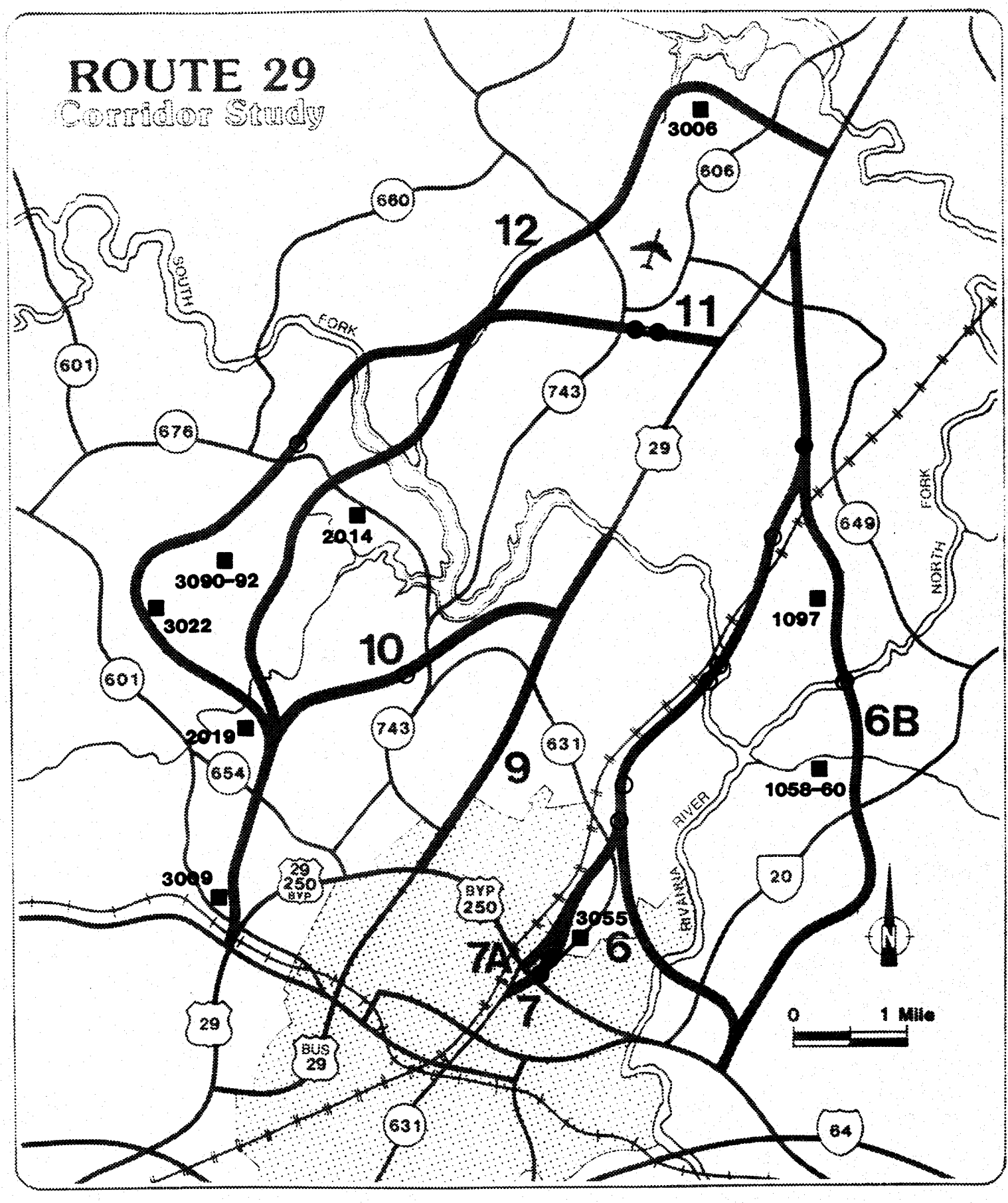
TABLE IV-7

STANDING STRUCTURES ON OR ELIGIBLE FOR NRHP (1)

Site No.	Name	Alternative	No Effect	No Adverse Effect	Adverse Effect	Comments
1058-60	Ridgeway Farm	6B			X	Visual effect only
1097	Red Hills Farm	6B			X	Visual effect only
2014	Woodlands (2)	11			X	Visual effect only
2019	Schlesinger Farm	10,11,12			X	Alt. 10 has visual effect only
3006	Crenshaw Farm	12			X	Visual effect only
3009	Westover	10,11,12		X		Visual effect only
3022	Chestnut Ridge	12			X	Visual effect only
3055	Cochran's Mill (2)	7,7A	X			
3090-92	The Barracks	11,12			X	Alt. 12 has visual effect only
-	Charlottesville Albemarle Courthouse Historic District (2)	7	X			

(1) Eligibility for the National Register of Historic Places as determined by Virginia Department of Historic Resources

(2) Already on or previously determined eligible for National Register of Historic Places.



■ HISTORIC STANDING STRUCTURES AFFECTED BY ALTERNATIVES

ARCHAEOLOGICAL SITES RECOMMENDED FOR PHASE II INVESTIGATIONS:

○ PREHISTORIC ● HISTORIC

Cultural Resources

Figure No. IV-11

TABLE IV-8

ARCHAEOLOGICAL SITES IMPACTED BY ALTERNATIVES*

Alternative	No. of Sites	Recommended for Phase II	
		Yes	No
6	15	6	9
6B	6	2	4
7	23	10	13
7A	16	6	10
10	2	1	1
11	9	2	7
12	5	1	4

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* Candidate Build Alternative locations as of September 1988.

D. VISUAL IMPACTS

The typical cross section for the new-location alternatives was shown in Figure II-3. At this stage in the analysis, a 300-foot wide right of way generally was assumed for all new location roadway segments. The new-location alternatives all pass through areas that are similar in character, with a mix of farms, wooded areas and low density residential developments. The view of the road will be a typical rural divided highway, with two travel lanes in each direction separated by a wide vegetated median. The view from the road will be a pleasant one of generally rolling terrain, with a variety of woods, farms, open fields, and residential areas.

Alternative 9 (the Expressway) goes through a developed suburban commercial area. Typical cross sections were shown in Figures II-4 and II-5. The facility would have a curb and gutter on each side of the service roads and concrete barriers separating slip ramps from the service roads. The narrow right of way, intended to reduce impacts on businesses along Route 29, would leave minimal room for landscaping. The view of the road will be a suburban arterial highway with express lanes in the center. Except at the southern end near Bypass 250, the expressway lanes would be depressed below cross streets. In most areas, the expressway lanes will be at a lower level than the at-grade service lanes alongside. This will be less visually intrusive than an elevated roadway. The view from the road will be of mixed commercial and industrial development, as currently exists on Route 29 north.

E. AIR QUALITY

1. Carbon Monoxide Analysis

The effects of the project alternatives on air quality were evaluated by analyzing carbon monoxide concentrations for a base year (1987), an interim year (2000), and the design year (2010). Carbon monoxide (CO), the predominant pollutant emitted by motor vehicles, is a stable gas which is generally found in highest concentrations near highways. Concentrations can be accurately predicted with computer models.

Concentrations of other pollutants with high correlations to motor vehicle emissions, such as nitrogen oxides and ozone, involve complex chemical reactions and atmospheric transport. There are no models available to accurately predict their concentrations at a microscale level. These pollutants must be analyzed on a large regional scale and are addressed at a system planning level as part of the State Implementation Plan. With the increasing use of unleaded gasoline and lower levels of lead in leaded gasoline, lead standards are not expected to be violated. Consequently, lead emissions have not been analyzed. Since motor vehicles contribute very little to regional levels of sulfur dioxide and particulates, they too have not been analyzed.

2. Receptor Sites

Potential "worst case" receptor sites for each alternative were selected for analysis as shown on Figure IV-12. The sites represent areas where the highest carbon monoxide concentrations could be expected and where the general public has access or where outdoor activities are likely to occur. In general, the sites are located near proposed right-of-way lines on roadway sections with highest peak-hour traffic volumes. Since parks and schools have a high degree of public use, several sites were selected in or near parks and school playgrounds near the alternatives.

3. Carbon Monoxide Concentrations

Table IV-9 shows the peak one-hour and eight-hour carbon monoxide concentrations under "worst case" conditions at the 11 analysis sites. In all cases, the one-hour concentrations include background of six parts per million and eight-hour concentrations include background of three parts per million. In comparing the concentrations in the table with the National Ambient Air Quality Standards of 35 parts per million for one hour and nine parts per million for eight hours, it can be seen that in no case will the NAAQS be violated. In fact, in all cases, CO concentrations will be well below the NAAQS.

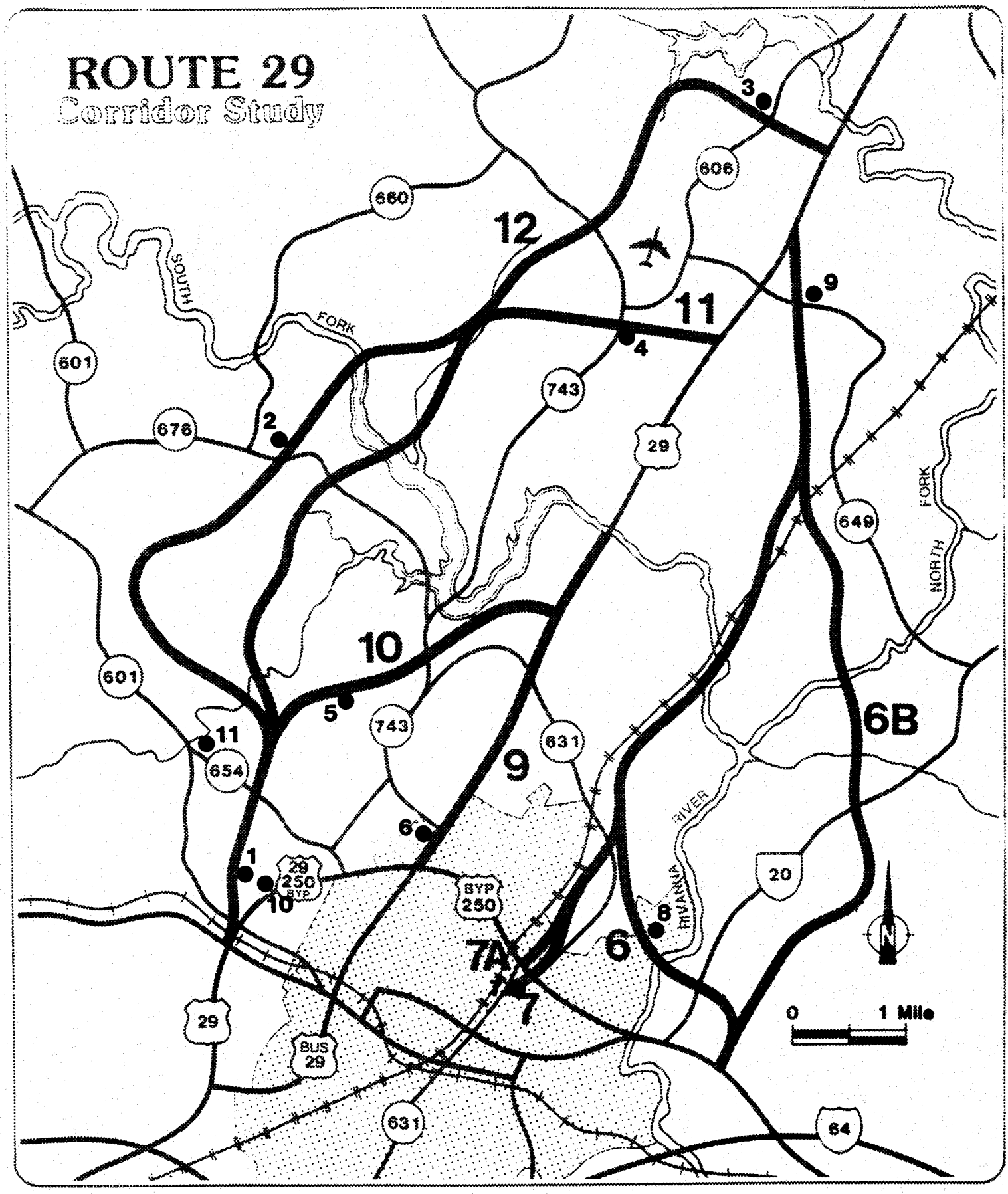
The analysis shows that the proposed bypass alternatives would have only slight effects on CO concentrations. Except at sites 4, 7, and 9, the bypass alternatives would increase CO levels only 0.1 parts per million above background levels. The higher levels at sites 4, 7, and 9 may be attributed to the added effects of traffic on existing roads. The maximum impact would occur at site 7, the McIntire Tennis Courts, where year 2010 build concentrations would increase over existing concentrations by 1.8 and 1.0 parts per million for one and eight hours respectively.

For site 6 on Alternative 9 (Expressway), year 2010 build concentrations would not be substantially higher than either existing or year 2010 no-build concentrations.

Secondary analysis sites represent areas not directly affected by the project alternatives. However, in some cases, implementation of a particular alternative could result in traffic volume increases on local roads that would not occur without that alternative. Sites 10 and 11 represent worst case secondary impact areas. As shown in the table, neither site would experience substantial air quality degradation as a result of implementation of any of the alternatives.

Sites 5, 7, and 8 represent school, outdoor recreation, and park areas. Site 5 at Greer Elementary School and site 8 representing Pen Park and Rivanna Park would experience only slight (0.1 parts per million) increases in CO concentrations. Site 7 at the McIntire Tennis Courts would experience greater increases; the resulting concentrations, however, would still be well below the NAAQS.

In view of the above, none of the alternatives will interfere with attainment or maintenance of the NAAQS. The State Implementation Plan contains no transportation control measures for this area. Therefore, except for construction procedures, the conformity requirements of 23 CFR 770 do not apply.



Carbon Monoxide Analysis Sites

Figure No. **IV-12**

TABLE IV-9

PEAK CARBON MONOXIDE CONCENTRATIONS (PARTS PER MILLION UNDER WORST CASE METEOROLOGICAL CONDITIONS)

Site#	Alternative	Year/Case	CO Concentrations Including Background	
			One Hour	Eight Hour
1	10, 11, 12	1987 Base	6.0	3.0
		2000 No-Build	6.0	3.0
		2000 Build	6.1	3.1
		2010 No-Build	6.0	3.0
		2010 Build	6.1	3.1
2	12	1987 Base	6.0	3.0
		2000 No-Build	6.0	3.0
		2000 Build	6.1	3.0
		2010 No-Build	6.0	3.0
		2010 Build	6.1	3.0
3	12	1987 Base	6.0	3.0
		2000 No-Build	6.0	3.0
		2000 Build	6.1	3.0
		2010 No-Build	6.0	3.0
		2010 Build	6.1	3.1
4	11	1987 Base	6.1	3.1
		2000 No-Build	6.2	3.1
		2000 Build	6.2	3.2
		2010 No-Build	6.2	3.1
		2010 Build	6.4	3.2
5	10	1987 Base	6.0	3.0
		2000 No-Build	6.0	3.0
		2000 Build	6.1	3.0
		2010 No-Build	6.0	3.0
		2010 Build	6.1	3.0
6	9	1987 Base	9.1	4.7
		2000 No-Build	8.8	4.5
		2000 Build	9.1	4.8
		2010 No-Build	9.1	4.7
		2010-Build	9.4	4.9

TABLE IV-9 (Cont.)

Site#	Alternative	Year/Case	One Hour	Eight Hour
7	7, 7A	1987 Base	9.3	4.9
		2000 No-Build	8.8	4.6
		2000 Build	9.8	5.2
		2010 No-Build	9.7	5.2
		2010-Build	11.1	5.9
8	6	1987 base	6.0	3.0
		2000 no-build	6.0	3.0
		2000 build	6.1	3.0
		2010 no-build	6.0	3.0
		2010-build	6.1	3.1
9	6B	1987 Base	6.3	3.2
		2000 No-Build	6.4	3.2
		2000 Build	6.5	3.3
		2010 No-Build	6.5	3.3
		2010-Build	6.7	3.4
10	9	1987 Base	7.3	3.7
		2000 No-Build	7.4	3.6
		2000 Build	7.5	3.8
		2010 No-Build	7.3	3.7
		2010-Build	7.6	3.9
11	10, 11, 12	1987 Base	6.5	3.3
		2000 No-Build	6.3	3.2
		2000 Build	6.4	3.2
		2010 No-Build	6.3	3.2
		2010-Build	6.5	3.3

F. NOISE

1. Study Procedures

Two types of traffic noise impacts are recognized. One occurs when predicted design-year build noise levels approach or exceed the noise abatement criteria. The other occurs when predicted design-year build noise levels substantially exceed existing noise levels. Under current Virginia Department of Transportation policy approved by the Federal Highway Administration, a substantial increase is defined as an increase of 10 decibels or more.

Noise sensitive areas along each alternative were divided into study areas that would experience relatively uniform noise conditions based on changes in traffic volumes, land use, and roadway configurations. Each study area is represented by the noise-sensitive receptor site (usually a building) within that area which is closest to the roadway and would, therefore, experience the greatest noise impact.

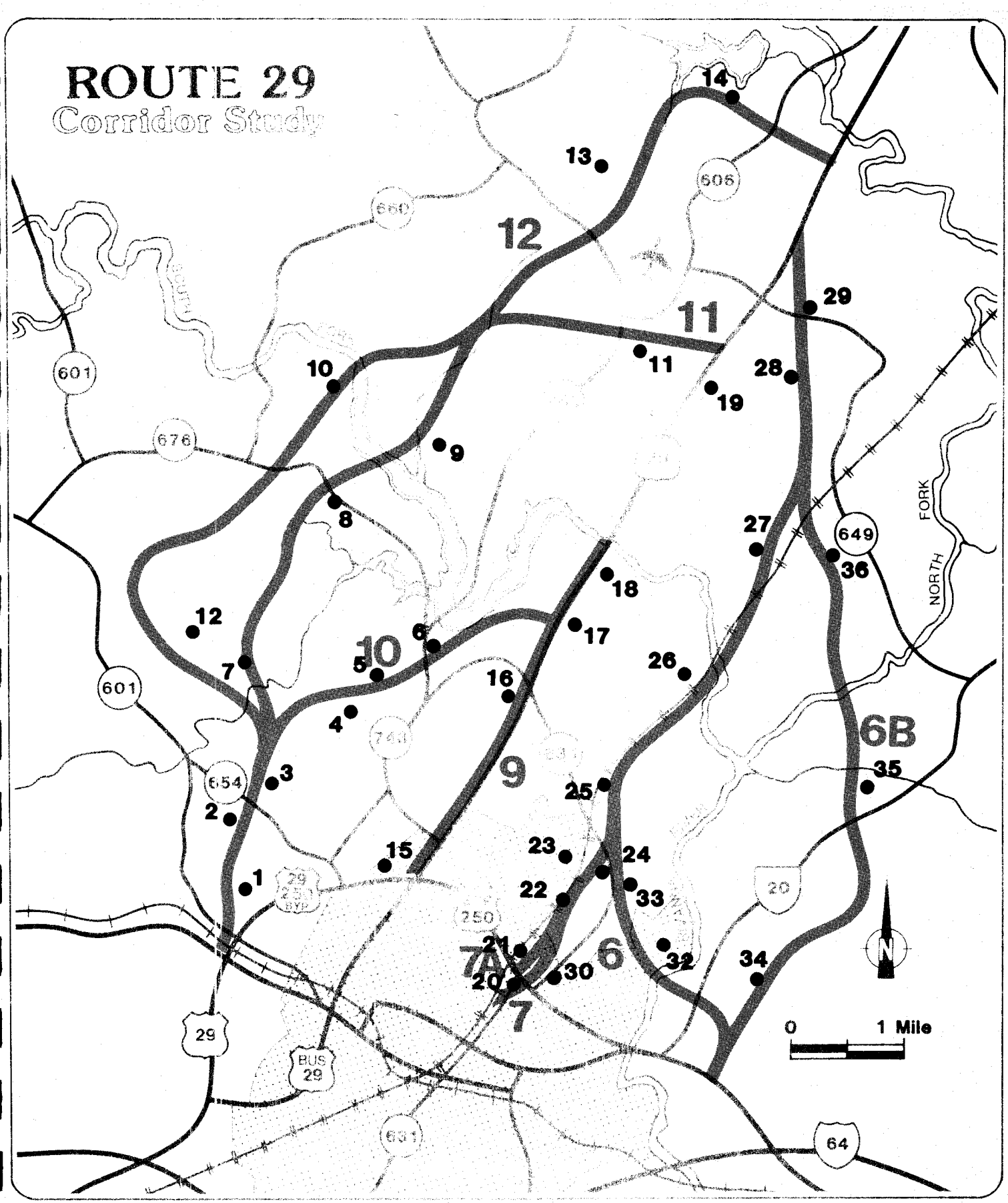
Figure IV-13 shows the locations of the 35 study sites. Table IV-10 describes the site locations and the areas they represent. Design-year noise levels were estimated for each site for both no-build and build conditions. For those sites where no single noise source dominates, design-year no-build noise levels were assumed to be the same as existing levels. Design-year no-build noise levels for sites presently dominated by traffic noise were calculated with the computer model using projected future traffic volumes. Design-year build noise levels for all of the sites were calculated with the model.

Identification of traffic noise impacts requires three comparisons of noise levels:

- Comparison of existing noise levels with design-year build noise levels shows changes that would occur between the present and the year 2010 if the project is built.
- Comparison of design-year build and design-year no-build noise levels shows what changes can be attributed to the project.
- Comparison of design-year-build noise levels with the noise abatement criteria shows whether future noise levels will be compatible with present land use if the project is built.

2. Study Results

Table IV-11 shows existing noise levels, design-year no-build noise levels, and design-year build noise levels for each site, enabling a quick comparison among the three. Each site represents the worst case impact within a particular segment of roadway. To assess the impacts of each alternative as a whole, the numbers of noise-sensitive receptors represented



Noise Analysis Sites

Figure No. **IV-13**

TABLE IV-10

NOISE ANALYSIS SITES

Site	Location	Area Represented
1	Soccer field at St. Anne's Belfield School 250' left (west) of Station 544 Alternates 10, 11, 12	Residential receptors from Route 250 to 3000' south of Barracks Road
2	2 Story Brick Dwelling Falcon Drive Colthurst Subdivision 400' left (west) of Station 578 Alternates 10, 11, 12	Residential receptors from 3000' south of Barracks Road to Barracks Road
3	2 Story Frame Dwelling Magnolia Drive Montvue Subdivision 200' right (east) of Station 608 Alternates 10, 11, 12	Residential receptors from Barracks Road to Mary Greer Elem. School
4	Playground at Mary Greer Elementary School 250' right (east) of Station 653 Alternate 10	Playground at Mary Greer Elementary School
5	One Story Frame Dwelling 200' left (west) of Station 672 Alternate 10	Residential receptors from Mary Greer Elementary School to Miller Road
6	2 story frame dwelling Squirrel Path Squirrel Ridge Subdivision 180' left (west) of Station 713 Alternate 10	Residential receptors from Miller Road to U.S. Route 29
7	2 story frame dwelling Stillhouse Road Ivy Farm Subdivision 165' left (west) of Station 666 Alternate 11	Residential receptors from Barracks Road to 2000' south of Route 676

TABLE IV-10 (Cont.)

Site	Location	Area Represented
8	2 story frame dwelling Wyngate Road Wyngate Subdivision 190' right (east) of Station 744 Alternate 11	Residential receptors from 2000' south of Route 676 to Route 676
9	Dwelling Willowbrook Road (cul-de-sac) Ardwood Subdivision 275' right (east) of Station 802 Alternate 11	Residential receptors from Route 676 to Miller Road
10	2 story frame dwelling Dundee Road Arbor Park Subdivision 290' left (west) of Station 864 Alternate 12	Residential receptors from Route 676 to Miller Road
11	2 story frame dwelling North of Rivanna Subdivision 200' right (south) of Station 936 Alternate 11	Residential receptors on both sides of alignment from Miller Road to U.S. Route 29
12	1 story frame dwelling west of Ivy Farm Subdivision 310' right (east) of Station 720 Alternate 12	Residential receptors on both sides of the alignment from Route 601 to Route 676
13	1 story frame dwelling Hunter Ridge Road Earlysville Heights 500' left (west) of Station 1070 Alternate 12	Residential receptors on both sides of alignment from Miller Road (Route 743) to 1000' west of Chris Greene Lake Road (Route 850)
14	1 story frame dwelling Chris Greene Lake Road Lake Acres Subdivision 160' left (north) of Station 1124 Alternate 12	Residential receptors on both sides of alignment from 1000' west of Chris Green Lake Road (Route 850) to U.S. Route 29

TABLE IV-10 (Cont.)

Site	Location	Area Represented
15	2 story brick apartment end of Middlesex Drive, North side of Route 250/29 Bypass. 120' left (north) of Sta. 85 + 50. Alternate 9	Residential receptors on both sides of Route 250/29 Bypass
16	Dwelling on Commonwealth Circle Berkley Subdivision U.S. Route 29 340' left (west) of Station 65 Alternate 9	Receptors on sides of the alignment from Route 250/29 Bypass to Rio Road
17	1 Story brick dwelling Woodbrook Subdivision 360' right (east) of Station 126+50 Alternate 9	Residential receptors on both sides of the alignment from Rio Road to Carrsbrook Drive
18	1 story brick dwelling Carrsbrook Subdivision 260' right (east) of Station 157 Alternate 9	Residential receptors on both sides of the alignment from Carrsbrook Drive to Route 643
19	1 story frame dwelling Hollymead Subdivision 100' right (east) of Station 944 Alternate 9	Residential receptors on both sides of the alignment from Route 643 to Route 649
20	McIntire Park Tennis courts near intersection of McIntire Road and Route 250 Bypass 60' right (east) of Station 396+70 Alternates 7 & 7A	Residential and recreational receptors at intersection of McIntire Road & Route 250 Bypass
21	Tee #2 McIntire Park Golf Course 170' left (west) of Station 409 Alternate 7A	Recreational receptors in McIntire Park (golf course)
22	Charlottesville High School Softball Field 260' left (west) of Station 438 Alternates 7 & 7A	Recreational receptors for playing fields at Charlottesville High School

TABLE IV-10 (Cont.)

Site	Location	Area Represented
23	1 story brick dwelling Kenwood Lane 470' left (west) of Station 451 Alternatives 7 & 7A	Residential receptors on both sides of alignment from Melbourne Road to Rio Road
24	1 story frame dwelling Rio Road 460' right (east) of Station 471 Alternate 7	Residential receptors along Rio Road
25	1 story frame dwelling 165' left (west) of Station 474 South of Free State Road Alternates 6, 7, 7A	Residential & recreational receptors from Rio Road to Free State Road
26	1 story frame dwelling Huntington Road East of Westmoreland Subdivision 500' left (west) of Station 515 Alternates 6, 7, 7A	Residential receptors from Free State Road to Route 643
27	2 story frame dwelling East of Powell Creek North of Route 643 590' left (west) of Station 611 Alternates 6, 7, 7A	Residential receptors from Route 643 to 4,200' north of Route 643
28	Undeveloped lots Creek Drive Road Forest Lake Subdivision 180' left (west) of Station 677 Alternates 6, 6B, 7, 7A	Residential receptors on both sides of alignment from intersection of Alt. 6 & Alt 6B to Creek Drive Road
29	Mount Ephraim Pentecostal Church 180' right (east) of Station 704+60 Alternates 6, 6B, 7, 7A	Church and residential receptors on both sides of alignment from Creek Drive Road to U.S. Route 29
30	Dwelling 170' right (east) of Station 430 Alternate 7	McIntire Park and residential receptors from McIntire Road to Melbourne Road

TABLE IV-10 (Cont.)

Site	Location	Area Represented
32	Pen Park golf course 165' right (east) of Station 380 Alternate 6	Recreational receptors in Pen Park & Rivanna Park & residential receptors from Route 250 to Pen Park Road
33	Townhouse in River Run Subdivision 180' right (east) of Station 421 Alternate 6	Residential receptors at River Run Subdivision
34	3 story frame dwelling Franklin Drive Franklin Subdivision 200' left (west) of Station 362 Alternate 6B	Residential receptors from Route 250 to Route 20
35	1 story frame dwelling North of Route 20 250' right (east) of Station 481 Alternate 6B	Residential receptors from Route 20 to North Fork of Rivanna River
36	1 story brick dwelling Bentivar Drive North of Bentivar Subdivision 540' right (east) of Station 587 Alternate 6B	Residential receptors from North Fork of the Rivanna River to intersection of Alt. 6 & Alt. 6B

Note: Site 31 had no noise-sensitive activities and was deleted from the study. Therefore, it does not appear in this table.

TABLE IV-11

EXISTING AND DESIGN YEAR NOISE LEVELS

Site #	Condition	Noise Source	Source-Receptor Distance (feet)	Noise Level L_{eq} dB(A)
1	Existing	Rte 250 Bypass	900	52
	No-Build	Rte 250 Bypass	900	55
	Build	Rte 250 Bypass	900	
		Alts. 10,11,12	250	66
2	Existing	Ambient	N/A	51
	No-Build	Ambient	N/A	51
	Build	Alts. 10,11,12	400	65
3	Existing	Ambient	N/A	49
	No-Build	Ambient	N/A	49
	Build	Alts. 10,11,12	200	64
4	Existing	Ambient	N/A	49
	No-Build	Ambient	N/A	49
	Build	Alt. 10	250	61
5	Existing	Ambient	N/A	54
	No-Build	Ambient	N/A	54
	Build	Alt. 10	200	67
6	Existing	Ambient	N/A	49
	No-Build	Ambient	N/A	49
	Build	Alt. 10	180	66
7	Existing	Ambient	N/A	54
	No-Build	Ambient	N/A	54
	Build	Alt. 11	165	68
8	Existing	Ambient	N/A	48
	No-Build	Ambient	N/A	48
	Build	Alt. 11	190	67
9	Existing	Ambient	N/A	57
	No-Build	Ambient	N/A	57
	Build	Alt. 11	275	68
10	Existing	Ambient	N/A	48
	No-Build	Ambient	N/A	48
	Build	Alt. 12	290	64
11	Existing	Ambient	N/A	50
	No-Build	Ambient	N/A	50
	Build	Alt. 11	200	70

TABLE IV-11 (Cont.)

Site #	Condition	Noise Source	Source-Receptor Distance (feet)	Noise Level L_{eq} dB(A)
12	Existing	Ambient	N/A	49
	No-Build	Ambient	N/A	49
	Build	Alt. 12	310	62
13	Existing	Ambient	N/A	49
	No-Build	Ambient	N/A	49
	Build	Alt. 12	500	59
14	Existing	Ambient	N/A	55
	No-Build	Ambient	N/A	55
	Build	Alt. 12	160	68
15	Existing	Rte. 250 Bypass	120	74
	No-Build	Rte. 250 Bypass	120	77
	Build	Rte. 250 Bypass	120	78
16	Existing	Rte. 29	340	65
	No-Build	Rte. 29	340	66
	Build	Rte. 29 & Expressway	340	68
17	Existing	Rte. 29	360	60
	No-Build	Rte. 29	360	61
	Build	Rte. 29 & Expressway	360	65
18	Existing	Rte. 29	260	61
	No-Build	Rte. 29	260	62
	Build	Rte. 29 & Expressway	260	66
19	Existing	Rte. 29	100	68
	No-Build	Rte. 29	100	70
	Build	Rte. 29	100	70
20	Existing	McIntire Road	60	74
		Rte. 250 Bypass	325	
	No-Build	McIntire Road	60	76
		Rte. 250 Bypass	325	
	Build	McIntire Road (Alt. 7A)	60	76
		Rte. 250 Bypass	325	
21	Existing	Ambient	N/A	53
	No-Build	Ambient	N/A	53
	Build	Alt. 7A	170	73

TABLE IV-11 (Cont.)

Site #	Condition	Noise Source	Source-Receptor Distance (feet)	Noise Level L_{eq} dB(A)
22	Existing	Ambient	N/A	47
	No-Build	Ambient	N/A	47
	Build	Alt. 7,7A	260	69
23	Existing	Ambient	N/A	52
	No-Build	Ambient	N/A	52
	Build	Alt. 7,7A	470	64
24	Existing	Rio Road	65	69
	No-Build	Rio Road	65	72
	Build	Rio Road	65	71
		Alts. 7,7A	460	
25	Existing	Ambient	N/A	48
	No-Build	Ambient	N/A	48
	Build	Alts. 6,7,7A	165	71
26	Existing	Ambient	N/A	46
	No-Build	Ambient	N/A	46
	Build	Alts. 6,7,7A	500	62
27	Existing	Ambient	N/A	53
	No-Build	Ambient	N/A	53
	Build	Alts. 6,7,7A	590	61
28	Existing	Ambient	N/A	49
	No-Build	Ambient	N/A	49
	Build	Alts. 6,6B,7,7A	180	70
29	Existing	Rte. 649	50	59
	No-Build	Rte. 649	50	65
	Build	Rte. 649	50	69
		Alts. 6,6B,7,7A	180	
30	Existing	Park Street	100	66
	No-Build	Park Street	100	69
	Build	Park Street	100	71
		Alt. 7	170	
32	Existing	Ambient	N/A	47
	No-Build	Ambient	N/A	47
	Build	Alt. 6	165	69
33	Existing	Ambient	N/A	58
	No-Build	Ambient	N/A	58
	Build	Alt. 6	180	67

TABLE IV-11 (Cont.)

Site #	Condition	Noise Source	Source-Receptor Distance (feet)	Noise Level L_{eq} dB(A)
34	Existing	Ambient	N/A	48
	No-Build	Ambient	N/A	48
	Build	Alt. 6B	200	63
35	Existing	Ambient	N/A	45
	No-Build	Ambient	N/A	45
	Build	Alt. 6B	250	61
36	Existing	Ambient	N/A	45
	No-Build	Rte. 643	175	58
	Build	Alt. 6B	540	63

by sites along the alternative were totaled. Receptors may be residences, platted and recorded residential lots, parks, playing fields, or other areas with outdoor activities.

As could be expected, introduction of a major new transportation route will greatly influence noise levels along the selected route, especially in rural areas where existing noise levels are low. Comparing existing noise levels with design-year build noise levels in Table IV-11, increases of two to 23 decibels would occur. Ten of the sites, 15-20, 24, 27, 30, and 33, would experience increases of two to nine decibels. Twenty-five sites, 1-14, 21-23, 25, 26, 28, 29, 32, and 34-36, would experience increases of 10 or more decibels. Sites experiencing increases of 10 or more decibels are considered to be impacted under the substantial increase criterion. Looking at the site locations, it is evident that most of the substantial increases would occur in outlying rural areas while most of the smaller increases would occur near existing roads and developed areas.

Comparing existing noise levels with design-year no-build noise levels in Table IV-11 shows little or no changes in most cases. Noise levels would increase from one to three decibels at sites 1, 15, 16, 17, 18, 19, 20, 24, and 30. This would be due to increases in traffic volumes on existing roads. In two cases, the increases would be greater. Site 29 on Route 649 would experience an increase of six decibels and site 36 on Route 643 would experience an increase of 13 decibels. These greater increases would be due to substantially greater traffic volumes using these routes as a result of both increased development and efforts to escape congestion on Route 29.

Comparison of no-build and build conditions readily shows that most major changes in noise levels would be attributable to the project alternatives due to introduction of major new noise sources represented by the alternatives.

At some sites there will be little difference between no-build and build case noise levels. At sites 15-20, 29,30, and 36, the differences range from zero to five decibels. At site 24, the no-build noise level will actually be one decibel higher than the build noise level.

These small differences can be attributed to the fact that with or without the project, highways adjacent to these sites will continue to serve major traffic volumes. In the case of site 24, no-build traffic volumes on Rio Road will be higher than build traffic volumes, which in turn will cause higher noise levels under the no-build condition.

Comparison of design-year noise levels with the noise abatement criteria (NAC) shows the second type of impact. Those sites currently experiencing noise levels equalling or exceeding the NAC (15, 19, 20, and 24) will also experience them under the design year no-build condition. Noise levels at site 30 would also increase above the NAC under the no-build condition. However, under the build condition, noise levels at 19 sites would equal or exceed the NAC (5, 7, 8, 9, 11, 14, 15, 16, 19, 20, 21, 22, 24, 25, 28, 29, 30, 32, and 33).

The worst impact would occur at site 15 where the noise level will exceed the NAC by 11 decibels under Alternative 9 (the Expressway). The next worst impact would be at site 20 where the noise level will exceed the NAC by nine decibels under Alternative 7A. At both

of these sites, existing noise levels exceed the NAC by seven decibels and no-build noise levels will exceed the NAC by nine to ten decibels which shows that the project alternatives are not entirely the causes of impacts at these two sites. Similarly, at sites 16, 19, 24, and 30, where noise levels will exceed the NAC by one to four decibels, there are little or no differences among existing, no-build, and build noise levels. At the remaining impacted sites, noise levels will exceed the NAC by zero to six decibels. These impacts can be attributed to the project alternatives.

Table IV-12 presents the total impacts by site and by alternative for the two types of impacts. The table shows that Alternative 7A would have the greatest noise impact because it would impact the greatest number of receptors. In order of decreasing impact, the other alternatives are:

Alternative 7
Alternative 6
Alternative 10
Alternative 6B
Alternative 9(Expressway)
Alternative 12
Base Case
Alternative 11

Aside from the impacts discussed above, special consideration is given to impacts on public use and nonprofit institutional facilities such as schools, churches, parks, and recreation areas. For schools and churches, additional consideration is given to interior noise levels since activities in these facilities are considered to be particularly sensitive to noise. Table IV-13 presents a list of facilities along with the alternatives they are affected by and the expected exterior and, where applicable, interior noise levels. All of the facilities with indoor activities are air conditioned and can therefore maintain closed window conditions year round. Projected interior noise levels with closed windows at all of these locations are less than the interior NAC.

Exterior noise levels will increase substantially over existing noise levels at the Belfield School soccer field, Greer Elementary School playground, and Charlottesville High School ball fields, at the Ivy Creek Methodist Church, and at Rivanna, McIntire, Pen, and Chris Greene Lake Parks.

The exterior NAC will be equalled or exceeded at Belfield School, Charlottesville High School ball fields, Union Ridge Baptist Church (there do not appear to be any exterior activities here that would be affected), Pleasant Grove Baptist Church, McIntire tennis courts, McIntire Park, Rivanna Park, and Pen Park.

TABLE IV-12

NOISE RECEPTORS IMPACTED BY SITE AND ALTERNATIVE

Base Case Alternative

Site	Equals or Exceeds Noise Abatement Criteria	Substantial Increase	Both	Total Impacted*
15	12	0	0	12
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	32	0	0	32
TOTALS	44	0	0	44

Alternative 6

32	3	33	3	33
33	1	0	0	1
25	3	14	3	14
26	2	64	2	64
27	0	0	0	0
28	14	22	14	22
29	4	3	3	4
TOTALS	27	136	25	138

Alternative 6B

34	0	11	0	11
35	0	6	0	6
36	0	10	0	10
28	14	22	14	22
29	4	3	3	4
TOTALS	18	52	17	53

* Total number of receptors where design-year noise levels equal or exceed FHWA NAC and/or will be 10 or more dB(A) higher than existing levels. Some receptors will experience a substantial increase and will also equal or exceed the noise abatement criteria. Therefore, the totals column is not necessarily the sum of the two impact types.

TABLE IV-12 (Cont.)

Alternative 7

Site	Equals or Exceeds Noise Abatement Criteria	Substantial Increase	Both	Total Impacted*
20	2	0	0	2
30	27	1	1	27
22	1	1	1	1
23	12	33	12	33
24	5	0	0	5
25	3	14	3	14
26	2	64	2	64
27	0	0	0	0
28	14	22	14	22
29	4	3	3	4
TOTALS	70	138	36	172

Alternative 7A

20	11	0	0	11
21	20	23	20	23
22	1	1	1	1
23	12	33	12	33
24	5	0	0	5
25	3	14	3	14
26	2	64	2	64
27	0	0	0	0
28	14	22	14	22
29	4	3	3	4
TOTALS	72	160	55	177

Alternative 9 (Expressway)

15	12	0	0	12
16	4	0	0	4
17	0	0	0	0
18	0	0	0	0
19	32	0	0	32
TOTALS	48	0	0	48

* Total number of receptors where design-year noise levels equal or exceed FHWA NAC and/or will be 10 or more dB(A) higher than existing levels. Some receptors will experience a substantial increase and will also equal or exceed the noise abatement criteria. Therefore, the totals column is not necessarily the sum of the two impact types.

TABLE IV-12 (Cont.)

Alternative 10

Site	Equals or Exceeds Noise Abatement Criteria	Substantial Increase	Both	Total Impacted*
1	1	3	1	3
2	0	8	0	8
3	0	7	0	7
4	1	1	1	1
5	1	10	1	10
6	1	27	1	27
TOTALS	4	56	4	56

Alternative 11

1	1	3	1	3
2	0	8	0	8
3	0	7	0	7
7	6	7	6	7
8	1	8	1	8
9	4	4	4	4
11	2	6	2	6
TOTALS	14	43	14	43

Alternative 12

1	1	3	1	3
2	0	8	0	8
3	0	7	0	7
10	0	14	0	14
12	0	6	0	6
13	0	4	0	4
14	2	4	2	4
TOTALS	3	46	3	46

* Total number of receptors where design-year noise levels equal or exceed FHWA NAC and/or will be 10 or more dB(A) higher than existing levels. Some receptors will experience a substantial increase and will also equal or exceed the noise abatement criteria. Therefore, the totals column is not necessarily the sum of the two impact types.

TABLE IV-13

NOISE LEVELS AT PUBLIC USE OR NONPROFIT INSTITUTIONAL FACILITIES

Facility	Air Conditioned	Outside Activities	Alternative	Exterior Leq	Interior Design Year Leq		
				Existing	Design Year	Open Windows	Closed Windows
A. St. Anne's Belfield School	Yes	Yes	9 (Expressway)	65	69	59	49
			Base Case	65	68	58	48
B. St. Anne's Belfield School Soccer Field	N/A	Yes	10, 11, 12	52	66	N/A	N/A
C. Mary Greer Elementary School	Yes	Yes	10	49	56	46	36
D. Mary Greer Elementary School Playground	N/A	Yes	10	49	61	N/A	N/A
E. Charlottesville High School Ball Fields	N/A	Yes	7, 7A	47	69	N/A	N/A
F. Church of Jesus Christ of Latter-Day Saints	Yes	No	10	59	63	53	43
G. Union Ridge Baptist Church	Yes	No	10	67	69	59	49
H. Ivy Creek United Methodist Church	Yes	Yes	12	48	59	49	39
I. Pleasant Grove Baptist Church	Yes	Yes	11	60	67	57	47
J. First Baptist Church	Yes	Yes	7	57	62	52	42
K. Park Street Christian Church	Yes	Yes	7, 7A	55	64	54	44
L. Mt. Ephraim Pentecostal Church	Yes	Yes	6, 6B, 7, 7A	56	64	54	44
M. YMCA	Yes	Yes	7A	60	65	55	45
N. McIntire Park	N/A	Yes	7, 7A	53	73	N/A	N/A
O. McIntire Tennis Courts	N/A	Yes	7, 7A	74	76	N/A	N/A
P. Rivanna Park	N/A	Yes	6	47	69	N/A	N/A
Q. Pen Park	N/A	Yes	6	47	69	N/A	N/A
R. Chris Greene Lake Park	N/A	Yes	12	49	63	N/A	N/A

3. Abatement Measures Considered

At those sites where noise impacts are identified, measures to reduce traffic noise must be considered. Examples of such measures include shifting alternatives, building sound

barriers, depressing the roadway, rerouting trucks, or providing insulation or air conditioning for buildings with noise-sensitive interior activities. The benefits of such measures are weighed against their social, economic, and environmental effects to determine their reasonableness and feasibility. To be meaningful, abatement measures must provide a minimum noise reduction of five decibels. A two to three decibel reduction would be barely noticeable and efforts to achieve such a minor reduction are generally considered unreasonable.

a. Rerouting Through Trucks

Since heavy trucks usually contribute the largest component of highway noise, rerouting them is sometimes an effective way to reduce noise levels. However, for this project, such a rerouting is not practical. There are no alternate routes within the project corridor comparable to Route 29. Furthermore, one major purpose of the project is to expedite the flow of through traffic, especially trucks, through or around Charlottesville.

b. Depressing the Roadway

Depressing the roadway, thereby creating a rock or earth noise barrier, is sometimes an effective noise reduction measure. Based on a review of preliminary vertical profiles of the project alternatives, this measure is not feasible at some locations for the following reasons:

- Roadway grades must conform with safety and engineering standards.
- The need to have interchanges with existing roads presents limitations at some locations.
- At some locations, depressing the road would put it below the elevations of streambed thereby disrupting natural drainage patterns.

At sites where this measure appeared feasible, an analysis was performed with the following results:

- Site 2 Alternatives 10,11, and 12 - Depressing the road at this location sufficiently to achieve a meaningful noise reduction would require excavation of roughly 83,000 additional cubic yards of material. The additional cost would be approximately $396,000 to protect six receptors ($66,000 per receptor), which is not considered reasonable.

- Site 4 Alternative 10 - Cut required to achieve proper grade here will be sufficient to protect the school playground without additional excavation.

- Site 5 Alternative 10 - Cut required to achieve proper grade here will protect four receptors. Additional excavation to protect remaining receptors is not feasible due to location of streambed.

- Site 6 Alternative 10 - Cut required to achieve proper grade in the Woodburn Road area would protect 10 receptors. Additional excavation to protect one additional receptor could cost over $150,000, which is not considered reasonable.

- Site 7 Alternative 11 - Additional excavation of 29,000 cubic yards at a cost of $130,000 would protect one receptor, which is not considered reasonable.

- Site 9 Alternative 11 - Cut required to achieve proper grade would protect two receptors. A deeper cut to protect the other two is not feasible due to the locations of the streambeds of tributaries to Naked Creek.

- Site 10 Alternative 12 - Cut required to achieve proper grade will protect the four impacted receptors in the Arbor Park subdivision without additional excavation.

- Site 12 Alternative 12 - Cut required to achieve proper grade will protect one receptor without additional excavation.

- Site 14 Alternative 12 - Cut required to achieve proper grade will protect two receptors in Lake Acres subdivision. Additional excavation to protect two other receptors is not feasible due to steep terrain.

- Site 25 Alternatives 6, 7, and 7A - To protect receptors here would require additional excavation of approximately 159,000 cubic yards at a cost of approximately $757,000. For the 14 receptors protected, this amounts to approximately $54,000 per receptor, which is not considered reasonable.

- Site 26 Alternatives 6, 7, and 7A - Additional excavation here of roughly 300,000 cubic yards would protect 44 receptors. This amounts to approximately $1.4 million or $32,000 per receptor, which is not considered reasonable.

- Site 28 Alternatives 6, 6B, 7, and 7A - Additional excavation here of approximately 65,000 cubic yards would protect 22 receptors at a cost of approximately $309,000. This amounts to approximately $14,000 per receptor which appears to be reasonable. This abatement measure will receive further consideration and is likely to implemented at this location if Alternate 6, 6B, 7 or 7A is chosen.

- Site 29 Alternatives 6, 6B, 7, and 7A - Cut required to achieve proper grade here will protect four receptors without additional excavation.

- Site 30 Alternative 7 - Cut required to achieve proper grade will partially protect seven receptors. Additional excavation here is not feasible because of the need to connect with existing roads.

To summarize, normal excavation to achieve proper grades will provide noise abatement at sites 4, 5, 6, 9, 10, 12, 14, and 29 for a total of 26 receptors. At site 28, additional excavation to provide abatement for 22 receptors appears to be cost effective and is likely to be done if an eastern bypass alternative is selected.

Much of the Expressway Alternative (Alternative 9) will be depressed to provide grade separation at major cross streets. Therefore, if this alternative is selected, the resulting noise levels will be somewhat less than those predicted for this study since those were based on assuming level road and level terrain for worst case noise levels.

c. Shifting Alternatives

Noise levels can be reduced by moving the source away from the receptor, i.e., shifting proposed alternatives. As a rough rule of thumb, the distance between the source and the receptor must be approximately doubled to attain a noise reduction of approximately 4.5 decibels (assuming vegetated or soft earth ground surface).

An analysis of potential alternative shifts at all impacted sites showed that none are practical for the following reasons:

- Sensitive receptors lie on both sides of the proposed alternatives. Shifts away from some receptors would increase noise impacts to other receptors.

- Some potential shifts would increase displacements of homes or businesses.

- Some shifts would increase impacts to other resources such as water bodies and historic sites.

- Some shifts would increase encroachment on other facilities such as the airport, parks, and recreation areas.

- Some shifts are constrained for engineering reasons such as steep terrain and interchanges with existing roads.

d. Sound Barriers

Sound barriers could be built to reduce noise levels at most impacted locations. However, they could not be used along existing roads where access to adjacent properties would be blocked. To be effective, sound barriers must be continuous and not have openings for access. Further, in accordance with Virginia Department of Transportation policy, approved by the Federal Highway Administration, sound barriers costing more than $20,000 per protected receptor (except for parks and schools) are not considered cost-effective. Barriers to protect parks and schools are evaluated on a case-by-case basis. Table IV-14 summarizes the sound barriers considered, which are located as shown in Figure IV-14. It should be noted that the barrier configurations are based on preliminary data and costs are approximate.

Below is a summary evaluation of potential sound barriers at parks and schools:

- McIntire Park - a barrier costing approximately $733,500 would protect three holes of a nine-hole golf course here. Because of the small benefit achieved, construction of this barrier is not considered reasonable.

- Rivanna Park and Pen Park - Barriers along both sides of the road to protect these parks would cost a total of approximately $3 million. The barriers would protect the soccer fields and tennis courts in Rivanna Park and four holes of the nine-hole golf course in Pen Park. These barriers are very expensive in relation to the benefits provided and are therefore not considered reasonable.

- Chris Green Lake Park - A barrier costing approximately $272,000 would protect the small part of the park impacted. Since this is a remote finger of the park which appears to receive little use, construction of this barrier is not considered reasonable.

- St Anne's-Belfield School - A barrier costing approximately $163,000 would protect a children's play area outside the school. Since existing noise levels are already relatively high here, and since the impact is only a slight exceedance of the NAC rather than a substantial increase, and since this area will be impacted even under the no-build alternative, construction of this barrier is not considered reasonable.

- St Anne's-Belfield School soccer field - A barrier here would cost approximately $318,000. The activity here would not appear to be especially noise-sensitive, and since this is a private school, the area is not open to the

Table IV-14

SOUND BARRIERS CONSIDERED

Barrier Number	Location	Description	Cost (rounded to nearest $100)
1A	West of Alt. 10 Sta. 542 to Sta. 552+60	length: 1060' height: 16'-19' reduction: 5-11dBA receptors: 1	Total: $290,500 per recept. $290,500
1B	East of Alt. 10 Sta. 534+30 to Sta. 559+80	length: 2550' height: 13'-16' reduction: 5 dBA receptors: 2	Total: $636,400 per recept. $318,200
1C	Along north side of Route 250 Bypass at Belfield School	length: 850' height: 12' reduction: 5 dBA receptors: 1	Total: $163,200 per recept. $163,200
2A	West of Alt. 10 Sta. 566+70 to Sta. 584+90	length: 1820' height: 13'-19' reduction: 5 dBA receptors: 6	Total: $474,000 per recept. $79,000
3A	East of Alt. 10 Sta. 592 to Sta. 618	length: 2600' height: 13'-19' reduction: 5-6 dBA receptors: 6	Total: $675,600 per recept. $112,600
4A	East of Alt. 10 Sta. 648 to Sta. 658	length: 1000' height: 14' reduction: 5 dBA receptors: 1	Total: $224,000 per recept. $224,000
5A	West of Alt. 10 Sta. 662+50 to Sta. 697	length: 3450' height: 11'-17' reduction: 5-7 dBA receptors: 8	Total: $856,800 per recept. $107,100
5B	East of Alt. 10 Sta. 673+70 to Sta. 684+40	length: 1070' height: 11'-17' reduction: 5 dBA receptors: 1	Total: $233,400 per recept. $233,400

TABLE IV-14 (Cont.)

Barrier Number	Location	Description	Cost (rounded to nearest $100)
5C	East of Alt. 10 Sta. 685+70 to Sta. 695	length: 930' height: 14' reduction: 5 dBA receptors: 1	Total: $208,300 per recept. $208,300
6A	West of Alt. 10 From entrance to Squirrel Ridge Subdivision to Sta 722	length: 1920' height: 12'-15' reduction: 5-10dBA receptors: 14	Total: $464,200 per recept. $33,200
6B	West of Alt. 10 Sta. 741 to Sta. 755	length: 1400' height: 15'-18' reduction: 5-6 dBA receptors: 8	Total: $356,100 per recept. $44,500
6C	East of Alt. 10 Sta. 736 to Sta. 748	length: 1200' height: 15'-18' reduction: 5 dBA receptors: 4	Total: $308,100 per recept. $77,000
6D	East of Alt. 10 Sta. 716+50 to Sta. 730	length: 1350' height: 15' reduction: 5 dBA receptors: 1	Total: $324,000 per recept. $324,000
7A	West of Alt. 11 Sta. 664+20 to Sta. 667+20	length: 300' height: 9' reduction: 6 dBA receptors: 1	Total: $43,200 per recept. $43,200
7B	East of Alt. 11 Sta. 670+30 to Sta. 673+30	length: 300' height: 9' reduction: 6 dBA receptors: 1	Total: $43,200 per recept. $43,200
7C	West of Alt. 11 Sta. 713 to Sta. 716	length: 300' height: 9' reduction: 6 dBA receptors: 1	Total: $43,200 per recept. $43,200
7D	East of Alt. 11 Sta. 719+40 to Sta. 731+20	length: 1180' height: 9' reduction: 6 dBA receptors: 3	Total: $169,900 per recept. $56,600
7E	East of Alt. 11 Sta. 676+60 to Sta. 685+60	length: 900' height: 11' reduction: 5 dBA receptors: 1	Total: $158,400 per recept. $158,400

TABLE IV-14 (Cont.)

Barrier Number	Location	Description	Cost
8A	East of Alt. 11 Sta. 743+20 to Sta. 754+80	length: 1030' height: 19' reduction: 5-12dBA receptors: 4	Total: $313,300 per recept. $78,300
8B	West of Alt. 11 Sta. 743 to Sta. 753+30	length: 1030' height: 19' reduction: 5 dBA receptors: 2	Total: $313,300 per recept. $156,700
9A	East of Alt. 11 Sta. 801 to Sta. 817	length: 1600' height: 11' reduction: 6 dBA receptors: 4	Total: $281,600 per recept. $70,400
10A	East of Alt. 12 Sta. 823 to Sta. 839	length: 1400' height: 16' reduction: 5 dBA receptors: 2	Total: $358,400 per recept. $179,200
10B	West of Alt. 12 Clearview Knolls Subdivision Sta. 825 to Sta. 847	length: 2200' height: 16' reduction: 5 dBA receptors: 7	Total: $563,200 per recept. $80,500
10C	West of Alt. 12 Arbor Park Subdivision Sta. 855+10 to Sta. 871+40	length: 1630' height: 19' reduction: 5-8 dBA receptors: 5	Total: $495,900 per recept. $99,200
11A	Along east side of Route 743 south of Alt. 11 interchange	length: 300' height: 13' reduction: 5 dBA receptors: 1	Total: $62,400 per recept. $62,400
11B	South of Alt. 11 & east of Rte 743 Sta. 930+40 to Sta. 945+35	length: 1495' height: 19' reduction: 5-10dBA receptors: 4	Total: $454,500 per recept. $113,600
12A	East of Alt. 12 Sta. 677 to Sta. 692+15	length: 1515' height: 16'-19' reduction: 5 dBA receptors: 1	Total: $416,600 per recept. $416,600

TABLE IV-14 (Cont.)

Barrier Number	Location	Description	Cost
12B	East of Alt. 12 Sta. 712 to Sta. 724+50	length: 1215' height: 13'-16' reduction: 5 dBA receptors: 1	Total: $281,600 per recept. $281,600
12C	West of Alt. 12 Sta. 727 to Sta. 741	length: 1515' height: 16'-19' reduction: 5 dBA receptors: 1	Total: $416,600 per recept. $416,600
12D	West of Alt. 11 Sta. 616+50 to Sta. 631+50	length: 1500' height: 16'-19' reduction: 5 dBA receptors: 1	Total: $412,000 per recept. $412,000
13A	West of Alt. 12 Earlysville Heights Subdivision Sta. 1053 to Sta. 1077+20	length: 2420' height: 17' reduction: 5 dBA receptors: 4	Total: $658,200 per recept. $164,600
14A	North of Alt 12 Lake Acres Subdivision Sta. 1121+30 to Sta. 1135+70	length: 1440' height: 11' reduction: 5 dBA receptors: 2	Total: $253,400 per recept. $126,700
14B	South of Alt 12 Lake Acres Subdivision Sta. 1121+30 to Sta. 1135+70	length: 1440' height: 11' reduction: 5 dBA receptors: 2	Total: $253,400 per recept. $126,700
15A	North of U.S. Route 250 Bypass Sta. 75 to Sta. 100+40	length: 2540' height: 11' reduction: 5-9 dBA receptors: 12	Total: $447,000 per recept. $37,250
16A	West of U.S. Route 29, Berkley Subdv. Sta. 61 +10 to Sta. 67+90	length: 930' height: 15' reduction: 5 dBA receptors: 4	Total: $223,200 per recept. $55,800
21A	West of Alt. 7A at McIntire Pk. Sta. 400+60 to Sta. 422+20	length: 2160' height: 16'-22' reduction: 5-13dBA receptors: 1	Total: $733,500 per recept. $733,500

TABLE IV-14 (Cont.)

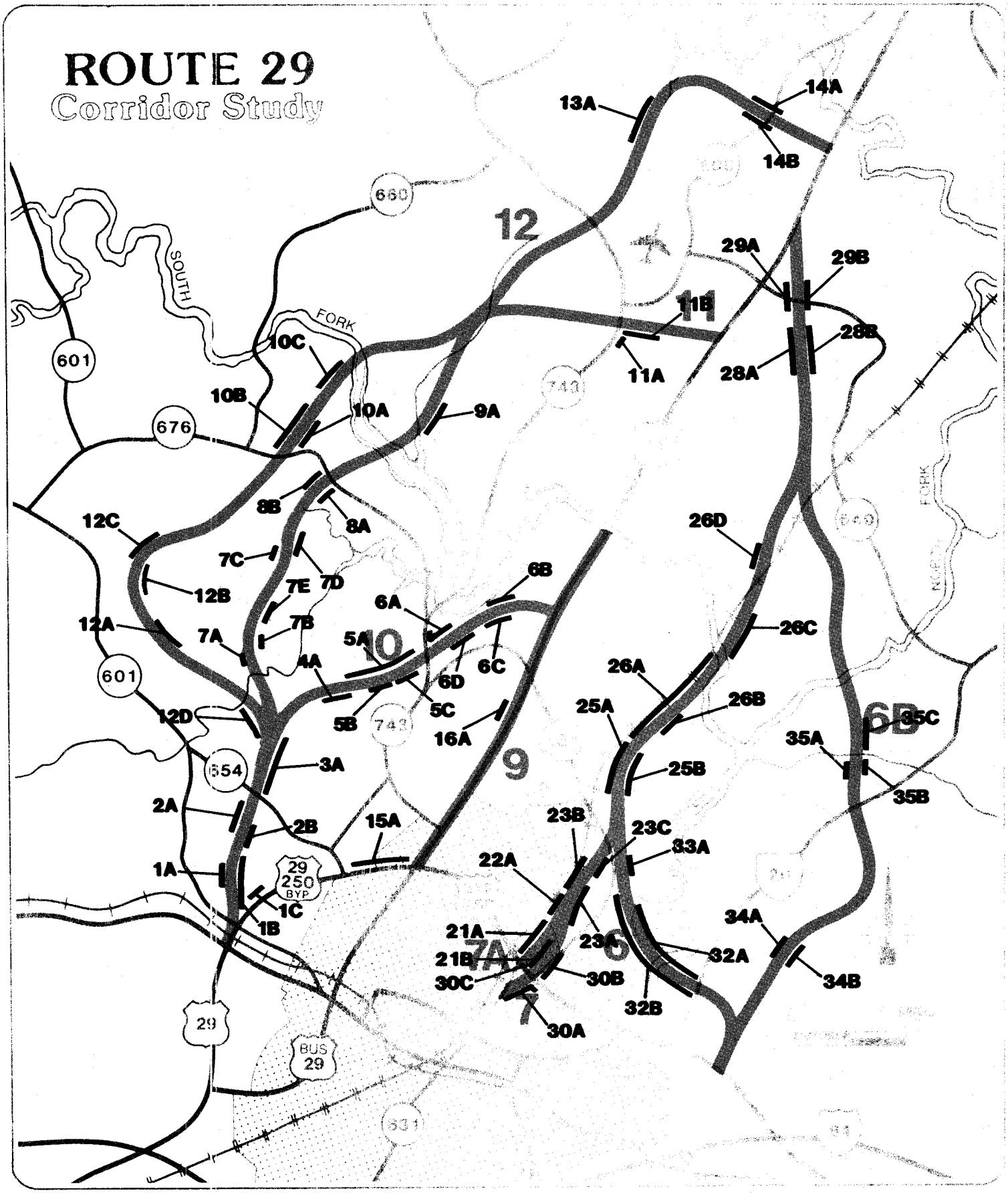
Barrier Number	Location	Description	Cost
21B	East of Alt. 7A Sta. 400+60 to Sta. 422+20	length: 2160' height: 16'-22' reduction: 5-9 dBA receptors: 22	Total: $733,500 per recept. $33,300
22A	West of Alt. 7 & 7A Ch'ville High School playing fields Sta. 429+60 to Sta. 443	length: 1340' height: 13' reduction: 5 dBA receptors: 1	Total: $279,300 per recept. $279,300
23A	East of Alt. 7 & 7A Sta. 424+70 to Sta. 448	length: 2330' height: 16'-19' reduction: 5-13dBA receptors: 17	Total: $656,700 per recept. $38,600
23B	West of Alt. 7 & 7A Greenbriar Park Subdiv. Sta. 443 to Sta. 461	length: 1800' height: 13'-19' reduction: 5 dBA receptors: 11	Total: $441,200 per recept. $40,100
23C	East of Alt. 7 & 7A Sta. 457+40 to Sta. 471+60	length: 1470' height: 15 reduction: 5 dBA receptors: 5	Total: $352,800 per recept. $70,600
25A	West of Alt. 6, 7, & 7A Sta. 462 to Sta. 487+70	length: 2570' height: 19' reduction: 5-14dBA receptors: 6	Total: $780,500 per recept. $130,100
25B	East of Alt. 6, 7, & 7A Sta. 462 to Sta. 487+70	length: 2570' height: 19' reduction: 5-13dBA receptors: 8	Total: $780,500 per recept. $97,600
26A	West of Alt. 6, 7, & 7A Northfields Subdivision Sta. 487+70 to Sta. 546	length: 5830' height: 19' reduction: 5 dBA receptors: 48	Total: $1,772,300 per recept. $36,900
26B	East of Alt. 6, 7, & 7A Sta. 503 to Sta. 515	length: 1200' height: 13'-16' reduction: 5 dBA receptors: 1	Total: $278,400 per recept. $278,400

TABLE IV-14 (Cont.)

Barrier Number	Location	Description	Cost
26C	East of Alt. 6, 7, & 7A Sta. 554 to Sta. 577	length: 2300' height: 16' reduction: 5 dBA receptors: 14	Total: $588,800 per recept. $42,100
26D	West of Alt. 6, 7, & 7A Sta. 576+40 to Sta. 586+40	length: 1000' height: 16' reduction: 5 dBA receptors: 1	Total: $256,000 per recept. $256,000
28A	West of Alt. 6, 6B, 7 & 7A Forest Lakes Subdivision Sta. 671+90 to Sta. 691	length: 1910' height: 19' reduction: 5-11dBA receptors: 15	Total: $580,600 per recept. $38,700
28B	East of Alt. 6, 6B, 7 & 7A Forest Lakes Subdivision Sta. 671+90 to Sta. 691	length: 1910' height: 19' reduction: 5-10dBA receptors: 7	Total: $580,600 per recept. $82,900
29A	West of Alt. 6, 6B, 7 & 7A Sta. 695+30 to Sta. 707+30	length: 1200' height: 11' reduction: 5 dBA receptors: 2	Total: $211,200 per recept. $105,600
29B	East of Alt. 6, 6B, 7 & 7A Sta. 698 to Sta. 710	length: 1200' height: 11' reduction: 5 dBA receptors: 2	Total: $211,200 per recept. $105,600
30A	East of Alt. 7 Sta. 400 to Sta. 417+50	length: 2050' height: 14' reduction: 5-8 dBA receptors: 13	Total: $459,200 per recept. $35,300
30B	East of Alt. 7 Sta. 423+50 to Sta. 439+80	length: 1630' height: 20' reduction: 3-6 dBA receptors: 11	Total: $521,600 per recept. $47,400
30C	West of Alt. 7 McIntire Park Sta. 420 to Sta. 438	length: 1800' height: 10' reduction: 5 dBA receptors: 1	Total: $288,000 per recept. $288,000

TABLE IV-14 (Cont.)

Barrier Number	Location	Description	Cost
32A	East of Alt. 6 Rivanna Park and Pen Park Sta. 349+50 to Sta. 400	length: 5050' height: 17'-19' reduction: 5-11dBA receptors: 2	Total: $1,516,800 per recept. $758,400
32B	West of Alt. 6 Rivanna Park and Rivanna Heights Subdv. Sta. 349+50 to Sta. 413	length: 6350' height: 17'-19' reduction: 5-11dBA receptors: 31	Total: $1,912,000 per recept. $61,700
33A	East of Alt. 6 River Run Subdv Sta. 417+50 to Sta. 424+60	length: 760' height: 14' reduction: 5 dBA receptors: 1	Total: $170,200 per recept. $170,200
34A	West of Alt. 6B Franklin Subdv. Sta. 358 to Sta. 370	length: 1200' height: 16' reduction: 5-9 dBA receptors: 6	Total: $306,200 per recept. $51,000
34B	East of Alt. 6B Franklin Subdv. Sta. 360+60 to Sta. 372+60	length: 1200' height: 16' reduction: 5-9 dBA receptors: 5	Total: $306,200 per recept. $61,200
35A	West of Alt. 6B Sta. 473+40 to Sta. 482+90	length: 950' height: 13' reduction: 5 dBA receptors: 1	Total: $196,300 per recept. $196,300
35B	East of Alt. 6B Sta. 476+60 to Sta. 486+10	length: 950' height: 13' reduction: 5 dBA receptors: 2	Total: $196,300 per recept. $98,200
35C	East of Alt. 6B Sta. 487+10 to Sta. 498+90	length: 1240' height: 16'-19' reduction: 5 dBA receptors: 3	Total: $347,800 per recept. $115,900



Potential Sound Barrier Locations

Figure No. **IV-14**

general public. Therefore, this expenditure is not considered justified. As a result of the noise generating activities occurring here, the benefits provided in relation to the high cost make this barrier unreasonable.

- Greer Elementary School - The grade of Alternative 10 through this area is such that the cut slope will serve as an effective sound barrier. Therefore, a structural barrier need not be considered.

- Charlottesville High School ballfield - A barrier here costing approximately $279,300 would protect a baseball field and a soccer field. As a result of the noise generating activities occurring here, the benefits provided in relation to the high cost make this barrier unreasonable.

- McIntire Tennis Courts - The 11 tennis courts here cannot be protected by a barrier along McIntire Road because access to the courts would be blocked.

None of the barriers evaluated for residential areas or parks and schools have been found to be reasonable and therefore will not receive further consideration.

G. ENERGY CONSIDERATIONS

As shown in the Table IV-15, the Base Case alternative would consume the least energy while Alternative 12 would consume the most. Most of the differences in energy consumption among the alternatives can be attributed to the energy consumed during the initial construction, with the greatest difference occurring between the Base Case alternative and Alternative 12. There is a maximum two percent difference among the alternatives for maintenance energy. For design-year operating energy, the maximum difference is five percent.

For each alternative, energy impacts were computed with regard to the amount of energy needed to build the project initially, the amount of energy needed to maintain the road network on an annual basis, the energy consumed by vehicles operating on the road network in the design year, and the total energy consumption comprising the sum of the above three categories. Construction energy was calculated based on a constant consumption rate per lane-mile (17.07×10^9 BTU's for roadways and 130.38×10^9 BTUs for bridges), times the number of lane-miles in each alternative. Similarly, maintenance energy was calculated based on a constant consumption rate per lane-mile (1.2×10^8 BTU's), times the number of total lane-miles in the County under each alternative. Operating energy was calculated based on the number of County-wide vehicle-miles traveled under each alternative in the design year, times an adjusted fuel consumption rate for the projected vehicle mix and speed, converted to units of energy. Table IV-15 shows the results of the analysis.

In considering the energy conservation potential of each alternative, it can be seen that there is little difference among the alternatives except in the construction category. In this

TABLE IV-15

ENERGY REQUIREMENTS (10^9 BTU'S)

Alternative	Construc. Energy	Annual Maintn. Energy	Design-Year Operational Energy	Total Energy	
				BTU's	Barrels of Crude Oil*
Base Case	112.7	255.8	962.2	1330.7	229,431
Expressway	521.0	257.4	928.0	1706.4	294,207
6	621.4	259.0	972.4	2152.8	371,172
6B	1036.9	258.9	963.2	2259.0	389,483
7	720.0	258.7	971.0	1949.7	336,165
7A	692.7	258.5	972.1	1923.3	331,603
10	500.7	257.5	966.2	1724.4	297,310
11	1082.5	259.3	967.8	2309.6	398,207
12	1174.8	261.1	971.1	2407.0	415,000

* Conversion factor: 5.8×10^6 BTU/Barrel of Crude Oil

category, the no-build alternative would yield the greatest savings while Alternative 12 would yield the least.

H. AQUATIC RESOURCES AND WATER QUALITY

1. Streams and Watersheds

A rough indication of potential effects to surface waters is the number of stream crossings involved. An alternative crossing a large number of streams would have greater opportunity for short-term or long-term effects on water quality than would an alternative with a small number of stream crossings. In addition, those alternatives crossing the reservoir or the watershed of the reservoir would have potential for greater impacts.

Table IV-16 shows the numbers of stream crossings and other surface water conditions impacted by the alternatives. The middle three columns show involvements within the South Fork Rivanna River Reservoir watershed. The last three columns show involvements with stream-related resources, wetlands and floodplains, which are discussed in other sections of this chapter.

Short-term water quality impacts are generally associated with construction and usually cease or greatly decrease upon completion of construction. Construction impacts are discussed in Section M.

Long-term impacts result from stormwater runoff from the completed highway. To estimate the impacts, a model developed for the Federal Highway Administration (Constituents of Highway Runoff, Vol. 3, FHWA/RD-81/044) was used to calculate runoff, pollutant buildup, and pollutant loadings. Rainfall data for use in the model was provided by the Rivanna Water and Sewer Authority. Pollutants analyzed included dissolved solids, suspended solids, nitrogen, carbon, phosphate, chloride, zinc, iron, copper, cadmium, and chromium.

Pollutant buildups and runoff concentrations depend on the length of the highway under consideration and the volume of traffic. Lower traffic volumes result in lower accumulations of pollutants while longer roadways have a greater dilution factor during rainfall events.

Of the seven new location alternatives, Alternative 7 would accumulate the greatest volume of pollutants while Alternative 10 would accumulate the least. Concentrations of pollutants in runoff would be lowest for Alternative 6B, followed by Alternatives 12 and 11. Concentrations would be greatest under Alternative 10.

Modeling for pollution loads of highway runoff showed that no violations of water quality standards will occur as a result of the project. The vegetated side slopes and ditches to be

TABLE IV-16

STREAM, RESERVOIR, WETLANDS, AND FLOODPLAIN IMPACTS OF EACH ALTERNATIVE

Alternative	Length (miles)	Stream Crossings	Reservoir Watershed			Wetlands		Flood-Plains Crossed
			Length (miles)	Stream Crossings	Reservoir Crossings	Sites	Acres	
6	8.1	27	0	0	0	5	1.5	7
6B	7.8	26	0	0	0	3	0.1	5
7	7.3	26	0	0	0	4	0.2	9
7A	7.0	27	0	0	0	4	0.2	9
9	3.3	4	0	0	0	1	0.1	0
10	5.4	13	4.2	10	0	1	0.1	0
11	9.4	28	7.4	19	1	3	0.3	4
12	12.9	41	8.4	23	1	4	0.6	8

established along the project should minimize any potential water quality degradation attributable to normal highway runoff.

Surface water involvements and water quality analyses are discussed in detail in the Aquatic Resources and Water Quality Technical Memorandum which is available for review.

2. Wetlands

Alternatives were compared based on the number, acreage, and functional values of the wetlands identified within the rights-of-way. Table IV-17 includes this comparison of sites and total acreage. Few wetlands sites were encountered during this study, and all but one were under 1/4 acre in size. This one sand bar by the Rivanna River would not be impacted greatly by bridging, or could be avoided altogether by a slight shift of Alternative 6. Including this site, Alternative 6 impacts on the greatest number and area of wetlands.

Due to the small size and low functional values of the wetlands encountered during the study, no significant impacts to wetlands will occur. In accordance with Executive Order 11990, "Protection of Wetlands," wetlands were given special consideration in developing and evaluating alternatives and have been avoided where practical. Where unavoidable, impacts will be minimized by measures such as bridging and best management practices. Mitigation of unavoidable impacts will most likely consist of construction of replacement wetlands.

During the detailed project design phase, specific information will be developed as follows:

- Selection of project design parameters for each stream crossing that may affect wetlands.
- More precise determination of specific wetlands impacts, including acres by type and affected functional values.
- Development of a reasonable mitigation approach based on the wetland area affected and its functional value.

3. Groundwater

Highway construction can influence groundwater storage levels by interrupting groundwater flow, reducing aquifer recharge area, and lowering the water table in the surrounding area. In addition, runoff from the highway can potentially degrade water quality.

On a regional scale, groundwater impacts of the proposed highway would be minimal. Numerous aquifers are available for use in the project area and ample precipitation exists for aquifer recharge. The recharge areas of the major aquifers are relatively extensive; and

TABLE IV-17

WETLANDS IMPACTED

Station	Description	NWI Classification	Acres Impacted	Alternatives
01	Upper End of Flat Branch North of Laurel Hill Church	PF01E	0.009	6, 6B, 7, 7A
02	Upper End of Flat Branch South of Station 01 above Small Pond	PF01E	0.052	6, 6B, 7, 7A
05	Pond along Powell Creek below Hollymead Lake	PEM3	0.088	6, 6B, 7, 7A
23	Powell Creek South of Route 643	PF01E	0.029	6, 7, 7A
37	Rivanna River (sand bar)	R3FL2	1.334	6
56	Tributary to Morey Creek on SW side of Route 29/ Route 250 Interchange	PF01E	0.138	10, 11, 12
60	Tributary to Powell Creek along Route 29	PF01E	0.069	11
81	Pond along Tributary to Flat Branch along Route 29	PEM3	0.086	11
95	Upper end of Naked Creek	PSS1	0.180	12
100	Tributary to South Fork Rivanna River Reservoir	PF01E	0.006	12
108/109	Tributary to Ivy Creek	PF01E POWK PSS1	0.247	12
124	Ponded Area along Route 29	PEM3	0.146	9

the project area water table aquifer provides a reservoir for groundwater which recharges the confined aquifers. Water quality is generally acceptable in the study area, and the nature of the piedmont sediments helps filter out pollutants that enter the groundwater.

A potential impact of the proposed highway on groundwater storage (of artesian aquifers) involves a reduction of recharge potential. This impact will be minimal however, as the recharge areas of the major aquifers are very large in comparison to the area which would be covered by the highway.

Groundwater contamination may occur along the highway. Potential pollutants include deicers, pesticides and herbicides, accidental spills of hazardous materials during transportation, pavement tars, and vehicle emissions. The soils in the project area typically have low clay contents, therefore, pollutants have a good chance of reaching groundwater and localized contamination may occur. The unconsolidated nature of the sediments however, will help filter pollutants and decrease the possibility of regional groundwater quality impacts. Impacts on artesian aquifers would be basically limited to recharge areas. If a major spill of hazardous material occurred within one of these areas, the water within the aquifer could become contaminated.

4. Floodplains

Figure IV-15 shows the location of floodplain crossings by the Candidate Build Alternatives. Table IV-18 lists each crossing and its length.

Executive Order 11988, "Floodplain Management," requires that the risk of flood loss be reduced and that the impact of floods to human, safety, health and welfare be minimized. Floodplain encroachment is defined as any construction, reconstruction, repair, rehabilitation, or improvement undertaken within the limits of the 100-year floodplain.

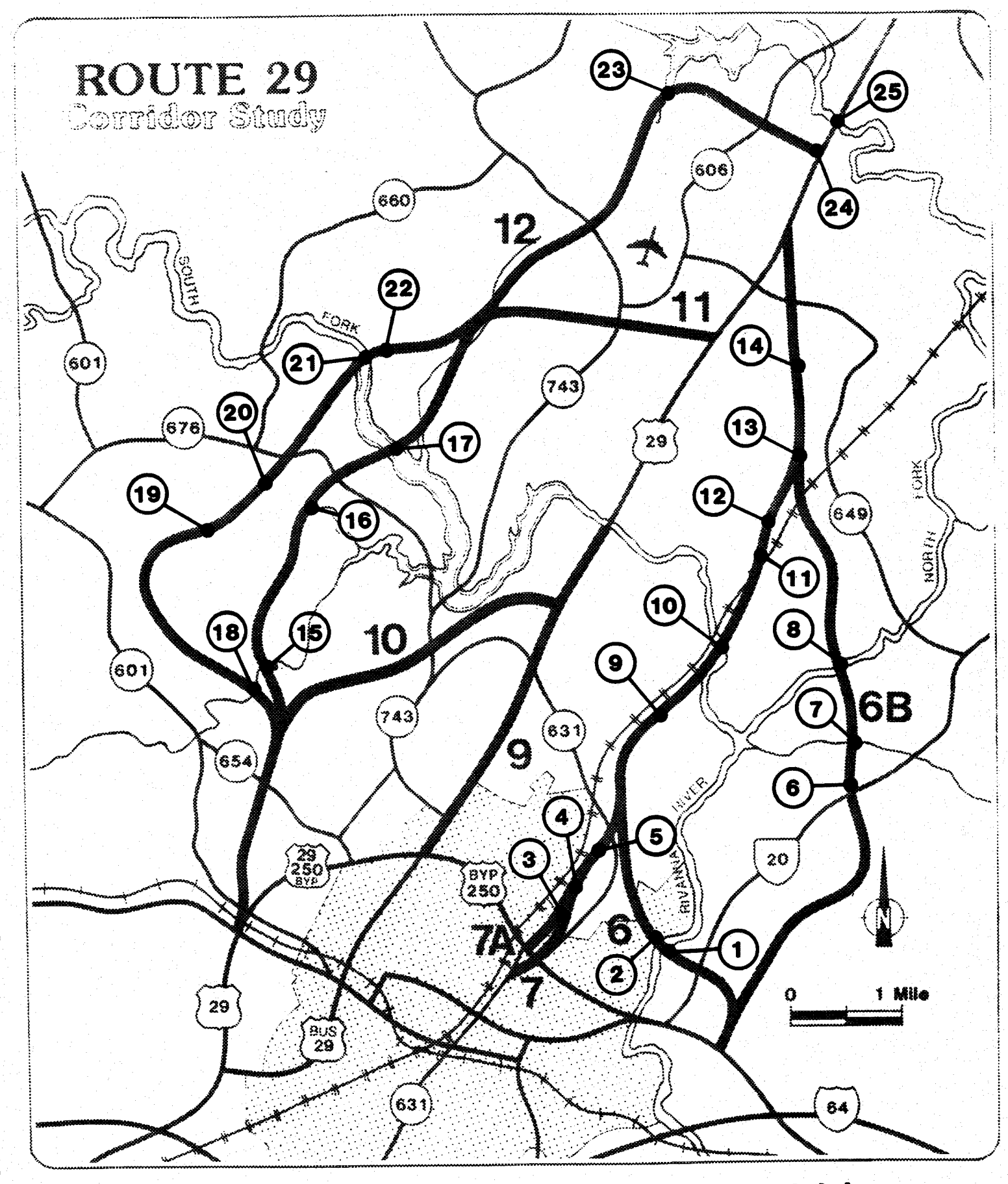
All of the project alternatives will have minimal effect on flooding risks. All drainage structures will be designed so that potential increases in flood levels will be minimal. No major impacts on natural and beneficial floodplain values have been identified. None of the alternatives will support incompatible floodplain development. Therefore, it appears that the project is consistent with Executive Order 11988.

5. Wild and Scenic Rivers

There are no designated National Wild and Scenic Rivers in the project area.

I. HABITAT AND WILDLIFE

Table IV-19 shows the acreage of various types of habitat within the right of way of each of the alternatives. Table IV-20 converts these habitat areas to high, moderate and low value habitats, and shows the percentages of each for the Candidate Build Alternatives.



Floodplain Crossing Sites

Figure No. **IV-15**

TABLE IV-18

FLOODPLAIN DATA AND TRAVERSING DISTANCE

Floodplain Crossing*	Stream	Alternative	100-Year Floodplain Length (ft)
1	Rivanna River	6	200
2	Rivanna River	6	2,660
3	Schenks Brook	7	220
4	Meadow Creek (Downstream)	7,7A	1,000
5	Meadow Creek (Upstream)	7,7A	340
6	Unnamed Stream (South of Redbud Creek)	6B	380
7	Redbud Creek	6B	220
8	North Fork Rivanna River	6B	680
9	Unnamed Stream (South of Westmoreland)	6,7,7A	400
10	South Fork Rivanna River	6,7,7A	420
11	Powell Creek (Downstream)	6,7,7A	780
12	Powell Creek (Upstream)	6,7,7A	180
13	Powell Creek (West of Proffit)	6,6B,7,7A	220
14	Powell Creek (Southeast of Hollymead)	6,6B,7,7A	440
15	Ivy Creek	11	220
16	Jumping Branch (South of Ivy Creek Church)	11	380
17	South Fork Rivanna River Reservoir	11	580
18	Ivy Creek	12	300
19	Jumping Branch	12	160
20	Unnamed Tributary to Jumping Branch	12	180
21	South Fork Rivanna River Reservoir	12	540
22	Unnamed Tributary to S. Fork Rivanna River Reservoir	12	180
23	Unnamed Tributary to Jacobs Run	12	160
24	Unnamed Tributary to North Fork Rivanna River	12	440
25	North Fork Rivanna River	12	640

* Number in Figure IV-15

TABLE IV-19

LAND COVER ACREAGES ALONG EACH ALTERNATIVE

Land Cover Classification	Alternative 6	6B	7	7A	9	10	11	12
Barren and Urban/Suburban/ Roadway	71.4	30.6	47.7	47.7	116.0	45.2	33.8	44.6
Agricultural	14.4	46.9	21.8	21.8	0.0	50.3	136.3	226.3
Forested	179.6	198.2	153.3	153.3	0.0	90.7	125.7	148.8
Old Field/Shrub	31.6	18.1	40.4	40.4	0.0	0.8	24.7	12.4
Wetland	1.5	0.2	0.2	0.2	0.2	0.2	0.3	0.6
Water	3.1	1.1	1.8	1.8	0.1	0.3	5.7	4.4
TOTAL	301.6	295.1	265.2	265.2	116.3	187.5	326.5	437.1

Note: Acreages computed assuming 300' right-of-way for lengths of new-location alternatives. Acreage for Alternative 9 includes existing roadway. For purposes of this analysis, Alternatives 7 and 7A assumed to be identical.

TABLE IV-20

HABITAT VALUE ALONG EACH ALTERNATIVE

Alternative	Habitat Value						Total Acres
	High		Moderate		Low		
	Acres	%	Acres	%	Acres	%	
6	212.7	70.5	14.4	4.8	74.5	24.7	301.6
6B	216.5	73.4	46.9	15.9	31.7	10.7	295.1
7/7A	193.9	73.1	21.8	8.2	49.5	18.7	265.2
9	0.2	0.2	0.0	0.0	116.1	99.8	116.3
10	91.7	48.9	50.3	26.8	45.5	24.3	187.5
11	150.7	46.2	136.3	41.7	39.5	12.1	326.5
12	161.8	37.0	226.3	51.8	49.0	11.2	437.1

Note: Acreages computed assuming 300' right-of-way for lengths of new-location alternatives. Acreage for Alternative 9 includes existing roadway. For purposes of this analysis, Alternatives 7 and 7A assumed to be identical.

Land cover along all eastern alternatives is predominately forested, with more land used for agricultural purposes and less as urban land. Over two-thirds of the land along Alternative 6 is of high wildlife value, while one-quarter of the alternative crosses low-value urban and open-water areas. Wildlife habitats along Alternative 6B rated as good encompass 73 percent of the total wildlife habitat areas. Land cover for Alternative 7 and 7A is similar to Alternative 6 since much of the area is common to both.

Nearly one-quarter of the land along Alternative 10 is considered urban or suburban habitat, low in terms of wildlife value. Alternative 11 reflects the more agricultural nature of the lands west of existing Route 29, with 42 percent of the total cultivated or pastoral fields. Land cover along this alternative is split mostly between high quality wildlife habitat and moderate habitat, with the remaining areas low in wildlife value. Alternative 12, being the longest of all study options, impacts on the greatest amount of terrestrial resources. Over half of this alternative is over agricultural fields, and only a third is forested. Overall, Alternative 12 is similar to Alternative 11 in terms of habitat value.

J. THREATENED OR ENDANGERED SPECIES

No threatened or endangered species would be affected by any of the Candidate Build Alternatives. There are no habitats within the study area considered critical to threatened or endangered species of wildlife within Albemarle County. There are no rare, threatened, or endangered species within the proposed alternative corridors as described in Chapter III. Populations of the James River spiny mussel have been located in Mechums River and Rocky Run in Albemarle County. Since both locations lie upstream of the proposed alignments, the James River spiny mussel would not be affected.

K. AGRICULTURAL AND FORESTAL IMPACTS

1. Agricultural Resources

Table IV-21 lists the acres of land in agricultural use impacted by each proposed alternative. Alternatives 11 and 12 impact the most agricultural land use. The right of way for Alternative 12 traverses 134 acres of farm land, excluding land in Agricultural/Forestal Districts, which is less than 0.1 percent of the total County acreage. On the east side, Alternative 6B, at 48 acres, impacts the most farmland. Alternatives 7 and 7A have the least farmland impact of the new location alternatives. Alternative 9, the expressway, has no farmland impact.

The Farmland Protection Policy Act of 1981 pertains to evaluation of farmland conversions to nonagricultural uses. The evaluation normally involves completion of an impact rating score sheet. For this project, information necessary for the Soil Conservation Service to estimate the relative value of farmland and to complete the score sheet is not available. Therefore, the impact rating cannot be done.

TABLE IV-21

AGRICULTURAL/FORESTAL IMPACTS OF ALTERNATIVES (ACRES)

Alternative	Agricultural Land Use*	Forestal Land Use*	Agricultural/ Forestal Districts	Prime Farmland Soils
6	27.9	18.8	0.0	89.5
6B	47.6	16.8	0.0	78.1
7	11.9	7.9	0.0	78.2
7A	11.9	7.9	0.0	78.2
9	0.0	0.0	0.0	**
10	31.7	0.0	13.5	48.7
11	100.1	0.0	116.3	101.7
12	133.9	0.0	174.2	157.6

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* Excludes Agricultural and Forestal District acreage.

** Current right-of-way and development preclude the creation of new impacts upon prime farmlands soil found along existing Route 29.

2. Prime Farmland

Table IV-21 lists the acres of prime farmland soils impacted by each proposed alternative. The range of prime farmlands soils impacted by the new location alternatives varies from 78 to 159 acres. The impact of each alignment is generally proportional to its length. Alternative 9, the Expressway, would have no impact on prime farmland soils.

3. Forest Resources

Table IV-21 shows the acres of forestal land use (land used for commercial production of forest products) required for the right of way of each of the alternatives, exclusive of land in Agricultural/Forestal Districts. The loss of forestal land use acres is greatest along Alternative 6 with 18.8 acres, while 6B and 7 and 7A have a project loss of 16.8 and 7.9 acres, respectively. The remaining alternatives do not impact upon designated forestal land use areas.

The construction of a roadway through a forested area creates several direct impacts upon the forest community. The stripping of the forest canopy and underbrush along a highway corridor also affects the soil, hydrology, and, wildlife habitat, as well as the economic potential for forest products.

4. Agricultural/Forestal Districts

Table IV-21 shows the acres of land in Agricultural/Forestal Districts that would be taken for the right of way for each of the alternatives. Alternative 10 would take about 14 acres, Alternative 11 about 116 acres, and Alternative 12 about 174 acres. Much of the area to the north of Charlottesville is in Agricultural/Forestal Districts and it is not possible to avoid taking portions of the Districts for these alternatives. The east side alternatives and the Expressway do not go through any Agricultural/Forestal Districts.

L. HAZARDOUS WASTES

The Charlottesville-Albemarle Emergency Services Coordinator has indicated that there are no known hazardous waste sites within any of the proposed alternative areas. Consultation with other agencies such as the U.S. Environmental Protection Agency and the Virginia Department of Health also revealed no known hazardous waste sites in the area.

Existing and past land uses along the alternatives were reviewed using a combination of aerial photographs and field investigation. No hazardous waste sites were discovered. Because past and present land use in most of the study area for the new location alternatives is rural, consisting mostly of agricultural, forest, and residential activities, there is little potential for hazardous waste sites. None of the alternatives cross any dumps,

landfills, auto graveyards, waste piles, manufacturing plants, or similar facilities likely to contain hazardous material.

As a precautionary measure in estimating right-of-way costs, it has been assumed that buildings displaced by the alternatives may contain asbestos. Only after a thorough inspection of each building after selection of an alternative will it be feasible to positively determine if asbestos is in fact present. If it is, then it will be disposed of in accordance with all applicable regulations of the hazardous waste laws.

The presence of hazardous materials in our environment is unavoidable in today's society. Transportation of hazardous materials is regulated by the Department of Transportation under strict packaging, manifesting, handling, and placarding requirements. Despite all precautions, however, the potential for accidents involving these materials is ever-present. The risk can be reduced by providing highways with safe design, including wide shoulders, a median separating oncoming traffic and appropriate roadway geometry.

Part of the study area is particularly sensitive to spills because two of the western alternatives, Alternatives 11 and 12, cross the South Fork Rivanna Reservoir. Alternative 10 crosses a portion of the reservoir's watershed. This reservoir is the main water supply in Charlottesville.

The risk of a hazardous material spill directly into the reservoir appears slight since only 360 feet and 230 feet of Alternatives 11 and 12, respectively, are directly over the reservoir. A spill within the watershed would have varying consequences depending on how far from the reservoir itself the spill occurred. The immediate risk to humans of a spill within the watershed would be related to how quickly contaminated water got into the distribution system. The water intake is located at the east end of the reservoir, approximately three miles downstream from Alternative 11 and four miles downstream from Alternative 12. If either of these alternatives are selected, it appears that, should a spill ever occur, there would be sufficient lead time to shut down the intake before any contaminated waters could enter the distribution system.

The potential for a rare hazardous spill or accident in close proximity to a concentration of people, especially children, is a concern expressed by several citizens. Schools are located adjacent to existing roads carrying trucks. For example, St. Annes-Belfield School is within 200 feet of US Route 29/250 Bypass and within 300 feet of Alternative 10. Mary Greer Elementary School is approximately 600 feet from Alternative 10. In 1988, representatives of the Charlottesville Fire Department compiled a list of hazardous materials being transported on U.S. Route 29 near Rio Road on week days during daylight hours. The materials included flammable gas, nonflammable gas, flammable solids, oxidizer, poison, corrosive, and radioactive substances. The data collected indicate that an average of 42 trucks per day during daylight hours are carrying some type of hazardous material. Should a western alternative be selected, it could be expected that many of these trucks would be using the new route and thereby passing the schools.

The Charlottesville-Albemarle Comprehensive Hazardous Substances Emergency Response Plan developed by the Local Emergency Planning Committee outlines procedures to be followed in the event of a hazardous materials incident. These procedures would be

followed by the local emergency response agencies in proportion to the type and seriousness of the incident.

M. CONSTRUCTION IMPACTS

"Construction impacts" refers to the short-term environmental impacts resulting from the process of constructing the project. They can involve changes in air quality, water quality, noise, traffic flow, and access to properties.

1. Water Quality

Short-term water quality impact will come from erosion and associated sedimentation. Erosion results when the ground surface is bared from clearing and earthmoving operations. After entering streams, the eroded material may increase turbidity levels and sedimentation downstream. Excessive quantities of suspended solids can harm fish and other aquatic life. Deposition of suspended solids may alter the substrate of stream beds, interfere with plant production and fish spawning, smother benthic fauna, and reduce substrate utilization.

Eroded material may also contain organic matter and nutrients, such as nitrogen and phosphorus. High inputs of organic matter may result in an increase in biological oxygen demand decreasing dissolved oxygen concentrations. Additionally, inputs of nutrients can increase both turbidity and eutrophication by increasing algae production.

Erosion and sediment control measures will be implemented to minimize water quality impacts from increased levels of sedimentation and turbidity. Control measures may include berms, dikes, sediment basins, fiber mats, straw silt barriers, netting, mulch, temporary and permanent seeding, and other methods. Construction impacts to in-stream aquatic habitats may be minimized to the extent practicable by avoiding stream relocations and by crossing streams at right angles. To the extent possible, construction equipment will be restricted from fording and otherwise disrupting in-stream habitats.

2. Air Quality

Construction impacts on air quality include exhaust emissions from construction equipment and dust generated by construction activities on disturbed earth. Additional emissions could be generated by burning of debris from clearing operations. These impacts would be temporary and would be minimized by enforcement of construction specifications and adherence to the Virginia Department of Air Pollution Control's regulations.

The Virginia Department of Transportation's Road and Bridge Specifications (January 1987) regulate construction procedures on all projects. The Specifications require the contractor to comply with all applicable laws, ordinances, regulations, orders, and decrees. This includes compliance with emissions standards for construction equipment and

adherence to regulations for burning of materials from clearing and grubbing, demolition, or other operations.

The Specifications have been reviewed by the State Air Pollution Control Board and found to conform with the State Implementation Plan. The Specifications prohibit burning of tires, asphaltic materials, used crankcase oil, or similar materials which produce dense smoke. Provisions will be included in the contract for allaying dust resulting from construction activities. Temporary air quality impacts from construction are not expected to be significant.

3. Noise

Noise receptors that would be sensitive to highway traffic noise would also be sensitive to noise from construction equipment while the project is being built. To minimize the effects of construction noise, the Virginia Department of Transportation's Road and Bridge Specifications contain noise control provisions. Following are some of the major elements of these provisions.

- Equipment shall in no way be altered so as to result in noise levels which are greater than those produced by the original equipment.

- The contractor's operations shall be performed in such a manner that the exterior noise levels measured at a noise sensitive activity shall not exceed 89 dB(A) during periods of such activity.

- The Department reserves the right to prohibit or restrict to certain portions of the project, any work which produces objectionable noise during normal sleeping hours, 10 p.m. to 6 a.m., unless other hours are established by local ordinance in which case the local ordinance shall govern.

4. Traffic Flow

Alternative 9, the Expressway, would have the most severe impact on traffic flow during construction, as it would be constructed along a busy existing highway. Construction phasing would attempt to minimize traffic impacts. This is discussed in detail in the Engineering Report. Two through lanes would be maintained in each direction throughout the construction process. Some traffic delays could be expected because of lane detours and the temporary narrowing of travel lanes. The number of turning lanes at intersections also might have to be reduced at times. Direct access to businesses could be affected, though some access would be maintained at all times.

The other alternatives, being constructed on new location, would have less severe traffic impacts during construction. Where the road crosses some existing roads, temporary

detours during construction of bridges might cause minor delays. The more complicated terminus points of each new-location alternative would have greater impacts on traffic, though it is anticipated that all roads would remain open during construction.

N. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The local short-term uses of the environment principally include the construction impacts described in the previous section and the resources used in construction of the highway improvements, including materials, energy, and labor. The short-term environmental impacts and use of resources must be balanced against the long-term benefits of the project, both locally and regionally.

Route 29 is a major transportation artery for Charlottesville and Albemarle County as well as for the state and the larger region, as discussed in Chapter I. Improvements to the traffic-carrying capacity of Route 29 are based on local and state transportation plans, and are needed to assure the productivity of the local area and the larger region. The local short-term impacts and use of resources for the project are consistent with the maintenance and enhancement of long-term productivity.

O. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Implementation of any of the Candidate Build Alternatives involves a commitment of natural, physical, human, and fiscal resources. Land used in the construction of a highway is considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. At present, there is no reason to believe such a conversion will ever be necessary or desirable.

Considerable amounts of fossil fuels, labor, and highway construction materials such as cement, aggregate, and bituminous material are expended. Additionally, large amounts of labor and natural resources are used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply and their use will not have an adverse effect upon continued availability of these resources. Any construction will also require a substantial one-time expenditure of both state and federal funds, which are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area, state, and region will benefit by the improved quality of the transportation system. These benefits will consist of improved accessibility and safety, savings in time, and greater availability of quality services, which are anticipated to outweigh the commitment of these resources.

V. LIST OF PREPARERS

The persons listed below were responsible for management and review of this Environmental Impact Statement and related technical memoranda and background studies.

Name	Primary Responsibilities
Virginia Department of Transportation	
Gene Wray	Project Manager Document review
Ken Wilkinson	Contract Manager Document review
J. Phillip Hopkins	Review of traffic analyses
Cary Adkins	Review noise study
Sam Curling	Review air quality analysis
David Ramsey	Review water quality analysis
R.P. Morris	Review engineering data
Don West	Review wildlife data
Arthur H. Taylor, III	Right of way and relocation data
Federal Highway Administration	
George E. Kirk	District Engineer Document review
B.J. Davis	Area Engineer Document review

The persons listed on the following pages were responsible for preparation of this Environmental Impact Statement, related technical memoranda, and background studies.

Name	Education and Experience	Primary Responsibilities
Sverdrup Corporation		
Richard C. Brown	BSCE; 32 years experience in traffic engineering and transportation planning	Project Manager
Margaret M. Ballard	M.S. in Urban Planning; 16 years experience in transportation planning	Deputy Project Manager; Public Involvement
David D. Metcalf	BSCE; MBA; 13 years experience in transportation planning	Engineering and Cost Estimating
J. Stuart Tyler	M.S. Civil Engineering 12 years experience in highway planning and environmental analysis	Noise, Air, and Energy Studies; Document Preparation
Richard C. Hartman	M.C.P.; 15 years experience in transportation planning	Socio-Economic Analysis and Report Preparation
Laura L. Greene	B.S. Geography; 3 years experience in highway planning and environmental studies	Public Involvement and Assistance in Noise and Air Studies
Sheila A. Cohen	B.A. Geography; 3 years experience in highway planning and environmental studies	Placement of Horizontal and Vertical Alignments on CADD
James M. Beers	Associates Degree; 4 years experience in graphic design	Preparation and Coordination of all Graphics
Joseph T. Erchenian	Associates Degree; 17 years experience in design and construction management	Design of Horizontal and Vertical Alignments
Rafik Bazikian	MEA; 9 years experience in highway and transportation engineering	Quantities and Engineering Cost Estimating

Name	Education and Experience	Primary Responsibilities
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J. Sanderson Stevens	M.A. Anthropology; 11 years experience conducting historic architectural projects	Supervised the Investigations of the Prehistoric Archaeologic Sites
Richard Meyer	M.A. Architectural History; 11 years experience conducting historic architectural projects	Supervised the Survey and Evaluation of Historic Architectural Resources
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Name	Education and Experience	Primary Responsibilities
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James R. Reed	Ph.D. Biology-Fishery Biology; 16 years experience in preparing environmental assessments and impact statements	Supervised and Coordinated the Biological Studies and Contributed to the Project Final Report
Robert A. Neely	M.S. Forestry and Wildlife Biology; 12 years experience in environmental analysis and impact assessment for terrestrial and aquatic ecosystems	Project Manager for natural resources studies
Thomas A. Stierhoff	B.S. Biology/ Biochemistry	Conducted Assessments of Wildlife Habitat Resources, Wetlands, and Rare and Endangered Species
Daniel Gonzales	B.S. Wildlife Management	Conducted Assessments of Terrestrial and Aquatic Ecosystems

VI. DISTRIBUTION OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

This document is being distributed to the following public agencies and officials for review. Additional copies are being made available for public review at local libraries and other locations.

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VII. COORDINATION AND COMMENT

Project coordination and solicitation of comments included coordination with local governments and public advocates and an active citizen participation program.

A. AGENCY COORDINATION

The principal mechanism for coordination with local governments was the Joint Transportation Committee, which met throughout the course of the study. Other coordination with state and local agencies is also described in this section.

1. Joint Transportation Committee

Members of the Project Study Team met with the Joint Transportation Committee (also referred to as the Route 29 Task Force) throughout the project. The Joint Transportation Committee consisted of elected officials and staff from Albemarle County, the City of Charlottesville, and the University of Virginia. The purpose of the meetings was to keep local officials abreast of the study process and to receive their opinions/concerns about the project.

The Joint Transportation Committee members contributed directly to the study process in a variety of ways. They commented during the development and initial screening of preliminary alternatives and requested that specific segments be included in the analysis. The Committee suggested factors to be examined in the impact matrix comparing the conceptual alternatives and facilitated in providing relevant data from previous plans and studies.

Work sessions occurred at the milestones of the project where the Project Study Team and the Joint Transportation Committee would jointly discuss the alternatives and the implications of each. Individual committee members also met at times with the Project Study Team to provide suggestions on the location and design of specific alternatives.

The public and press were welcomed at Committee meetings, providing an opportunity to keep the public informed throughout the course of the study. There have been nine meetings of the Project Study Team with the entire Joint Transportation Committee. Several additional meetings between individual members of the Joint Transportation Committee and the Project Study Team have been held.

2. Other Local Coordination

In addition to the formal meetings of the Joint Transportation Committee, the Project Study Team had numerous contacts with and held working sessions with staff persons from local agencies, including the Albemarle County Departments of Engineering, and Planning and

Community Development, the Charlottesville Department of Community Development, the University of Virginia, the Charlottesville-Albemarle Airport, the Thomas Jefferson Planning District Commission, and the Charlottesville City Council.

3. Interagency Coordination

In November 1987, letters were sent to federal, state, and local agencies informing them of the development of the Draft Environmental Impact Statement for the Route 29 project. A Notice of Intent to prepare an Environmental Impact Statement was published in the Federal Register November 12, 1987.

On September 22, 1988, an interagency coordination meeting was held in Richmond. Representatives of state and federal agencies were given a presentation on the project and were invited to comment. A list of agencies invited to the meeting and a summary of their comments is presented in Table VII-1.

Among the agencies submitting correspondence on the project were the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE). The EPA offered guidelines, which have been followed in the appropriate chapters, on the consideration of alternatives and the types of environmental impacts to be examined. The COE's primary concern was for the evaluation of wetland impacts, which are discussed in Section F of Chapter III and Section H of Chapter IV.

B. CITIZEN INVOLVEMENT

An extensive citizen participation effort was made to keep the public involved and informed throughout the course of the study. It included citizen information meetings, presentations before special interest groups, newsletters, and a telephone "hotline."

1. Citizen Information Meetings

Two citizen information meetings and an "open house" have been held during the course of the study. The first citizen information meeting was held on December 14 and 15, 1987, from 1:00 p.m. to 9:00 p.m., at the University Hilton Hotel. The purpose of the meeting was to familiarize residents with the study and to obtain public comment on the study process and the initial range of alternatives. More than 300 citizens attended the meeting during the two-day period. They submitted approximately 150 comment cards at the session. The meeting was conducted in an "open forum" format with a formal project briefing lasting for approximately one half hour on each evening. Members of the Project Study Team were available to answer and discuss questions concerning the study.

The second citizen information meeting was held on June 15 and 16, 1988, from 1:00 p.m. to 9:00 p.m. at the University Hilton Hotel. A total of 823 citizens signed the attendance

TABLE VII-1

SEPTEMBER 22, 1988, INTERAGENCY COORDINATION MEETING

Agency	Comments
Federal	
Fish and Wildlife Service	Not present
Environmental Protection Agency	Glad you are pursuing the elevated concept. Lynn Rothman is the contact person for EPA. Requested a field review of the project areas.
National Marine fisheries Service	No Comment.
Army Corps of Engineers	We received the Corridor Study on October 4, 1988 and will send comments when our review of its is complete.
United States Coast Guard	Not present.
State	
Virginia Water Control Board	Defer to group consensus.
Marine Resources Commission	Not present.
Division of Parks and Recreation	Provided comments previously to VDOT as part of Department of Conservation and Historic Resource letter on EIS.
Virginia Institute of Marine Science	Not present.
State Health Department	Not present.
Department of Game and Inland Fisheries	Will hold comment for the DEIS.
Division of Soil and Water Conservation	Not present.
Council on the Environment	Will hold comments for DEIS.
Natural Heritage Program	Not present.

register during the two days. More than 1400 brochures and 700 copies of Newsletter No. 3 were distributed at the meeting. This meeting provided citizens the opportunity to review the study process, the quantitative comparison of the 27 conceptual alternatives, and the six alternatives that were recommended for further study in the Draft Environmental Impact Statement. People were given the opportunity to state their opinions concerning these alternatives. The meeting was conducted in an open, informal format with display boards, continuous automatic slide presentation, brochures, and comment sheets. Members of the Project Study Team were available to answer and discuss questions concerning the study. Approximately 290 comment cards were turned in at the meeting.

An "Open House" meeting was held on June 8, 1989, from 1:00 p.m. to 9:00 p.m. and on June 9, 1989, from 9:00 a.m. to 4:00 p.m. at the County Office Building. The primary purpose of this open house was to allow the public to review and ask questions about the preliminary 1"=200' plan sheets of the alternatives being studied in the Draft Environmental Impact Statement and the detailed traffic data available at that time. Following this open house, the maps and data remained at the County Office Building where they were available for the public and local agencies.

2. Interest Group Meetings

As part of the continuing commitment of the Virginia Department of Transportation to inform the public about the project, over 20 meetings were held with various interest groups. Table VII-2 summarizes these meetings, which provided for an exchange of ideas and information relevant to the project.

Members of the Project Study Team were also in attendance at several local public hearings and meetings such as those on the Comprehensive Plans of both the City and County.

3. Location Public Hearing

The formal Location Public Hearing will be held after the release of this Draft Environmental Impact Statement. The information presented at the hearing will illustrate the potential impacts, both beneficial and adverse, of the alternatives studied and presented in the Draft Environmental Impact Statement. A stenographer will be present to make a transcript of verbal comments from the citizens concerning the project. Written comments can be submitted within 10 days following the hearing.

4. Newsletters

The Route 29 Project Study Team published and distributed seven newsletters reporting the progress and upcoming events of the Route 29 Corridor Study. Two more newsletters are expected to be published during the remainder of the project. The eighth newsletter will

inform the citizens of the Location Public Hearing and release of the Draft Environmental

TABLE VII-2

INTEREST GROUP MEETINGS

Date	Organization
1/25/88	League of Women Voters
2/22/88	5 C's Committee
4/7/88	ALERT
4/15/88	Joe Passaneau (Piedmont Environmental Council Consultant)
5/3/88	Carrsbrook Homeowners Meeting
6/16/88	Albemarle-Charlottesville Airport Director
6/18/88	GE Fanuc Corp.
7/21/88	University Real Estate Foundation
7/28/88	Developers of Branchlands Commercial Area
8/17/88	Key West Homeowners Association
9/28/88	Charlottesville Chamber of Commerce
10/6/88	Charlottesville Area Board of Realtors
10/12/88	Ivy Farm Homeowners Association
10/20/88	Blue Ridge Homebuilder's Association
10/26/88	Charlottesville/Albemarle Transportation Coalition
11/17/88	Community Planning Coalition
11/31/88	ALERT
2/28/89	American Society of Civil Engineers at UVA
3/14/89	Charlottesville Area Hazardous Waste Coordinator
4/26/89	Joe Passaneau and Tim Lindstrom
5/31/89	Charlottesville/Albemarle Transportation Coalition
6/5/89	Federation of Neighborhood Associations

Impact Statement. Another newsletter may be published after the Location Public Hearing summarizing the citizens comments and presenting the recommended alternative, if any.

The newsletter mailing list has been developed from 1) citizens calling on the "hotline" requesting their name be added to the list, 2) comment forms received at the first and second citizen information meetings, and 3) comment forms passed out at other meetings throughout the project. Approximately 1100 names are on the mailing list.

5. Telephone Hotline

A telephone hotline was installed at the beginning of the Route 29 Corridor Study, in December 1987. Citizens have used this toll free number (800-63-RTE29 or 800-637-8329) to receive information on the scheduling of the project, to voice their opinions and concerns, and to arrange meetings with the Project Study Team and their local neighborhoods and organizations. A member of the Study Team was available during working hours to answer the hotline, and people could leave comments on a recording after hours. Approximately 315 hotline calls have been received as of April, 1990.

6. Summary of Public Comments

Presented here is a summary of the major categories of comments expressed by the public. These include comments from citizens at the first and second citizen information meetings, hotline calls, and comment cards received during the project. It should be noted that there has not been a consensus established within the community of a preferred alternative or alternatives.

Some citizens support one or more of the bypass alternatives. Their comments state that a bypass will eventually be necessary and the time for construction is now. Many of these comments focus on safety and cost: that a bypass would improve the safety of Route 29 north by diverting trucks, and that the cost of a bypass is more reasonable than an expressway. Others oppose some or all of the bypass alternatives. They comment that any bypass would only help through traffic. Many of these comments express concern for potential impacts to rural areas, real estate values, and the South Fork Rivanna River watershed.

Groups have been formed within the community that both favor and oppose the expressway concept. Some people support the expressway because they are opposed to any bypass alternative. Others oppose the expressway due to its impacts to businesses and access along Route 29 north, or because they feel an expressway would be out of character with the community.

The following are among the specific categories of comments received from citizens:

* Watershed/reservoir concerns
* Air quality
* Noise impacts (construction and traffic)
* Agricultural-forestal districts impacts
* Parkland impacts
* Natural beauty of countryside impacted
* Safety (traffic and proximity to schools)
* Real estate values decreased by alternative(s)
* Concern about receiving fair value for homes/land taken
* Neighborhoods being divided, portions of property being taken
* Businesses being taken
* Affluence in area could determine location of alternative(s)
* Traffic being dumped into City/County
* Lower speed limit on Route 29N
* No problem with traffic at all
* Emergency vehicular response time
* Project could promote commercial and/or residential development
* Improve existing transit system (rail, bus service)
* Improve existing roads
* Limit truck traffic and control local shopping traffic in area
* Use overhead roads (along Rt. 29N or Southern Railroad)
* Cost versus traffic benefit

VIII. SECTION 4(f)/106 EVALUATIONS

A. DESCRIPTION AND NEED FOR THE PROPOSED ACTION

The need for the proposed action and descriptions of all the alternatives are included in Chapters I and II of this Draft Environmental Impact Statement.

B. OVERVIEW

The U.S. Department of Transportation Act of 1966 (23 U.S.C. 138 and 49 U.S.C. 303), Section 4(f), requires that no publicly-owned land from a public park or public recreation area, or land from a significant historic site be used for federal-aid highways unless there is no feasible and prudent alternative. Specific alternatives and actions to minimize harm must be considered. Furthermore, the Land and Water Conservation Fund Act of 1970, Section 6(f), requires land conversion approval by cognizant park authorities where these funds were used in purchase or development of park lands or facilities.

There are many parks and historic resources in the Charlottesville-Albemarle County area. Two alternatives under study would require use of land in three public parks; two alternatives would require use of land from two sites currently on or eligible for the National Register of Historic Places. Refer to Figure VIII-1 for a map of the project area, project alternatives, and general Section 4(f)/106 locations. Figure VIII-2 shows specific locations for 4(f) park locations. Figure VIII-3 shows specific locations for 4(f)/106 historic sites.

C. SECTION 4(f) EVALUATION ON RIVANNA AND PEN PARKS

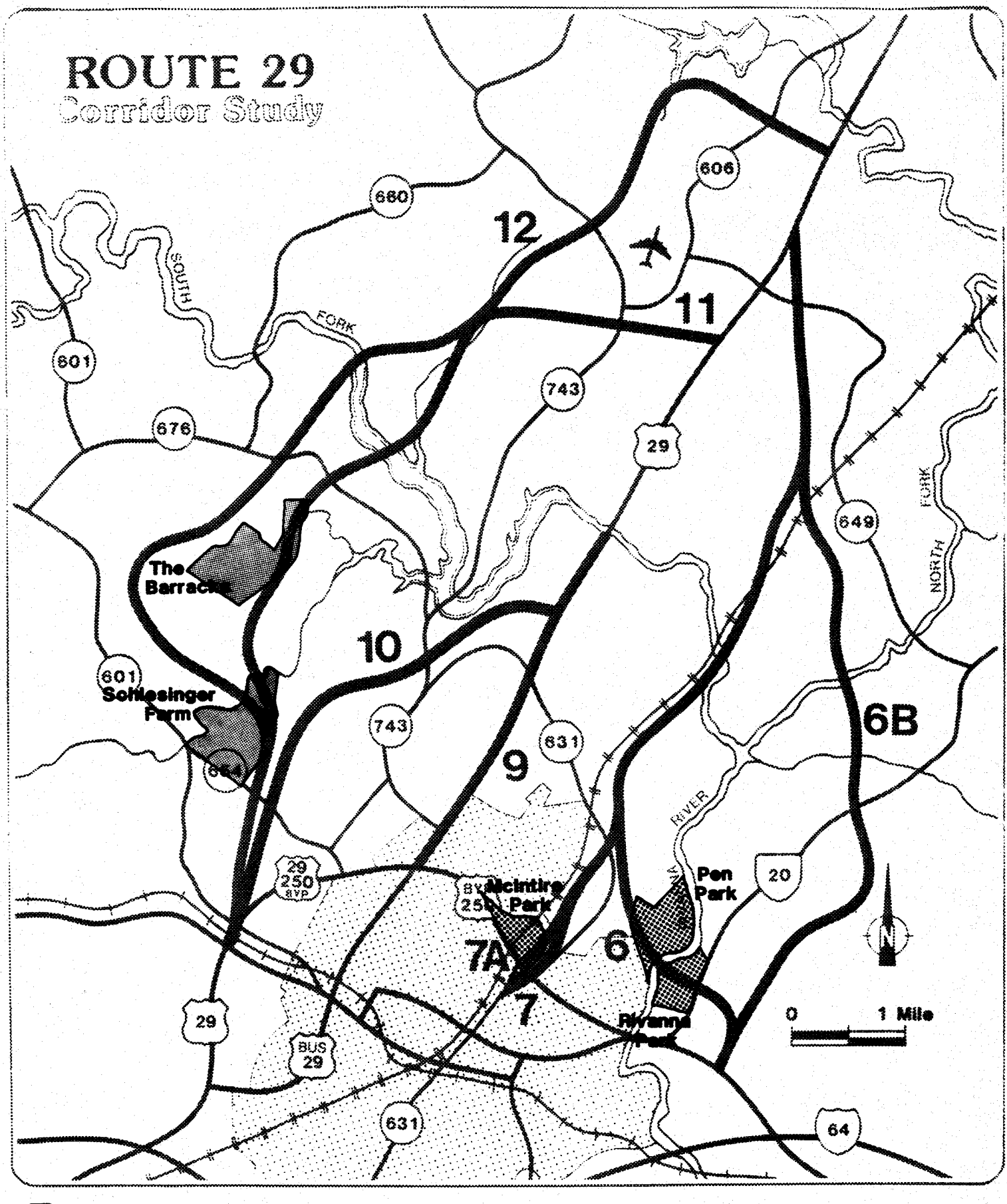
1. Description of Rivanna Park

a. Relationship to Alternatives

Figures VIII-1 and VIII-2 show the location of Rivanna Park in relation to the project alternatives. Figure VIII-4 is a detailed map of the park showing how it would be affected by Alternative 6.

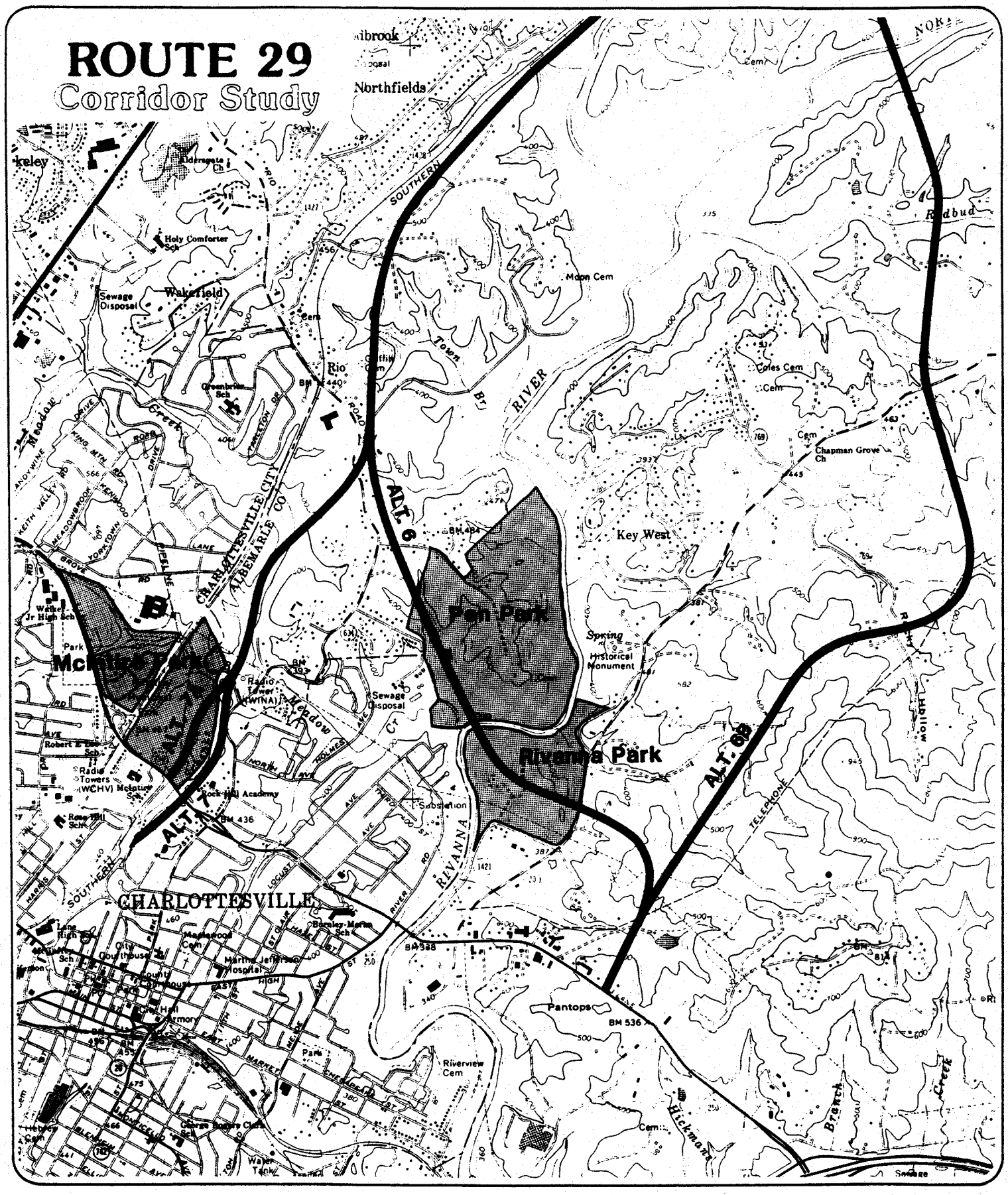
b. Size and Location

Rivanna Park is a new 111-acre park located in Albamarle County approximately one-half mile north of the intersection of U.S. Route 250 and Va. Route 20. The park is bounded by Elk Drive to the south, the Rivanna River to the west and north, and Route 20 to the east.



Location of 4(f)/106 Properties

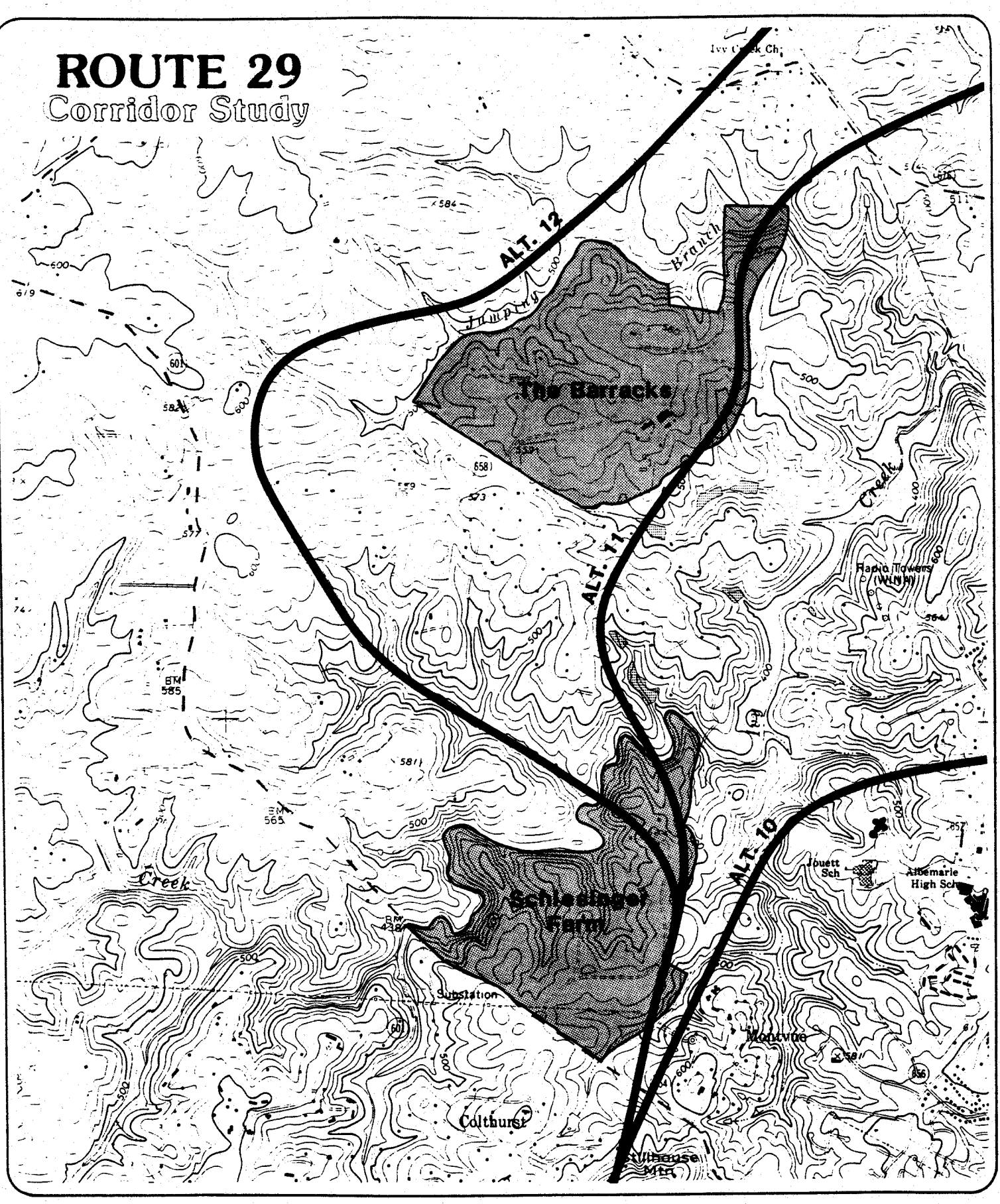
Figure No. **VIII-1**



4(f) PROPERTIES

Location of 4(f) Park Properties

Figure No. VIII-2

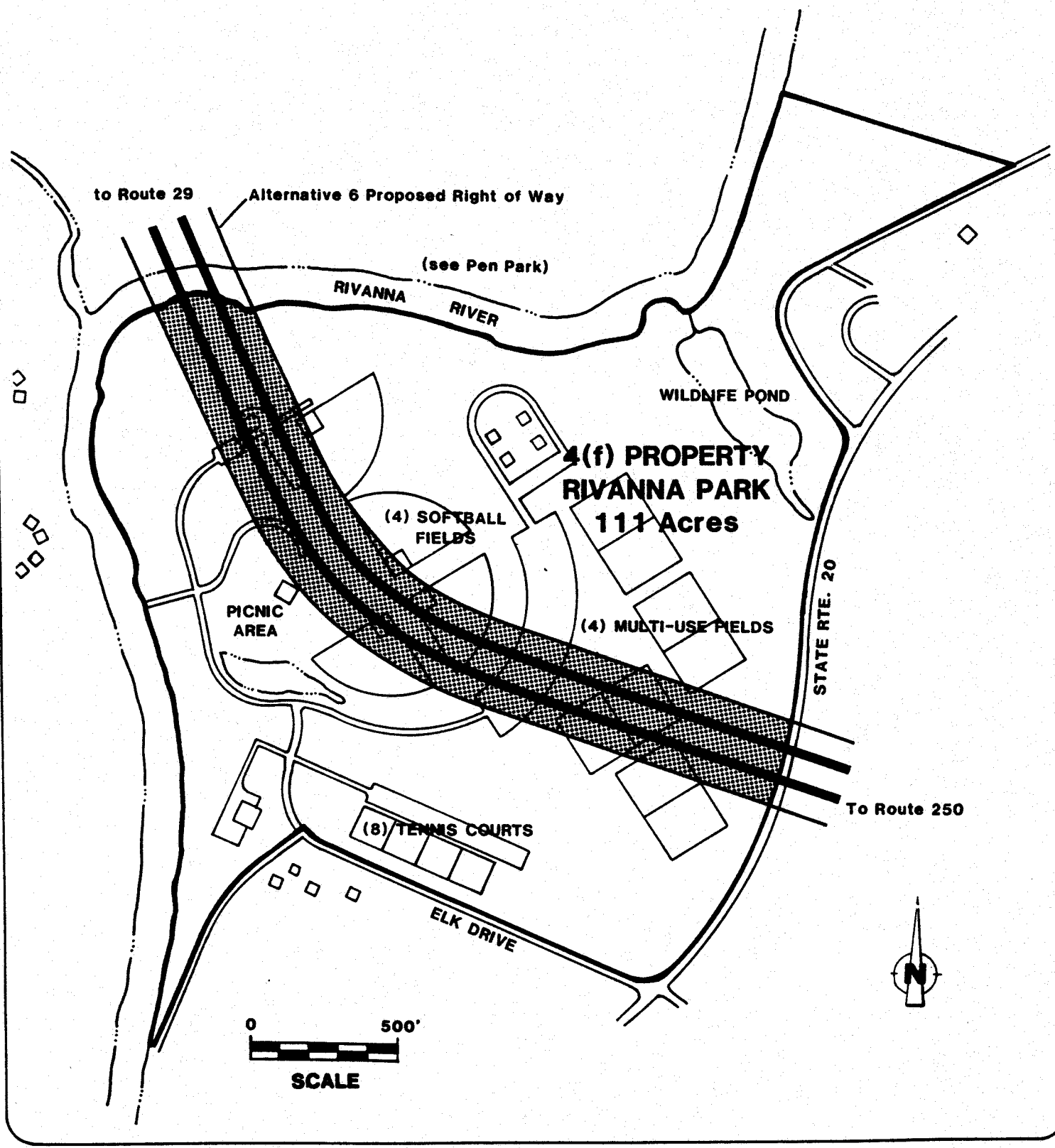


4(f)/106 HISTORIC PROPERTIES

Location of 4(f)/106 Historic Properties

Figure No. VIII-3

ROUTE 29
Corridor Study



AREA OF POTENTIAL 4(f) INVOLVEMENT
(18 Acres)

Rivanna Park

Alternative 6

Figure No. VIII-4

c. Ownership and Type of Property

Rivanna Park is a public park co-owned by the City of Charlottesville and Albemarle County.

d. Function

The function is to provide active and passive recreation, including ball playing, tennis, soccer, football and picnicking.

e. Facilities

The park offers, in its first phase of development, parking facilities, three unlighted softball fields, a concession building, four tennis courts, four multi-use fields and a playground. A wildlife pond is situated in the northeastern portion of the park; there are picnic and grassy areas adjacent to the river banks.

f. Access

Access is principally by automobile from Elk Drive off of Route 20.

g. Relationship to Similarly Used Lands

As shown in Figure VIII-2, Rivanna Park is immediately across the Rivanna River from Pen Park, the largest City-owned park. It is also within two miles of McIntire Park in the city of Charlottesville.

h. Applicable Clauses Affecting Ownership

There are no reversionary clauses affecting ownership. City and County funds for the park's purchase were supplemented by a grant from the Virginia Department of Transportation, and from the Virginia Outdoors Fund; Section 6(f) does not apply.

i. Unusual Characteristics

Rivanna Park is in a valley of the Southwest Mountain, and has been virtually entirely regraded since its purchase to provide level playing surfaces and to minimize encroachment of floods from the low-lying Rivanna River. It lies in Monticello's viewshed and is visible

from three neighboring historic properties. Adjacent land use to the east and south of the site is primarily residential, although the Elks Club is located south of Elks Drive.

2. Description of Pen Park

a. Relationship to Alternatives

Figure VIII-1 and VIII-2 show the location of Pen Park in relation to the project alternatives. Figure VIII-5 is a detailed image of the park showing how it would be affected by Alternative 6.

b. Size and Location

Pen Park is a 267 acre park located in the City of Charlottesville. It is situated east of Park Street, west of the Rivanna River, and approximately one mile north of U.S. Route 250 Bypass.

c. Ownership and Type of Property.

Pen Park is a public park, owned by the City of Charlottesville. It is the largest park in Charlottesville.

d. Function

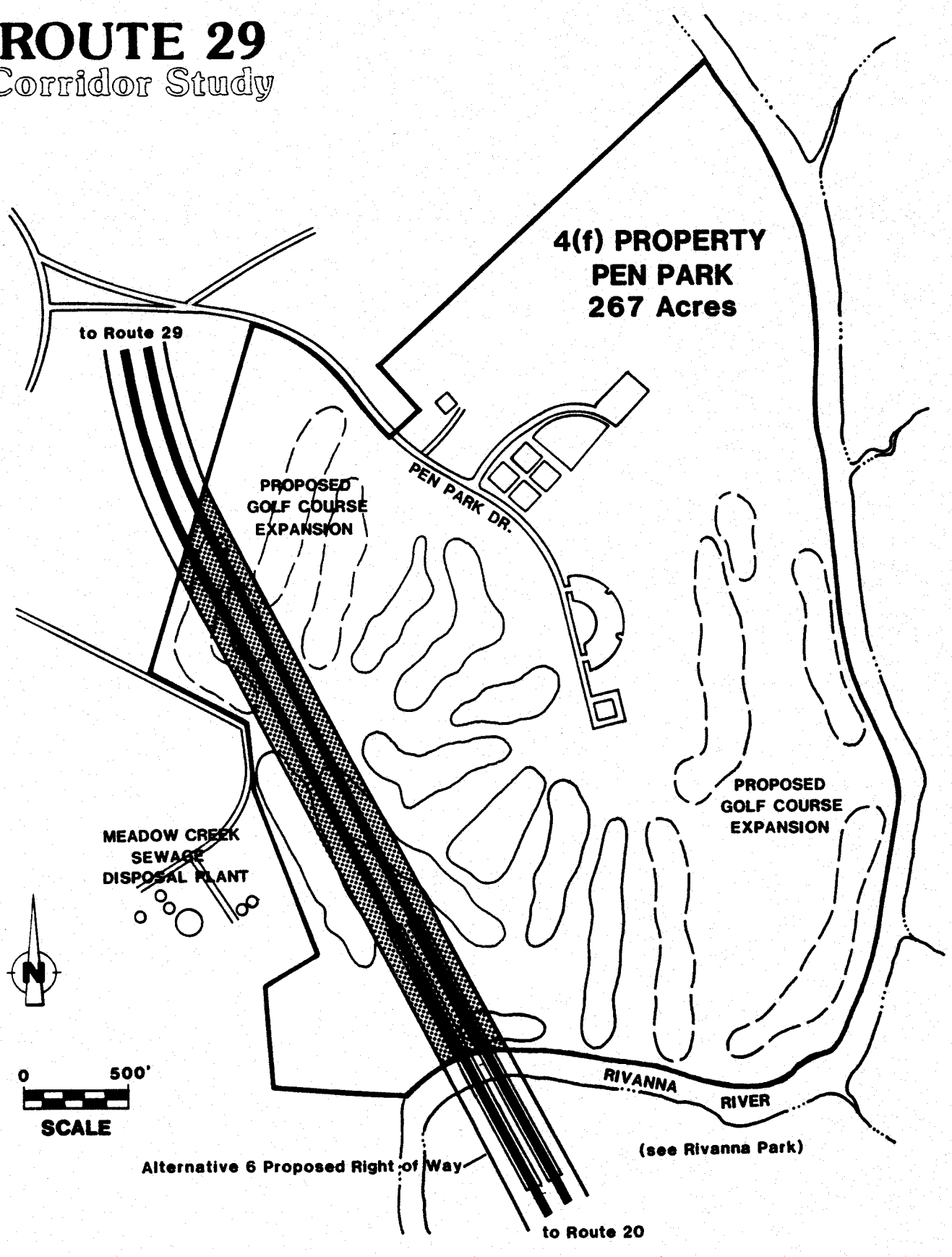
The function of the park is to provide active and passive recreation, including golf, tennis, soccer, Little League baseball, picnicking, and gardening.

e. Facilities

It contains a nine hole golf course, a club house and proshop, eight tennis courts, four outdoor picnic shelters, two soccer fields and a Little League baseball field. An outdoor physical fitness jogging course is specially adapted to also accommodate the blind and handicapped. Additionally, there are 223 garden plots available to rent from the City. Proposed enhancements to the present facilities at Pen Park include expanding the golf course to 18 holes, and a bike path and trail system linkage with Rivanna Park.

The City plans to expand the recreational capabilities of Pen Park to include bicycle paths, nature trails, boating facilities, and an amphitheater along the Rivanna River. There is a plan to provide "progressive tree planting" primarily near the shelters.

ROUTE 29
Corridor Study



AREA OF POTENTIAL 4(f) INVOLVEMENT
(12.6 Acres)

Pen Park

Alternative 6

Figure No. **VIII-5**

f. Access

Access to the park is via Pen Park Drive which intersects with Rio Road, with paved entrance and parking facilities. It is readily accessible to the entire City, and public transit service to Pen Park provides major recreational opportunities not available at neighborhood or community parks in other parts of the City.

g. Relationship to Similar Lands

As shown in Figure VIII-2, Pen Park is immediately across the Rivanna River from Rivanna Park. It is also within two miles of McIntire Park.

h. Applicable Clauses Affecting Ownership

There are no reversionary clauses affecting ownership. The majority of the park was purchased in 1972, with 33 more acres purchased in 1979; it was annexed to the City in 1988. Land and Water Conservation funds were used in the purchases, so Section 6(f) applies to any proposed action affecting any portion of the park.

i. Unusual Characteristics

The park is situated on rolling terrain, with views of several mountains and open land in all directions. The land to the west and north is residential, and to the south is industrial with the Meadowcreek sewage disposal plant. To the southeast, across the Rivanna River, lies the new Rivanna Park.

3. Impacts of Alternative 6 on Rivanna Park and Pen Park

Approximately 18 acres of parkland from Rivanna Park will be required by Alternative 6. The alignment is 300 feet wide, and traverses the center of the park for a distance of approximately 3,000 feet. It crosses two playing fields, half of the parking area, and two softball fields. Two of the remaining softball fields (one is undeveloped) will be in such close proximity to the alignment that they would have to be slightly realigned to be avoided.

Noise and air quality impacts to the park would result from Alternative 6. Noise levels will exceed Federal Highway Administration noise abatement criteria by two decibels and will increase 22 decibels over existing noise levels. The soccer fields and tennis courts in the park would be impacted by the increased noise levels. The Air Quality Analysis determined that Rivanna Park would experience only a slight increase (0.1 parts per million) in carbon monoxide concentrations.

Construction activities will have an impact upon water and air quality, noise, traffic flow, etc. Short-term water quality impacts will come from erosion and associated sedimentation.

Construction impacts on air quality would include exhaust emissions from construction equipment and dust generated by construction activities on disturbed earth. Additional emissions could be generated by burning of debris from clearing operations if this method of disposal is used.

The location of the alignment would alter the existing visual quality of the park by acting as a permanent divider of the facility. The most noticeable feature of the proposed roadway would be the bridge approximately 1400 feet long spanning the Rivanna River.

The western edge of Pen Park is impacted by Alternative 6, requiring approximately 12.6 acres. The alignment is approximately 300' wide and traverses the park for approximately 1,800 linear feet.

Although leaving the majority of the park intact, the alignment would impact three of the holes of the existing golf course, and impact two of the proposed holes for the course expansion. The entrance drive to the park would be crossed on structure, but outside the park boundary.

If Alternative 6 is built, noise levels will exceed Federal Highway Administration noise abatement criteria by two decibels and will increase 22 decibels over existing noise levels. Four remaining holes of the golf course would be impacted by the increased noise levels. The Air Quality Analysis determined that Pen Park would experience only a slight increase (0.1 parts per million) in carbon monoxide concentrations.

Construction impacts to Pen Park will involve dust and noise similar to those described in the previous discussion on Rivanna Park. The resulting visual impact is lessened somewhat because Alternative 6 is situated to one extreme side of the park, the side adjacent to the sewage disposal plant.

4. Avoidance Alternatives

Alternative 6B was specifically developed as an alternative to avoid Rivanna Park and Pen Park. Its termini are the same as those of Alternative 6 but most of its alignment lies further east to avoid historic sites and residential areas. Any alternatives closer to, but still outside the park, would have severe impacts on residential communities.

Alternative 6B the avoidance alternative, would not take any park land, though it would take 46.7 more total acres for right-of-way than Alternative 6. Alternative 6B would displace seven fewer families and impact 85 fewer noise receptors than Alternative 6. Alternative 6B would have a total cost about $4.6 million more than Alternative 6 and would be about 0.3 miles shorter.

5. Measures to Minimize Harm

Should this Alternative 6 continue to be studied following public and agency review of the Draft Environmental Impact Statement and the Location Public Hearing, all possible measures to minimize harm to both Rivanna Park and Pen Park would be undertaken.

Consideration will be given to reducing the roadway typical section through the parks, depressing the roadway, providing landscaped screening, and other techniques to reduce impacts.

Crossing of the Rivanna River and floodplain will be on structure; passive recreation uses under the structure (e.g. fishing) are possible.

Construction activities would involve all necessary permitting, sedimentation and erosion control, and restoration work.

In the case of Pen Park, suitable replacement property of at least equal fair market value and reasonable equivalent usefulness and location will be sought in accordance with Section 6(f) regulations.

6. Coordination

Documentation for Rivanna Park and Pen Park included contacts with the City Department of Parks and Recreation and Department of Community Development. Should Alternative 6 be selected, additional coordination, specifically with the Virginia Department of Parks and Recreation will be necessary to satisfy Section 6(f) requirements of documentation of approved mitigation plans for Pen Park.

D. SECTION 4(f) EVALUATION ON MCINTIRE PARK

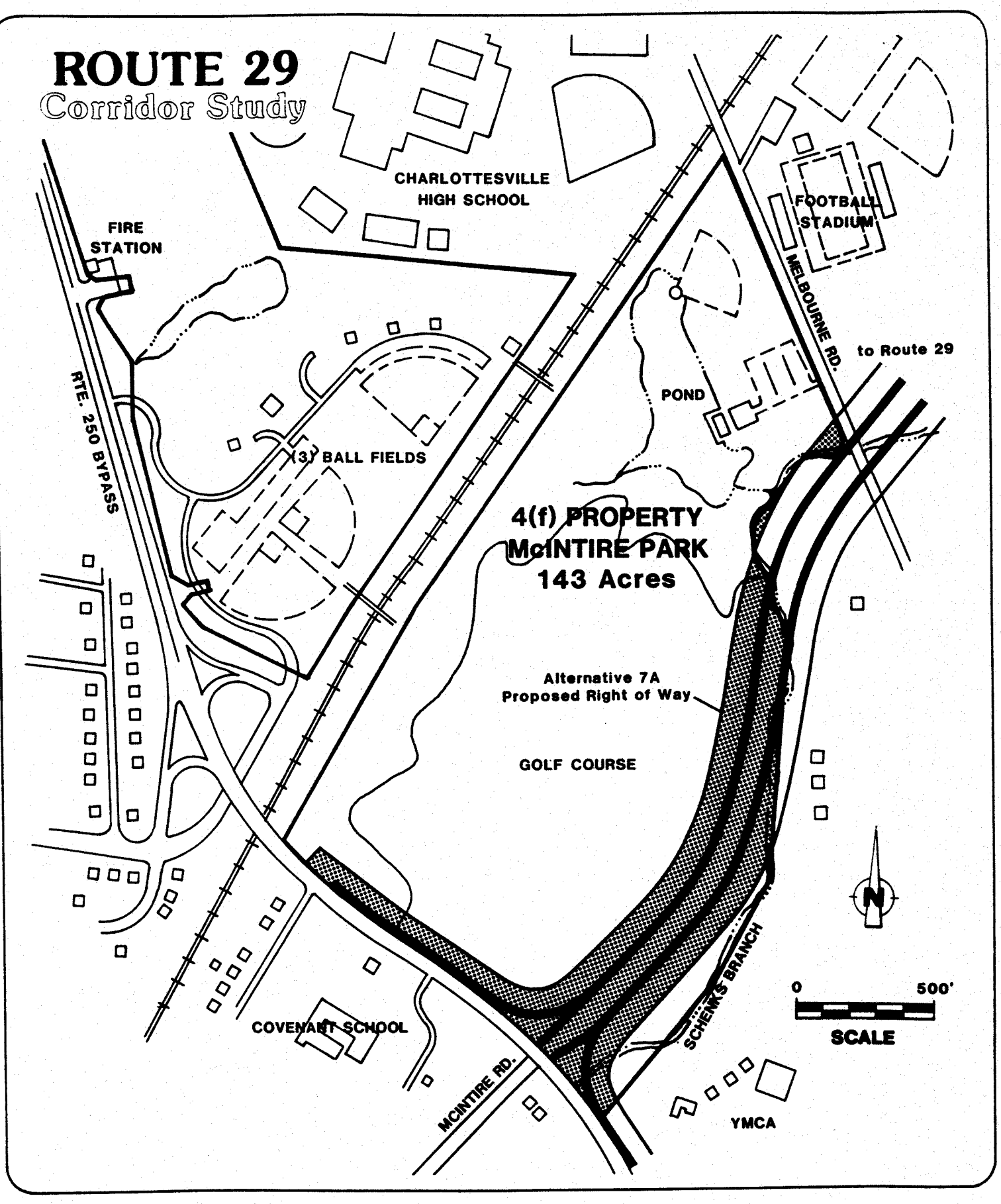
1. Description of McIntire Park

a. Relationship to Alternatives

Figures VIII-1 and VIII-2 show the location of McIntire Park in relation to the project alternatives. Figure VIII-6 is a detailed map of the park showing how it would be affected by Alternative 7A.

b. Size and Location

McIntire Park is a 143 acre park located in the City of Charlottesville north and east of the U.S. Route 250 Bypass. The park is traversed by the Southern Railroad, which in fact



AREA OF POTENTIAL 4(f) INVOLVEMENT
(11 Acres)

McIntire Park

Alternative 7A

Figure No. VIII-6

separates the park into two parcels, east and west. Route 250 Bypass also severs a portion of the park; lighted tennis courts and a maintenance facility are located south of the bypass, east of McIntire Road.

c. Ownership and Type of Property

McIntire Park is a public park, owned by the City of Charlottesville.

d. Function

McIntire Park is one of two major parks in the City, the other being Pen Park. Because of its size and location, McIntire Park functions as a major recreational resource for City residents. Activities include picnicking, golf, softball, and tennis.

e. Facilities

The park's rolling terrain, pockets of woods, winding streams, nine hole golf course, children's wading pool, and flowering azaleas, provide numerous opportunities for use. Additionally, facilities include 11 tennis courts, a bathhouse/restroom, playground, concession building, paved parking, two softball fields, and picnic areas. Expansion and rehabilitation of several of the facilities has been ongoing in recent months.

f. Access

Access to the park is principally by automobile. Pedestrian access is restricted to the west and south due to Route 250 Bypass. The valley formed by Schenks Creek to the east also limits pedestrian access. The railroad corridor prohibits any direct access between the eastern and western portions of the park.

g. Relationship to Similarly Used Lands

To the north, McIntire Park abuts the Charlottesville High School grounds, allowing a blending of the expanse of fields and woods. East of Schenks Branch is a well developed residential area; the tennis courts are also bounded by residences to the east. Two other large parks, Pen Park and Rivanna Park, are located within two miles of McIntire Park.

h. Applicable Clauses Affecting Ownership

The park is owned by the City of Charlottesville, having been donated by Paul Goodloe McIntire. There is no reversionary clause to the city's title, and section 6(f) does not apply.

i. Unusual Characteristics

McIntire Park has no unusual characteristics.

2. Impacts of Alternative 7A on McIntire Park

The eastern portion of McIntire Park would be impacted by Alternative 7A. Approximately 11 acres along Schenks Branch are within the proposed right-of-way. Alternative 7A tapers from abut 250' to 300' wide, and would run almost 2000' in the park north from U.S. Route 250 Bypass. Additionally, limited acreage along the north side of Route 250 Bypass would be required for acceleration and deceleration lanes. Three holes of the nine hole golf course would be taken.

Noise and air quality impacts would result from Alternative 7A. Noise levels would exceed Federal Highway Administration noise abatement criteria by six decibels and increase 20 decibels over existing noise levels within the golf course. Although the tennis courts on McIntire Road would experience noise levels exceeding the noise abatement criteria by nine decibels, existing noise levels are already seven decibels greater than the criteria. The Air Quality Analysis determined that McIntire Park tennis courts would experience increases in carbon monoxide concentrations of 1.8 parts per million for one hour and 1.0 parts per million for eight hours.

The construction impacts will be similar to those stated in the Rivanna and Pen Park discussions. Greater interruption of local traffic flow may occur since the Park is located in a more congested portion of Charlottesville.

Because Alternative 7A follows the natural boundary of Schenks Branch on the eastern portion of the Park, the greatest visual impact may be the bridge which crosses the creek.

3. Avoidance Alternatives

Alternative 7 was developed to avoid the park. Alternative 7 differs from 7A only for the southern terminus. The two alternatives are identical from a point north of Melborne Road. Alternative 7 runs east of the park impacting several homes and apartments, and ties in at grade with Park Street and Route 250 Bypass. It crosses Route 250 Bypass, runs behind the tennis courts, takes the Rescue Squad Building, and ties in at-grade with McIntire Road.

Alternative 7, the avoidance alternative, takes no park land, but it would take five more total acres of right-of-way than Alternative 7A. It would displace 24 more families, one more business and one more non-profit organization than Alternative 7A, but it would impact five fewer noise receptors. Alternative 7 would cost about $2.5 million more than Alternative 7A; construction cost would actually be about $1.7 million less but right-of-way and utility relocation costs would be about $4.2 million more.

4. Measures to Minimize Harm

Should Alternative 7A continue to be studied following public and agency review of the Draft Environmental Impact Statement and the Location Public Hearing, all possible measures to minimize harm would be undertaken.

Among the measures likely to be studied would be roadway geometric changes which may lead to further reducing the right-of-way width or merge areas, and providing landscaped screening. Purchase of property for conversion to parkland may be possible. However, contiguous properties appear limited in suitability or access.

Construction activities would involve all necessary permitting, sedimentation, and erosion control, and restoration work.

5. Coordination

Documentation for the McIntire Park included contacts with City staff in the Department of Parks and Recreation, and Department of Community Development. Elected City officials participating in the Joint Transportation Committee on the Route 29 study advised the Project Study Team to maintain both Alternative 7 and Alternative 7A as corridors for this study.

E. SECTION 4(f)/106 EVALUATION ON SCHLESINGER FARM AND THE BARRACKS AS AFFECTED BY ALTERNATIVE 11

1. Description of Schlesinger Farm

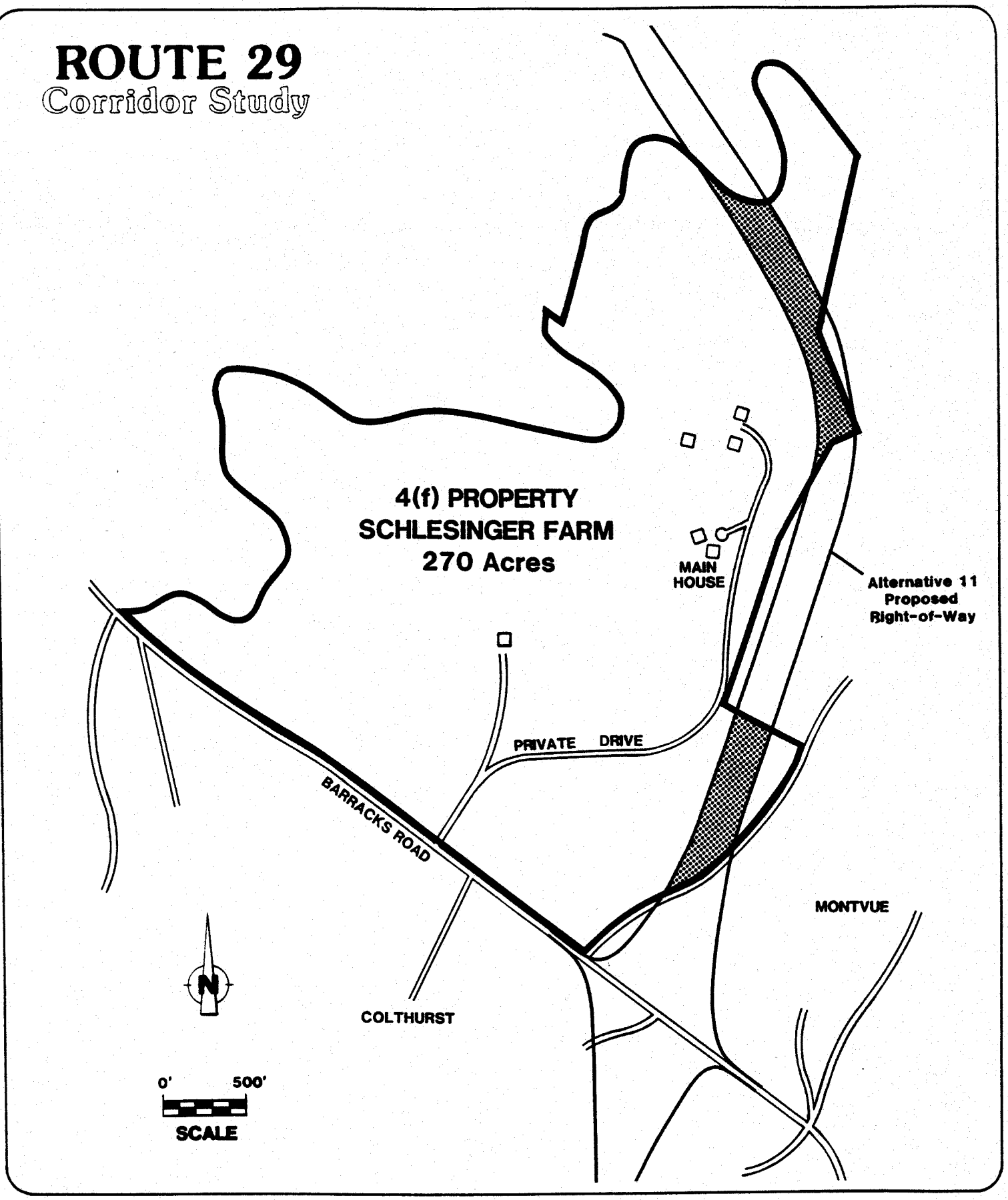
a. Relationship to Alternatives

Figures VIII-1 and VIII-3 show the location of Schlesinger Farm in relation to the project alternatives. Figure VIII-7 is a detailed map of the site showing how it would be affected by Alternative 11.

b. Size and Location

The present Schlesinger Farm property totals 270 acres. The size of the property has not changed since it was acquired by Henry Schlesinger in 1937. The property is located in Albemarle County on the north side of Barracks Road about a mile northwest of Bypass 250.

ROUTE 29
Corridor Study



AREA OF POTENTIAL 4(f)/106 INVOLVEMENT
(17.7 Acres)

Schlesinger Farm

As Affected by Alternative 11

Figure No. **VIII-7**

c. Ownership and Type of 4(f)/106 Property

Schlesinger Farm is a privately-owned farm that has been determined by VDHR to be eligible for the National Register of Historic Places. This property appears to have been developed circa 1937 by Henry J. Schlesinger. The property remains in the Schlesinger family.

The main house is a single-story frame building with board-and-batten siding. A large barn is located near the house. Several additional outbuildings are located on the property. The house, barn, and many of the outbuildings appear to retain a high degree of integrity. This property appears to be a relatively rare, intact example of a Depression-era farm. The property boundaries encompass the eligible historic resource.

d. Function

There are no public activities on this property.

e. Facilities

There are no public facilities.

f. Access

Access to the property is by private drive from Barracks Road.

g. Relationship to Similarly Used Lands

Other privately owned farm properties some of which have been determined to be eligible for the National Register are located throughout Albemarle County.

h. Applicable Clauses Affecting Ownership

Research of property deeds did not reveal any reversionary clause affecting this property.

i. Unusual Characteristics

This property has no unusual characteristics other than those described which make the property eligible for the National Register.

2. Description of The Barracks

a. Relationship to Alternatives

Figure VIII-1 and VIII-3 show the location of The Barracks in relation to the project alternatives. Figure VIII-8 is a detailed map of the site showing how it would be affected by Alternative 11.

b. Size and Location

The historic site includes three separately owned parcels, The Barracks, the Farm Manager's House, and Barrackside Farm. Together they total 335 acres. The property is located in Albemarle County north of Ivy Farm subdivision at the end of Route 658.

c. Ownership and Type of Property

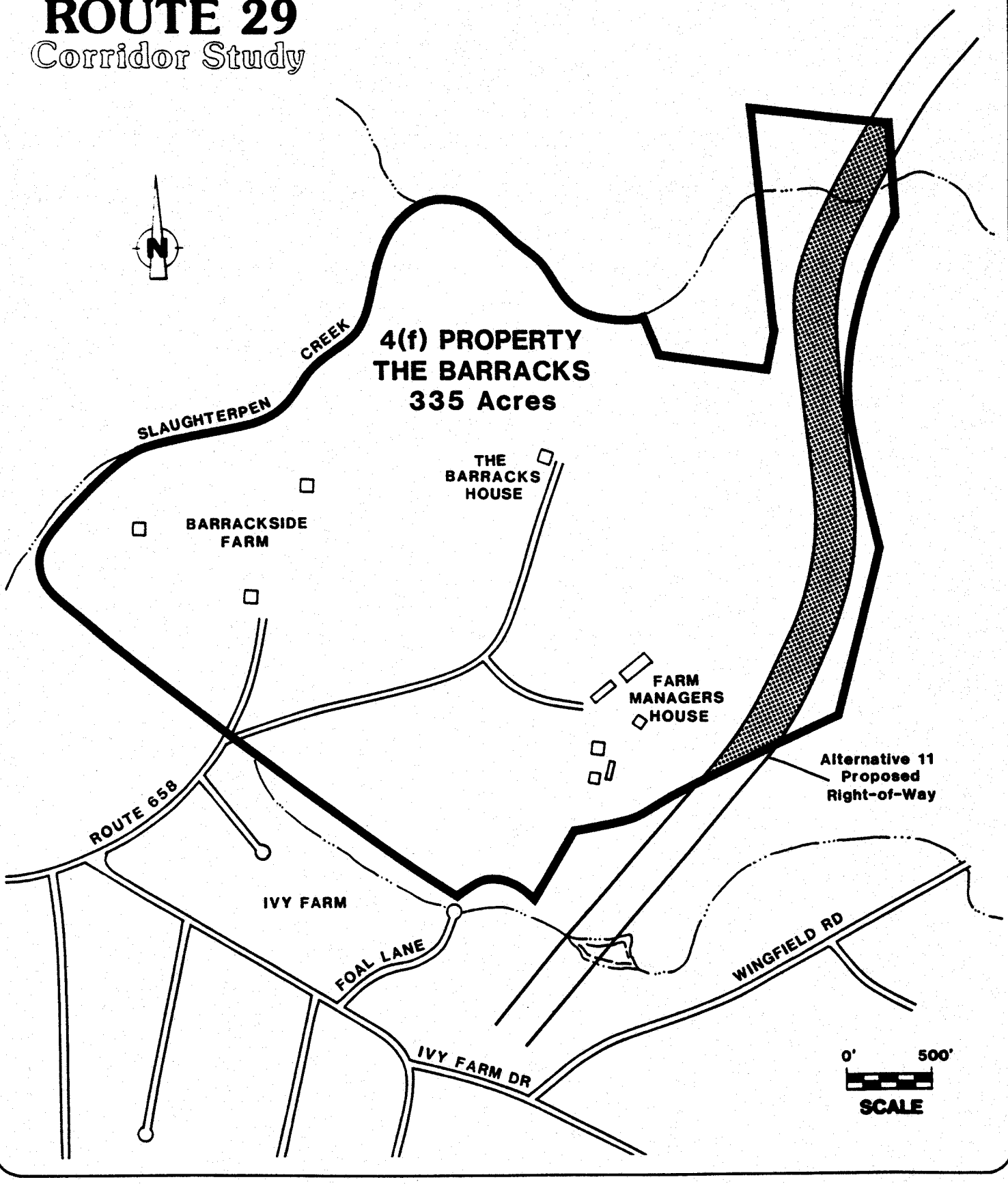
The Barracks consists of privately-owned properties that have been determined by VDHR to be eligible for the National Register of Historic Places.

Thomas Garth acquired the 1,616-acre Barracks property, site of a prisoner-of-war camp during the Revolutionary War, in 1811. Garth willed 875 acres of the property to his son Garland Garth in 1812. Garland Garth erected the house presently known as The Barracks in 1819. Garland Garth lived in The Barracks until 1862, when business reverses forced him to sell the house and 597 acres, acting through his son Garland A. Garth, to George Carr. The Barracks property consists of the large house built by Garland Garth in 1819, its associated gardens, and a group of 1930s outbuildings and cottages. The integrity of the main house and its grounds are excellent. the interior of the house retains much of its original plan and trim.

The Barracks Farm Manager's House appears to date from the mid-twentieth century. It is a one-and-one-half-story vernacular style frame building on a concrete-block foundation. The interior trim appears to date from ca. 1930s. The building may have been erected as a residence for the manager of The Barracks Farm.

The Barrackside Farm was included within The Barracks tract until 1892. Following the death of George Carr, George Carr, Jr., received this portion of his father's farm. The property has remained in the Carr family until the present. The property presently includes three houses, two of which appear to date from the mid-nineteenth century, a large, deteriorated barn, and an assortment of outbuildings. The older houses, both of which have been greatly altered over the years, were probably tenant houses associated with the period when this property was a portion of the larger Barracks tract. The third house is a single-story frame cottage with two large additions that may have been constructed in the late nineteenth century as the residence of George T. Carr.

ROUTE 29
Corridor Study



AREA OF POTENTIAL 4(f)/106 INVOLVEMENT (30.6 Acres)

The Barracks

As Affected by Alternative 11

Figure No. **VIII-8**

d. Function

There are no public activities on these properties.

e. Facilities

There are no public facilities on these properties.

f. Access

Access is from Route 658.

g. Relationship to Similarly Used Lands

There are other privately-owned farm properties located throughout Albemarle County some of which have been determined to be eligible for the National Register.

h. Applicable Clauses Affecting Ownership

Research of property deeds did not reveal any reversionary clauses affecting these properties.

i. Unusual Characteristics

These properties have no unusual characteristics.

3. Impacts of Alternative 11 on Schlesinger Farm and The Barracks

The 300 foot wide right-of-way for Alternative 11 would take 17.7 acres along the eastern edge of the Schlesinger Farm property. The closest distance to the main house from the edge of pavement would be about 800 feet.

Alternative 11 would traverse the eastern edge of The Barracks site and would take 30.6 acres. The closest that the edge of pavement would come to the Farm Manager's House would be 450 feet and the closest it would come to the main Barracks house would be 1600 feet. In addition to the taking of property, the proximity of this alternative would constitute adverse visual effects.

4. Avoidance Alternatives

The other two west side alternatives, Alternatives 10 and 12, have the same southern terminus as Alternative 11 and provide similar traffic service. Alternative 12; however, also takes a part of the Schlesinger Farm property. Alternative 10 takes no 4(f) properties. Alternative 10; therefore, will be considered as the 4(f) avoidance alternative to Alternative 11.

Compared with Alternative 11, Alternative 10 is four miles shorter, takes 148 fewer acres, and costs $20.8 million less. Alternative 10 would displace two more families and five more businesses than Alternative 11, and it would impact 13 more noise receptors.

5. Measures to Minimize Harm

Should Alternative 11 continue to be studied following public and agency review of the DEIS and the Location Public Hearing, all possible measures to minimize harm to the Schlesinger Farm and The Barracks would be undertaken. Among the measures to be considered will be reducing the roadway typical section to reduce takings of these historic sites and providing landscaped screening to reduce visual impacts.

6. Coordination

Coordination has been carried out with the Virginia Department of Historic Resources in identifying potential historic structures and project impacts. VDHR made the determination that both Schlesinger Farm and The Barracks are eligible for the National Register.

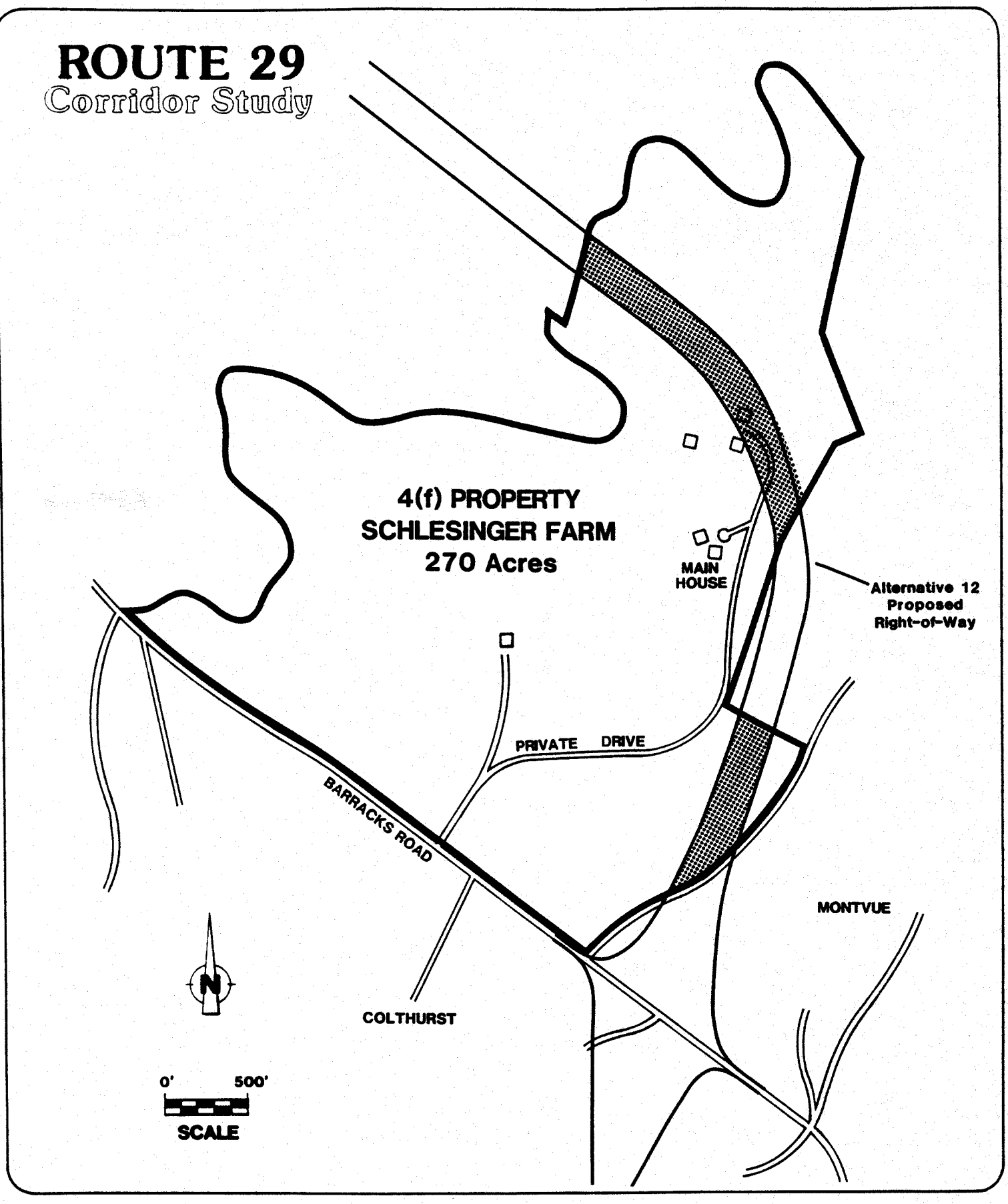
Should Alternative 11 be selected, an appropriate memorandum of agreement will be executed among VDOT, VDHR, and FHWA, in accordance with Section 106 of the Historic Preservation Act. The memorandum of agreement will outline measures to be taken to minimize adverse impacts to these historic properties. The measures will be developed in close coordination with VDHR.

F. SECTION 4(f)/106 EVALUATION ON SCHLESINGER FARM AS AFFECTED BY ALTERNATIVE 12

1. Description of Schlesinger Farm

The description of Schlesinger Farm was presented in Section E.1. Figure VIII-9 is a detailed map of how the property would be affected by Alternative 12.

ROUTE 29
Corridor Study



AREA OF POTENTIAL 4(f)/106 INVOLVEMENT
(25.2 Acres)

Schlesinger Farm

As Affected by Alternative 12

Figure No. **VIII-9**

2. Impacts of Alternative 12 on Schlesinger Farm

The 300 foot wide right-of-way for Alternative 12 would take 25.2 acres along the eastern edge and in the northern portion of the Schlesinger Farm property. The closest distance to the main house from the edge of pavement would be about 500 feet. In addition to the taking of property, the proximity of Alternative 12 to the farm would constitute an adverse visual effect.

3. Avoidance Alternatives

The two other west side alternatives have the same southern terminus as Alternative 12 and provide similar traffic service. Alternative 11; however, also takes a part of the Schlesinger Farm property. Alternative 10, which takes no 4(f) properties, will be considered the avoidance alternative to Alternative 12.

When compared with Alternative 12, Alternative 10 is 7.5 miles shorter, requires 175 fewer acres and costs $89.5 million less. Alternative 10 would displace four fewer families and three more businesses and it would impact 10 more noise receptors than Alternative 12.

4. Measures to Minimize Harm

Should Alternative 12 continue to be studied following public and agency review of the DEIS and the Location Public Hearing, all possible measures to minimize harm to the Schlesinger Farm would be undertaken. Among the measures to be considered will be reducing the roadway typical section to reduce the amount of land required from this historic site and providing landscaped screening to reduce visual impacts.

5. Coordination

Coordination has been carried out with the Virginia Department of Historic Resources in identifying potential historic structures and project impacts. VDHR made the determination that Schlesinger Farm is eligible for the National Register.

Should Alternative 12 be selected, an appropriate memorandum of agreement will be executed among VDOT, VDHR and FHWA, in accordance with Section 106 of the Historic Preservation Act. The memorandum of agreement will outline measures to be taken to minimize adverse impacts to this historic property. The measures will be developed in close coordination with VDHR.

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Appendix

Quantitative Evaluation Data for Conceptual Alternatives

ROUTE 29

CITY OF CHARLOTTESVILLE & ALBEMARLE COUNTY
Quantitative Evaluation Data for Conceptual Alternates

VDOT
JUNE 1988

ALTERNATES	FAR EAST		NEAR EAST										ROUTE 29		
	1	1A	2	2B	3	3B	4	4B	5	5B	(6)	(7)	8	(9)	BASE CASE
TRAFFIC															
Facility Level of Service (LOS)	C*	C*	C*	C*	C*	C*	C*	C*	C*	C*	C*	C*	F	D	F
LOS @ Rte. 29 N @ Rio Road**	NEAR	NEAR	NEAR	NEAR	NEAR	NEAR	NEAR	NEAR	NEAR	NEAR	NEAR	OVER	UNDER	UNDER	NEAR
LOS @ Rte. 29 @ Hydraulic Road**	OVER	OVER	OVER	OVER	OVER	OVER	OVER	OVER	OVER	OVER	OVER	NEAR	UNDER	UNDER	OVER
% Diverted from Rte. 29 @ Hydraulic Road															
Local	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	9	36	36	0
Commuter	<1	<1	1	1	1	1	4	4	4	4	14	28	96	96	0
Through	41	41	46	46	46	46	47	47	47	47	20	20	100	100	0
Total	3	3	4	4	4	4	5	5	5	5	6	15	58	58	0
% Diverted from Emmet St. @ Barracks Road	<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<10	<30	>5	>5	0
SOCIO-ECONOMIC ENVIRONMENT															
Archaeological Sites															
Known archaeological sites (# taken)	0	0	1	1	0	0	0	0	2	2	1	1	0	0	0
Known archaeological sites (w/in 1/4 mi.)	0	1	3	4	0	1	0	1	2	3	9	13	0	0	0
Potential areas for pre- historic archaeological sites (acres)	207	408	219	420	285	486	225	426	171	372	233	150	0	0	0
Potential areas for historic archaeological sites (acres)	85	148	63	104	62	103	48	89	42	83	14	8	0	0	0
Businesses (# taken)	0	0	2	3	2	3	6	7	3	4	1	1	19	36	0
Businesses access relocated (#)	0	0	2	2	2	2	4	4	2	2	1	0	3	3	0
Cemeteries (# taken)	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0
Cemeteries (w/in 1/4 mi.)	6	11	6	10	4	8	3	7	6	10	5	4	0	0	0
Churches (# taken)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Churches (w/in 1/4 mi.)	2	3	1	2	2	3	1	2	2	3	1	1	1	1	1
Commercial and Industrial Area (Existing) Acres	0	0	6	8	5	7	14	16	5	7	6	1	24	45	3
Commercial and Industrial Areas (Zoned) Acres	0	0	57	57	57	57	74	74	75	75	43	18	25	49	3
Commercial and Industrial Land Designated in the Comprehensive Plan (Acres)	0	0	57	57	57	57	74	74	75	75	46	18	25	49	3
Historical Sites															
National Register Listed or Eligible or Potential (#)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Sites (#)	2	3	0	0	0	0	0	0	2	2	0	0	0	0	0
National Register Listed or Eligible (w/in 1/4 mi.)	6	12	7	10	5	8	3	6	5	6	1	1	0	0	0
National Register (Potential) Districts (w/in 1/4 mi.)	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Other Sites (w/in 1/4 mi.)	38	47	23	24	19	20	14	15	26	29	11	11	0	0	0
National Register Listed or Eligible (acres)	0	0	0	21	0	21	0	21	0	21	0	0	0	0	0
National Register Potential District (acres)	372	372	280	280	252	252	245	245	152	152	48	0	0	0	0
National Register—Listed View Sheds (w/in 1/4 mi.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medical facilities (w/in 1/4 mi.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neighborhoods (# traversed)	1	4	1	5	1	5	1	5	2	7	2	2	0	0	0
Parks (acres)	0	0	0	0	0	0	0	0	0	0	37	17	0	0	0
Other public/recreation areas (w/in 1/4 mi.)	0	0	0	0	1	1	1	1	0	0	0	2	0	0	0
Residences (# taken)	12	22	10	28	9	27	15	33	13	31	8	17	1	1	0
Residences (w/in 1/4 mi.)	160	237	129	272	138	281	192	335	134	277	318	586	353	353	353
Residential (existing) (acres)	26	42	21	45	17	41	27	51	32	56	11	16	1	1	0
Residential (zoned) (acres)	0	0	31	69	36	74	38	76	70	108	155	164	0	0	0
Residential land designated in Comprehensive Plan (acres)	0	0	31	31	31	31	55	55	62	62	149	151	0	0	0
Schools (# taken)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schools (w/in 1/4 mi.)	0	0	0	0	0	0	0	0	0	0	0	3	2	2	2
Major streets crossed (#)	2	7	1	5	1	5	1	5	1	5	1	1	2	2	2
Minor streets crossed (#)	4	11	7	10	7	10	6	9	3	6	3	4	9	9	9
NATURAL ENVIRONMENT															
Agricultural and Forestal Districts (acres)	16	55	12	42	12	43	12	43	0	31	0	0	0	0	0
Bridge structures over Rivanna Reservoir & its major tributaries															
total length (feet)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
number	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Farmland (acres)	179	368	217	323	218	325	200	306	115	222	143	124	0	0	0
Prime Farmland Soils (acres)	103	56	77	100	69	92	54	77	38	61	72	58	1	2	0
Floodplains (acres)	43	75	19	43	49	73	23	47	28	52	27	23	0	0	0
Major Stream Crossings (#)	8	15	6	17	4	15	4	15	5	16	4	3	0	0	0
Conservation Easements (acres)	0	0	0	0	15	15	3	3	0	0	0	0	0	0	0
Rare and Endangered Species (w/in 1/4 mi.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scenic Roads & Rivers Crossed (#)	1	3	1	3	1	3	1	3	1	3	1	0	0	0	0
Unique Habitats (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reservoir Watersheds (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wetlands (acres)	24	38	19	31	16	28	15	27	14	26	4	6	0	0	0
Woodlands (acres)	400	835	251	394	241	385	165	309	179	322	179	143	3	5	0
ENGINEERING															
Total length (mi.)	16.1	33.6	13.2	29.1	12.5	28.4	10.3	26.2	8.1	24.0	8.9	7.2	3.3	3.3	3.0
Construction Cost ($ millions)	192.8	384.5	147.3	344.2	144.4	341.3	118.5	315.4	89.5	286.5	78.9	52.2	130.3	138.2	15.6
Right-of-Way Cost ($ millions)	6.8	13.0	18.8	29.0	18.3	28.5	20.6	30.8	24.7	34.9	32.9	15.4	14.4	28.7	1.1
Engineering Cost ($ millions)	23.1	46.1	17.7	41.3	17.3	41.0	14.2	37.8	10.7	34.4	9.5	6.3	17.8	18.9	2.0
Total Cost ($ millions)	222.7	443.6	183.8	414.5	180.0	410.8	153.3	384.0	124.9	355.8	121.3	73.9	162.5	185.8	18.7
Average Cost/mi. ($ millions)	13.8	13.2	13.9	14.2	14.4	14.5	14.9	14.7	15.4	14.8	13.6	10.3	49.2	56.3	6.2
Interchanges (#)	4	11	4	7	4	7	4	7	4	7	4	3	2	2	0
Tunnels (#)	1	2	0	1	0	1	0	1	0	1	0	0	0	0	0
Cuts/fills over 80 ft. (length in feet)	150	550	350	750	350	750	700	1,100	1,550	1,950	300	0	0	0	0

* Level of Service C or better
** Under capacity
Near Capacity
Over Capacity

◯ =Recommended by Project Study Team

ALTERNATES	ROUTE 29			NEAR WEST			FAR WEST								
	BASE CASE	8	(9)	(10)	(11)	(12)	13	13C	13D	14	14C	14D	15	15C	15D
TRAFFIC															
Facility Level of Service (LOS)	F	F	D	C*	C*	C*	C*	C*	C*	C*	C*	C*	C*	C*	C*
LOS @ Rte. 29 N @ Rio Road**	NEAR OVER	UNDER UNDER	UNDER UNDER	UNDER NEAR	NEAR NEAR	NEAR NEAR	NEAR OVER	NEAR OVER	NEAR OVER	NEAR OVER	NEAR OVER	NEAR OVER	NEAR OVER	NEAR OVER	NEAR OVER
LOS @ Rte. 29 @ Hydraulic Road**															
% Diverted from Rte. 29 @ Hydraulic Road															
Local	0	36	36	10	3	2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Commuter	0	96	96	22	25	23	4	4	4	2	2	2	2	2	2
Through	0	100	100	100	100	100	59	59	59	60	60	60	60	60	60
Total	0	58	58	21	18	16	5	5	5	5	5	5	5	5	5
% Diverted from Emmet St. @ Barracks Road	0	>5	>5	<10	<20	<15	<1	<1	<1	<1	<1	<1	<1	<1	<1
SOCIO-ECONOMIC ENVIRONMENT															
Archaeological Sites															
Known archaeological sites (# taken)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Known archaeological sites (w/in 1/4 mi.)	0	0	0	2	2	2	1	2	1	0	1	0	0	1	0
Potential areas for pre- historic archaeological sites (acres)	0	0	0	81	169	228	228	333	363	408	467	484	425	489	501
Potential areas for historic archaeological sites (acres)	0	0	0	15	21	21	69	90	97	76	125	104	79	127	106
Businesses (# taken)	0	19	36	20	21	21	1	1	1	1	1	1	1	1	1
Businesses access relocated (#)	0	3	3	2	1	0	0	0	0	0	0	0	0	0	0
Cemeteries (# taken)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Cemeteries (w/in 1/4 mi.)	0	0	0	2	0	2	3	3	5	6	6	8	10	10	12
Churches (# taken)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Churches (w/in 1/4 mi.)	1	1	1	0	1	0	1	1	2	1	1	2	3	3	4
Commercial and Industrial Area (Existing) Acres	3	24	45	5	5	5	1	1	1	1	1	1	1	1	1
Commercial and Industrial Areas (Zoned) Acres	3	25	49	53	22	45	27	27	27	0	0	0	0	0	0
Commercial and Industrial Land Designated in the Comprehensive Plan (Acres)	3	25	49	45	41	45	27	27	27	0	0	0	1	1	1
Historical Sites															
National Register Listed or Eligible or Potential (#)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Sites (#)	0	0	0	2	0	0	0	0	1	0	0	1	1	0	2
National Register Listed or Eligible (w/in 1/4 mi.)	0	0	0	2	5	2	2	7	9	4	9	11	15	20	22
National Register (Potential) Districts (w/in 1/4 mi.)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Other Sites (w/in 1/4 mi.)	0	0	0	8	3	5	13	14	20	23	24	30	22	23	29
National Register Listed or Eligible (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
National Register Potential District (acres)	0	0	0	0	0	0	0	0	0	0	0	0	77	77	77
National Register—Listed View Sheds (w/in 1/4 mi.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medical facilities (w/in 1/4 mi.)	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
Neighborhoods (# traversed)	0	0	0	3	1	1	13	2	3	2	3	4	4	5	6
Parks (acres)	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0
Other public/recreation areas (w/in 1/4 mi.)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Residences (# taken)	0	1	1	12	18	12	6	10	26	13	17	33	24	28	44
Residences (w/in 1/4 mi.)	353	353	353	448	310	369	197	256	264	168	227	235	250	309	317
Residential (existing) (acres)	0	1	1	38	37	23	9	15	52	45	51	8	60	66	103
Residential (zoned) (acres)	0	0	0	43	59	56	42	42	42	7	7	7	1	1	1
Residential land designated in Comprehensive Plan (acres)	0	0	0	56	32	48	16	16	16	16	16	16	17	17	17
Schools (# taken)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Schools (w/in 1/4 mi.)	2	2	2	4	1	1	0	0	0	1	1	1	1	1	1
Major streets crossed (#)	2	2	2	2	3	3	5	6	6	5	6	6	5	6	6
Minor streets crossed (#)	9	9	9	2	2	2	5	9	10	7	11	12	8	12	13
NATURAL ENVIRONMENT															
Agricultural and Forestal Districts (acres)	0	0	0	0	15	42	100	124	124	99	123	123	49	74	74
Bridge structures over Rivanna Reservoir & its major tributaries															
total length (feet)	0	0	0	0	1360	1260	760	760	760	500	500	500	500	500	500
number	0	0	0	0	4	3	1	1	1	1	1	1	1	1	1
Farmland (acres)	0	0	0	43	133	186	308	389	401	361	441	454	301	389	402
Prime Farmland Soils (acres)	0	1	2	26	44	66	118	153	154	113	148	149	132	167	168
Floodplains (acres)	0	0	0	2	9	9	55	79	77	47	70	69	15	27	25
Major Stream Crossings (#)	0	0	0	1	4	3	7	9	9	9	11	11	7	10	10
Conservation Easements (acres)	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0
Rare and Endangered Species (w/in 1/4 mi.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scenic Roads & Rivers Crossed (#)	0	0	0	1	1	1	2	2	2	2	2	2	2	2	2
Unique Habitats (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Reservoir Watersheds (acres)	0	0	0	146	216	253	468	538	538	493	563	563	499	569	569
Wetlands (acres)	0	0	0	1	7	6	21	53	50	19	50	47	10	35	32
Woodlands (acres)	0	3	5	116	158	172	190	298	291	344	452	445	430	490	483
ENGINEERING															
Total length (mi.)	3.0	3.3	3.3	5.2	8.7	10.6	14.0	19.3	19.6	19.5	24.8	25.1	20.2	25.5	25.8
Construction Cost ($ millions)	15.6	130.3	138.2	38.8	60.7	77.7	121.0	172.1	172.4	137.3	188.4	188.7	139.6	193.5	193.9
Right-of-Way Cost ($ millions)	1.1	14.4	28.7	24.4	17.1	18.2	14.2	15.7	16.7	11.9	13.5	16.0	8.3	9.9	10.7
Engineering Cost ($ millions)	2.0	17.8	18.9	4.7	7.3	9.3	14.5	20.7	20.7	16.5	22.6	22.6	16.8	23.2	23.3
Total Cost ($ millions)	18.7	162.5	185.8	67.9	85.1	105.2	149.7	208.5	209.8	165.7	224.5	227.3	164.7	226.6	227.9
Average Cost/mi. ($ millions)	6.2	49.2	56.3	13.1	9.8	9.9	10.7	10.8	10.7	8.5	9.1	9.1	8.2	8.9	8.8
Interchanges (#)	0	2	2	4	5	5	6	8	8	6	8	8	7	9	9
Tunnels (#)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuts/fills over 80 ft. (length in feet)	0	0	0	0	100	200	100	700	700	0	600	600	0	600	600

* Level of Service C or better ◯ =Recommended by Project Study Team
** Under capacity
Near Capacity
Over Capacity