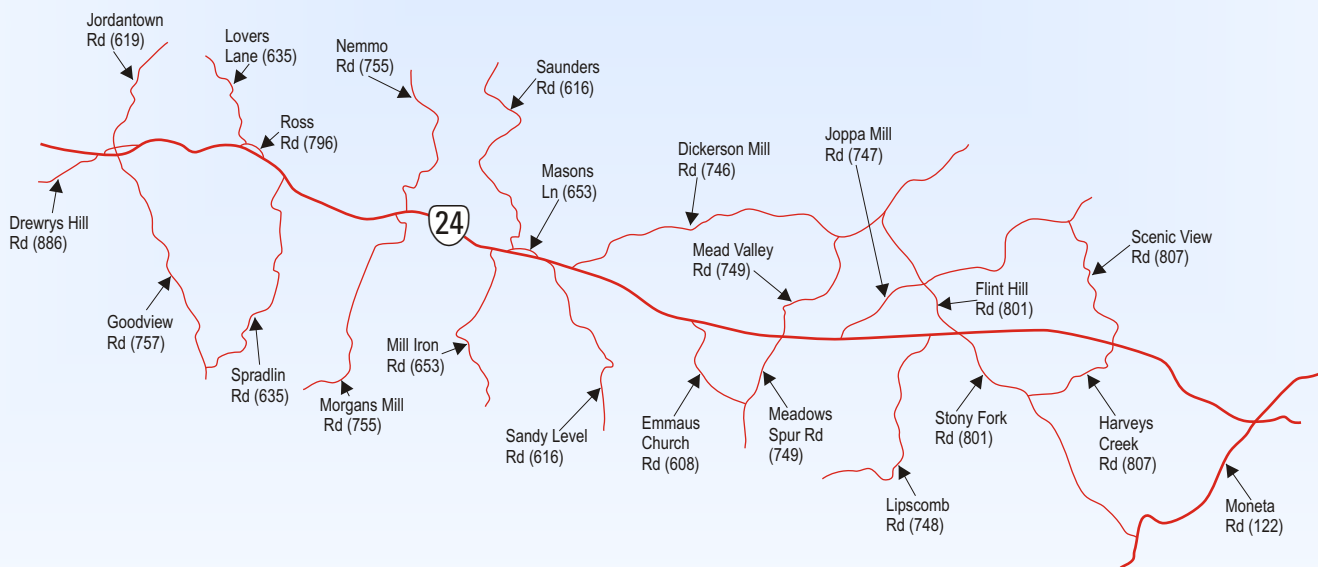


# ROUTE 24 CORRIDOR MANAGEMENT STUDY

BEDFORD COUNTY, VIRGINIA



JUNE 2006

# **ROUTE 24 CORRIDOR MANAGEMENT STUDY**

----

**Bedford County, Virginia**

*Developed by*  
**Virginia's Region 2000 Local Government Council**

*In cooperation with*  
**Bedford County, Virginia**  
**Virginia Department of Transportation**  
**and**  
**Federal Highway Administration**

**June 2006**

*The contents of this report reflect the views of the authors, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration (FHWA) or the Commonwealth Transportation Board. This report does not constitute a standard specification or regulation. FHWA acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute approval of location and design or a commitment to fund any recommended improvements. Additional project-level environmental impact assessments and/or studies of alternatives may be necessary.*

## Executive Summary

This study examined 14.1 miles of Virginia Route 24 in Bedford County, extending from Virginia Route 886 East (in the community of Stewartsville) to Virginia Route 122. Route 24 is the major east-west highway in southwestern Bedford County, serving travel within the County as well as to/from the Roanoke metropolitan area and to/from the residential and recreational areas in the growing Smith Mountain Lake region.

Functionally classified as a rural minor arterial by the Virginia Department of Transportation (VDOT), Route 24 is a two-lane rural highway with access via at-grade intersections through most of the study area. The exception is the approximately 0.55 mile section at the western end of the study area, where Route 24 is a four-lane divided highway. There are currently two signalized intersections in the study area: one at the western end at Routes 619/757 in Stewartsville and at the eastern end at Route 122

This study identified transportation concerns and recommendations based on existing roadway operations and geometrics, developed traffic projections to the year 2030, and assessed the ability of the roadway to accommodate year 2030 travel demands. The safety of the existing road was determined through analysis of motor vehicle crash records between January 2002 and December 2004, as well as through field investigations. Public involvement played a key role in the study, and outreach meetings to stakeholders and the general public were held early in the study to assist in identifying transportation concerns, and later in the study to allow for public review and comment on preliminary recommendations. Public hearings to take official comment were held as part of the review and adoption process by the Bedford County Planning Commission and Board of Supervisors.

This study identified both existing and future transportation concerns along Route 24, based on traffic engineering analyses as well as input from the general public. The two-lane western sections of the study corridor (west of Route 746) currently operate at over-capacity conditions, along with the intersections of Route 24 with Route 755 West (Morgans Mill Road) and Route 801 East (Stony Fork Road). The corridor experienced a total of 179 motor vehicle crashes from 2002 to 2004; areas of concern with respect to safety that were identified based on analyses of crash records as well as public input include the following:

- the intersection and vicinity of Emmaus Church Road (Route 608)
- the vicinity of Masons Lane (Route 653), Sandy Level Road (Route 616), Dickerson Mill Road (Route 746), and Emmaus Church Road (Route 608) – note that these are areas where existing driveway densities are high relative to the remainder of the study corridor
- the intersection and vicinity of Harveys Creek and Scenic View Roads (Route 807)

Route 24 has also experienced substantial growth in traffic over the past 10 to 15 years, and this growth is expected to continue. Traffic volumes by the year 2030 are anticipated to be 40 to 60 percent higher than they are today, with the higher levels of growth anticipated in the western part of the study corridor. This additional traffic will result in

increased congestion on Route 24, and more intersections in the study corridor would operate at deficient service levels, with motorist travel delays well in excess of what VDOT considers acceptable. Increased traffic on both Route 24 and side streets is also expected to exacerbate some of the existing safety concerns that were identified by the study.

There are a total of 335 access points in the existing study corridor today (counting both directions on Route 24), or an average of 24.1 access points per roadway mile. The number of access points is a matter of concern because studies have consistently shown that the number of driveways per mile is a key indicator of accident frequency. Safety and traffic flow on Route 24 would, therefore, be enhanced through efforts to consolidate access points and control the number and location of new driveways.

The traffic operations and safety issues identified by this study were confirmed and reiterated by those who attended this study's two public meetings. Meeting participants also emphasized the need for proactive transportation planning in the corridor to address existing needs and to plan for future improvements. Based on the technical analyses and public input, this study recommends a combination of roadway upgrades and planning initiatives. Based on projected traffic volumes by the year 2030, widening Route 24 to four lanes with a median is recommended for most of the study corridor. This four-laning is recommended to incorporate access management principles that will preserve the long-term functionality such a major transportation investment. Access management principles seek to limit the number of driveways and provide for good spacing of major intersections as well as safe and effective driveway access designs.

This study incorporates short-, mid-, and long-term recommendations. Short-term improvements are recommended to be implemented within the next 5 years. These improvements include relatively low-cost and low-impact improvements as well as planning actions that Bedford County should take within the same five-year timeframe. Mid-term improvements are those that would be implemented within the 5 to 10 year timeframe. These include projects that require some lead time in terms of location and environmental studies, as well as more capital-intensive projects that require some time to accrue funding for construction. Long-term projects are those that would be implemented over a timeframe of 10 years or more. Many long-term recommendations relate to improvements that are contingent on property uses changing, and are intended to guide decisions that would be necessary should a property convert to more intensive uses. Improvements such as parallel access roads or shifting entrances should then be part of the re-development. This guidance for property owners and county planning staff will enhance and promote the safety and transportation functionality of Route 24.

Study recommendations are summarized below:

- Changes to the Bedford County Comprehensive Plan to provide the policy foundation for zoning and regulatory procedures that can be used to preserve the functionality and safety of Route 24.

- Update to the Corridor Overlay District portion of the Bedford County Zoning Ordinance to incorporate access management elements for this important corridor.
- Construct Route 24 to a four-lane divided roadway between just west of Routes 619/757 (Jordantown and Goodview Roads) and Route 801 East (Stony Fork Road). The study recommends that Route 24 be constructed on a new alignment south of existing Route 24 between Routes 619/757 and just east of Route 635 (Spradlin Road). From just east of Route 635 to east of Nemmo Road (Route 755), Route 24 is recommended to be widened along its existing alignment. From east of Nemmo Road to approximately 0.7 miles east of Dickerson Mill Road (Route 746), a new alignment for Route 24 north of the existing roadway is recommended. The remainder of the four-laning to Route 801 East is recommended to take place along the existing alignment of Route 24. Consideration of the inclusion of bicycle and pedestrian features is recommended as part of the widening of Route 24.
- Consolidate two existing unsafe intersections of Route 24 at Route 635 (Lovers Lane) and Route 796 (Ross Road) into a new and improved intersection located approximately midway between the two existing intersections.
- Improve the following intersections on Route 24 through the addition of turn lanes:
  - Routes 619/757 (Jordantown/Goodview Roads)
  - Route 746 (Dickerson Mill Road)
  - Route 747 (Joppa Mill Road)
- Continue currently programmed intersection improvements at Route 24 and Route 122.
- Align side roads in several locations to improve intersection configuration and placement, and/or to convert offset T-intersections into single 4-leg intersections. Locations where these improvements are recommended include:
  - Route 608 (Emmaus Church Road)
  - Route 755 (Morgans Mill Road and Nemmo Road)
  - Route 616 and Route 653 (Sandy Level Road and Mason Lane)
  - Route 801 (Stony Fork Road and Flint Hill Road)
  - Route 807 (Harveys Creek Road and Scenic View Road)
  - Route 748 (Lipscomb Road and entrance to Staunton River High School)
- Improve sight distance at several locations in the study corridor through the removal of brush and other minor improvements.
- Increase enforcement of existing speed limits.
- Ongoing assessment of the need for a traffic signal at the entrance to Staunton River High School.

**Table of Contents**

**Executive Summary ..... ES-1**

**1 Existing Conditions.....1**

1.1 Roadway Geometry .....1

1.2 Traffic Data.....3

1.3 Safety Analysis .....4

1.4 Roadway Operations Analyses .....12

1.5 Public Participation and Input.....13

**2 Year 2030 Traffic Forecasts and Operations .....15**

2.1 2025 Traffic Forecasts .....15

2.2 2025 No-Build Traffic Operations.....18

2.3 Corridor Transportation Issues .....18

**3 Study Recommendations .....20**

3.1 Short-Term Recommendations .....23

3.2 Mid-Term Recommendations .....24

3.3 Long-Term Recommendations .....25

3.4 Estimated Costs.....25

**List of Exhibits**

1 Study Area ..... 2

2 Summary of Access Points ..... 3

3 Summary of Segment Counts ..... 3

4 AM Peak Hour Volumes (Existing)..... 5

5 PM Peak Hour Volumes (Existing)..... 6

6 Corridor-Wide Accident Summary..... 7

7 Accident Summary by Year .....8

8 Accident Summary by Type..... 9

9 Accident Summary by Light Conditions and Severity.....9

10 Accident Rates.....10

11 Accident Milepost Graphic.....11

12 Summary of Segment Level of Service (Existing Conditions).....12

13 Summary of Intersection Level of Service (Existing Conditions).....12

14 Summary of Segment Volumes and Level of Service (Year 2030).....15

15 AM Peak Hour Turning Movements (2030) .....16

16 PM Peak Hour Turning Movements (2030) .....17

17 Intersection Peak Hour Level of Service (2030).....18

18 Summary of Corridor Transportation Issues.....19

19 Proposed Major Access Nodes On Route 20.....21

20 Proposed Route 24 Typical Cross-section..... 22

21 Estimated Costs for Physical Improvements.....26

22-33 Maps Showing Improvement Recommendations.....Following page 27

## **Chapter 1 – Existing Conditions**

Virginia Route 24 serves east-west travel in Central Virginia, extending from the City of Roanoke to US Route 60 in Buckingham County. Approximately 33 miles of Route 24 are located in Bedford County. This report documents the study of Route 24 in the western portion of Bedford County, extending from Virginia Route 886 East (in the community of Stewartsville) to Virginia Route 122, a distance of approximately 14.1 miles. The study area is shown in Exhibit 1.

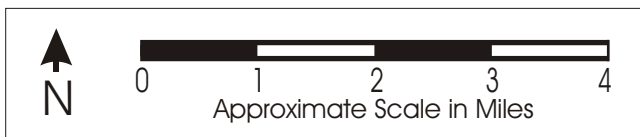
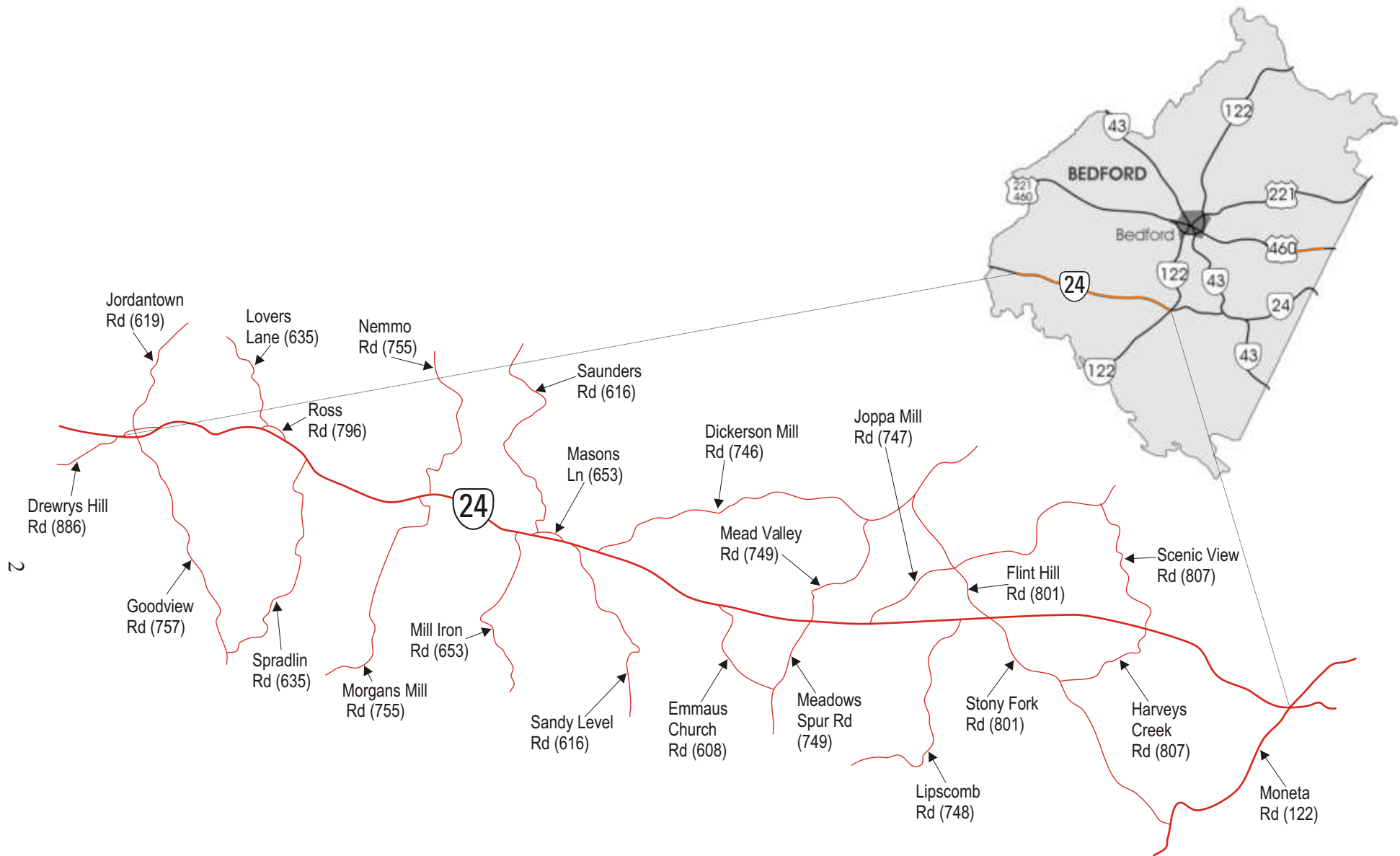
Route 24 through the study area serves southwestern Bedford County, providing travel within the County as well as to/from the Roanoke metropolitan area and to/from the residential and recreational areas in the Smith Mountain Lake region. Except for a small section in the western portion of the study area, Route 24 is a two-lane rural highway. This important transportation corridor has experienced substantial growth in traffic over the past 10 to 15 years, and this growth is expected to continue. The Route 24 Corridor Management Study was performed to develop plans and recommendations to accommodate existing and future travel demands in a safe and efficient manner.

This study identified transportation concerns and recommendations based on existing conditions (traffic and roadway geometrics), and identified recommendations to address these same concerns for a planning horizon of 20 years or more (the planning horizon for this study is 2030). The primary concerns on Route 24 today relate to capacity concerns (primarily in the western portions of the study corridor), as well as roadway safety with particular concerns at several intersections.

The existing conditions analyses for the corridor study included assessing traffic flow, safety, access, and roadway geometrics. To support these analyses, traffic counts were taken, roadway operations analysis was performed, traffic accident reports were retrieved and analyzed, and field observations were made. In addition, traffic forecasts were developed for the year 2030. Study recommendations that address both existing and projected concerns before they become major problems allows for better overall transportation and land use planning. The study also seeks to develop a framework for transportation planning in the corridor, and to assist in efforts to preserve the rights-of-way that will be needed to serve existing and future travel demands.

### **1.1 Roadway Geometry**

Route 24 is a four-lane divided highway from the western study limits to just west of Blankenship Road (Route 791), a distance of approximately 0.55 miles. For the remainder of the 14.1 miles of the study area, Route 24 is a two-lane undivided rural roadway. In the two-lane sections, the travel lanes on Route 24 range in width from 10 to 11 feet, with shoulder widths generally varying from 1 to 3 feet. Passing is not allowed (double yellow line) on approximately 90 percent of Route 24 through the study area. The posted speed limit on most of Route 24 is 55 miles per hour, with speed reductions in a number of areas due to roadway geometry and/or safety concerns.



**24** Exhibit 1  
**Study Area**  
 Bedford County Route 24 Corridor Management Study



Traffic signals are located at two intersections, the Jordantown Road/Goodview Road (Route 619/Route 757) intersection with Route 24; and the Moneta Road (Route 122) intersection with Route 24. All other intersections on Route 24 are controlled by stop signs on the side streets. With the exception of the intersections at Route 619/Route 757, Route 755 East and West, and Route 122, turn lanes are not provided at intersections in the study corridor.

Including side roads and driveways, there are 335 access points on Route 24 through the study area. This represents an average of 24.1 access points per mile (combining both directions on Route 24). These access points are summarized in Exhibit 2.

Exhibit 2  
**Summary of Access Points**

From	To	Distance (miles)	Number of access points			Number of access points per mile		
			EB	WB	Total	EB	WB	Total
Route 619/757	Route 791	0.26	2	2	4	7.7	7.7	15.4
Route 791	Route 635W	1.22	8	8	16	6.6	6.6	13.1
Route 635W	Route 755W	2.03	23	29	52	11.3	14.3	25.6
Route 755W	Route 653W	1.21	28	28	56	23.1	23.1	46.3
Route 653W	Route 746	0.92	24	21	45	26.1	22.8	48.9
Route 746	Route 608	1.50	16	13	29	10.7	8.7	19.3
Route 608	Route 801E	3.05	46	26	72	15.1	8.5	23.6
Route 801E	Route 807	1.76	16	17	33	9.1	9.7	18.8
Route 807	Route 122	1.95	14	14	28	7.2	7.2	14.4
<b>TOTALS</b>			<b>177</b>	<b>158</b>	<b>335</b>	<b>12.7</b>	<b>11.4</b>	<b>24.1</b>

*Note: EB – on eastbound lanes; WB – on westbound lanes*

## 1.2 Traffic Data

Traffic counts were performed on Route 24 in November of 2005. Forty-eight hour machine counts were performed on three segments of Route 24 and at five locations on side roads off of Route 24. These counts were performed on weekdays (excluding Monday mornings and Friday afternoons) and classified vehicles by type (i.e., car and truck). The locations for these 48-hour machine counts and the 24-hour volumes at each location are summarized in Exhibit 3. For all locations in the corridor, the highest daily volumes occurred between the hours of 4:00 and 6:00 p.m. The morning peak period was generally between 7:00 and 9:00 a.m.

Exhibit 3  
**Summary of Segment Counts**

Count Location	24-Hour Traffic	AM Peak Hour Volumes		PM Peak Hour Volumes		Percent Trucks/Buses	
		East/North-bound	West/South-bound	East/North-bound	West/South-bound	Single Unit	Multi-Unit
Route 24 west of Route 619 (Jordantown Road)	15,028	342 (26%)	984 (74%)	973 (71%)	405 (29%)	4.0%	4.3%

Exhibit 3  
**Summary of Segment Counts**

Count Location	24-Hour Traffic	AM Peak Hour Volumes		PM Peak Hour Volumes		Percent Trucks/Buses	
		East/North-bound	West/South-bound	East/North-bound	West/South-bound	Single Unit	Multi-Unit
Route 24 west of Route 746	8,486	283 (32%)	611 (68%)	546 (66%)	285 (34%)	4.5%	2.6%
Route 24 west of Route 122	2,523	97 (37%)	168 (63%)	131 (55%)	108 (45%)	10.7%	3.8%
Route 757 south of Route 24	4,373	367 (80%)	89 (20%)	114 (26%)	331 (74%)	3.9%	1.3%
Route 746 (Dickerson Mill Road) north of Route 24	1,205	26 (21%)	95 (79%)	74 (68%)	35 (32%)	6.3%	1.3%
Route 801 (Stony Fork Road) south of Route 24	2,153	159 (63%)	94 (37%)	83 (41%)	118 (59%)	7.3%	2.0%
Route 608 (Emmaus Church Road) south of Route 24	1,435	105 (81%)	25 (19%)	47 (33%)	94 (67%)	4.5%	1.7%
Route 122 north of Route 24	4,763	210 (55%)	169 (45%)	190 (48%)	203 (52%)	8.1%	5.5%

*Notes: The percent of traffic traveling in each direction is shown in parenthesis. Multi-unit trucks are tractor trailers.*

Intersection turning movement counts were performed at four locations in the corridor. These counts were conducted in November 2005. The counts were conducted on weekdays between the hours of 7:00 and 9:00 a.m. and 4:00 and 6:00 p.m. at the following locations:

- A. Route 24 at Route 619/757 (Jordantown Road/Goodview Road)
- B. Route 24 at Route 635 (Lovers Lane)
- C. Route 24 at Route 755 West (Morgans Mill Road)
- D. Route 24 at Route 801 (Flint Hill Road/Stony Fork Road)

Peak hour turning movements for the a.m. and p.m. peak hour are shown in Exhibits 4 and 5, respectively.

### 1.3 Safety Analysis

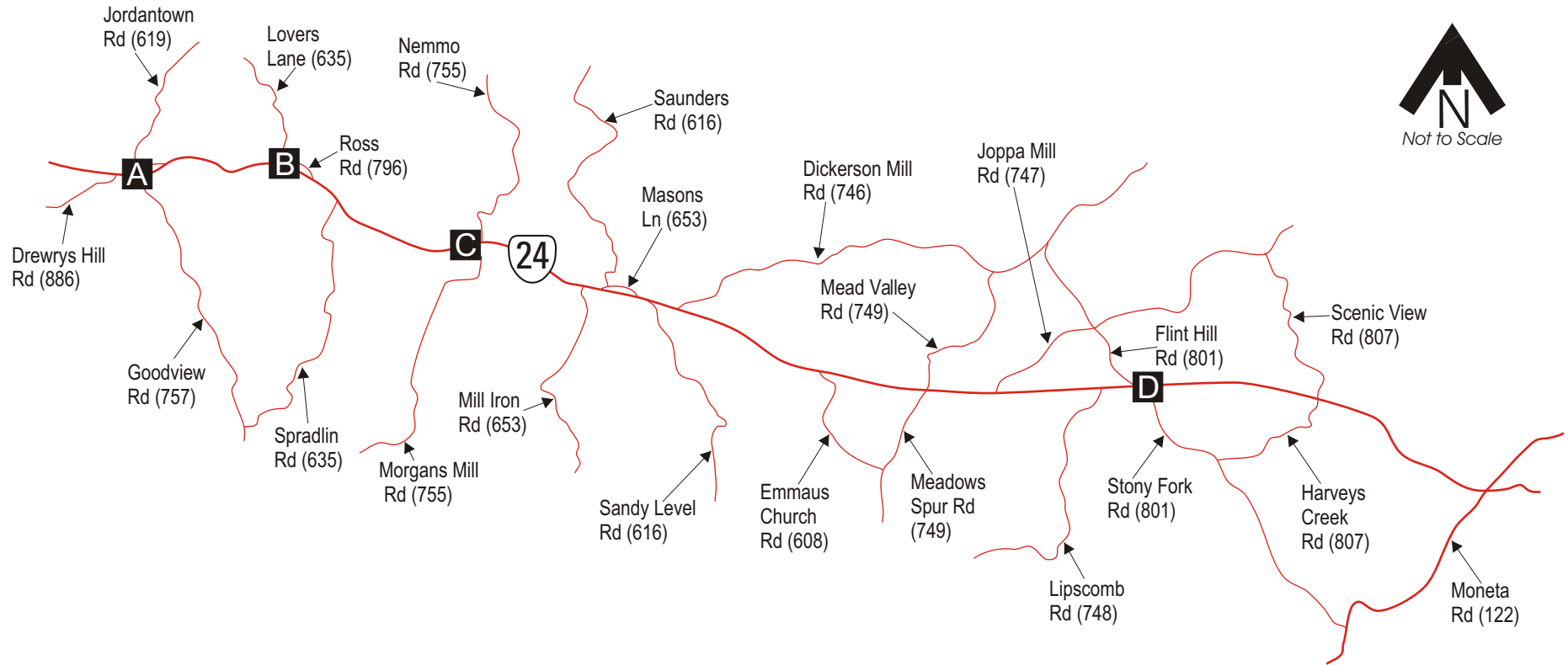
Roadway safety in the study corridor was assessed based on an analysis of vehicle crash records for the three-year period from January 2002 through December 2004. Crash data from January 1990 through May 2005 were also analyzed for comparison purposes. There were a total of 179 vehicular crashes during the three year period from January 2002 through December 2004, with the number of crashes remaining relatively constant between 2003 and 2004, which was a slight decrease of 7 percent in crashes from 2002 (68 in 2002, 54 in 2003, and 57 in 2004).



# Exhibit 4

## 2005 AM Peak Hour Turning Movements

### Bedford County Route 24 Corridor Management Study



**A** Route 24 at Route 619/757

287	39	16	↖	22
↙	↓	↘	←	623
			↘	74
	82	↖	↖	↑
	145	→	283	33
	97	↘		38

**B** Route 24 at Route 635

46	9	↖	2
↙	↘	←	756
	9	↖	
	241	→	

**C** Route 24 at Route 755 West

		←	645
		↘	24
		↖	
	244	→	63
	7	↘	30

**D** Route 24 at Route 801 East

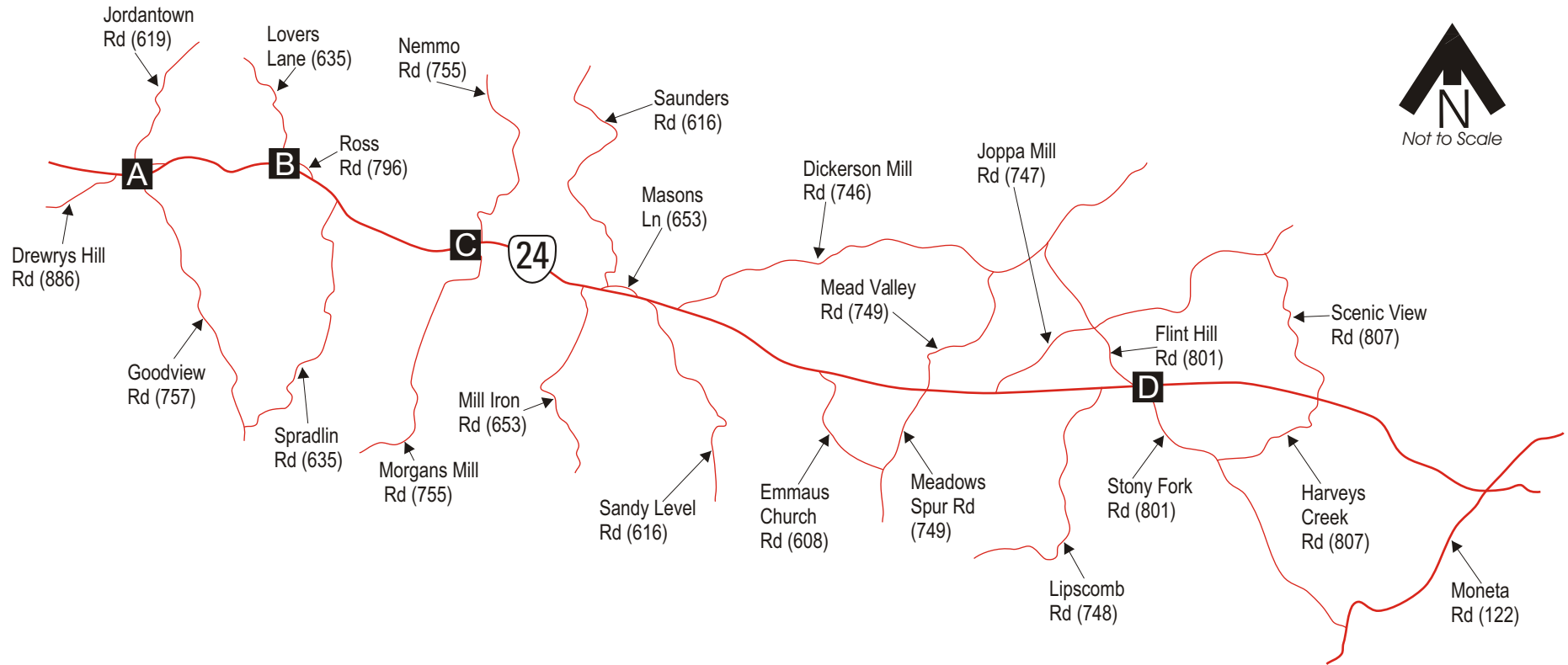
		←	200
		↘	0
		↖	
	135	→	157
	92	↘	5



# Exhibit 5

## 2005 PM Peak Hour Turning Movements

### Bedford County Route 24 Corridor Management Study



9

**A** Route 24 at Route 619/757

				6	
79	22	16		194	
				20	
	241				
	616		82	28	41
	276				

**B** Route 24 at Route 635

			2
27	0		221
	34		
	575		

**C** Route 24 at Route 755 West

			235
			27
575		18	30
72			

**D** Route 24 at Route 801 East

			108
			1
164		56	2
110			

The analysis of accidents included assessing the total number of accidents in any calendar year and identifying trends in the number and/or types of accidents at various locations. Locations with high numbers of accidents relative to the entire study corridor were analyzed in conjunction with field investigation to determine potential causes and recommended solutions. The analysis was also supplemented by field observations of traffic safety and by input from the general public, Bedford County officials, and the VDOT Bedford Residency.

For comparison with similar roadway facilities across the Commonwealth, accident rates were also calculated based on both total accidents per 100 million vehicle miles (MVM) and for equivalent property damage only (PDO) accidents per 100 million vehicle miles. Accident rates for intersections are based on the number of accidents as compared to the total number of vehicles that enter the intersection. The calculation is based on annual accidents as compared to annual entering vehicles (measured in millions). For roadway segments, the calculation compares total annual accidents to total vehicle miles (number of annual vehicles times the length of the segment in miles). The increased severity and cost associated with accidents involving injuries or fatalities is accounted for by calculating the PDO equivalent. Standard methodologies used by VDOT factor a fatal accident by 12, an injury accident by 3, and a PDO accident by 1 to calculate PDO equivalents.

For the entire study corridor, there were 134.85 accidents per 100 million vehicle miles and 262.92 equivalent PDO accidents per 100 million vehicle miles. This accident rate is less than average within the Commonwealth. In 2000, the average crash rate on Virginia primary arterials was 157 per 100 million vehicle miles. Additional corridor-wide accident statistics are shown in Exhibit 6.

**Exhibit 6  
Corridor-Wide Accident Summary**

<b>Category</b>	<b>Attribute</b>	<b>Number of Accidents</b>	<b>Percent</b>
Total accidents over three years		179	
Year Breakdown	2002	68	38%
	2003	54	30.2%
	2004	57	31.8%
Accident Type	Rear-End	41	22.9%
	Angle	31	17.3%
	Head-On	2	1.1%
	Sideswipe	5	2.8%
	Fixed Object	92	51.4%
	Other	8	4.5%
Time of Day	Daylight	95	53.1%
	Dark	73	40.8%
	Dawn or Dusk	11	6.1%

Exhibit 6  
Corridor-Wide Accident Summary

Category	Attribute	Number of Accidents	Percent
Crash Severity	Property Damage Only	103	57.5%
	Injury	74	41.3%
	Fatality	2	1.1%

Exhibits 7 through 10 show accident statistics by segment and intersection. Exhibit 11 summarizes the accidents that occurred in the corridor by VDOT-designated milepost. This graphic sums accidents by half-mile segment centered at every 0.1-mile interval on Route 24. While this results in accidents being counted more than once (the reader is cautioned not to sum all of the accidents in this graph as it will overestimate total accidents), this graphic is useful in identifying geographically where accidents are occurring. Exhibits 7 through 10 and Exhibit 11 indicate that, relative to the study corridor as a whole, those locations with safety concerns include the following:

- the intersection and vicinity of Emmaus Church Road (Route 608)
- the vicinity of Masons Lane (Route 653), Sandy Level Road (Route 616), Dickerson Mill Road (Route 746), and Emmaus Church Road (Route 608) – note that these are areas where existing driveway densities are high relative to the remainder of the study corridor
- the intersection and vicinity of Harveys Creek and Scenic View Roads (Route 807)

Exhibit 7  
Accident Summary by Year

Location Type	From	To	Length (miles)	Accidents By Year			
				2002	2003	2004	All Years
Intersection	At Route 886		0.1	3	1	3	7
Segment	Route 886	Route 619/757	0.13	0	0	0	0
Intersection	At Route 619/757		0.1	2	4	3	9
Segment	Route 619/757	Route 635W	1.36	3	5	7	15
Intersection	At Route 635W		0.1	0	0	2	2
Segment	Route 635W	Route 755W	1.94	7	1	5	13
Intersection	At Route 755W		0.1	3	1	3	7
Segment	Route 755W	Route 653W	1.13	7	5	5	17
Intersection	At Route 653W		0.1	2	2	0	4
Segment	Route 653W	Route 746	0.83	3	5	0	8
Intersection	At Route 746		0.1	4	2	2	8
Segment	Route 746	Route 608	1.39	6	15	5	26
Intersection	At Route 608		0.1	5	1	1	7
Segment	Route 608	Route 801E	2.97	13	4	16	33
Intersection	At Route 801E		0.1	1	2	0	3
Segment	Route 801E	Route 807	1.64	2	1	0	3
Intersection	At Route 807		0.1	0	0	2	2
Segment	Route 807	Route 122	1.86	5	3	2	10
Intersection	At Route 122		0.1	2	2	1	5
<b>TOTALS</b>			<b>14.25</b>	<b>68</b>	<b>54</b>	<b>57</b>	<b>179</b>

Exhibit 8  
**Accident Summary by Type**

Location Type	From	To	Accident Type					
			Rear-End	Angle	Head-On	Side-swipe	Fixed Object	Other
Intersection	At Route 886		1	3	0	0	3	0
Segment	Route 886	Route 619/757	0	0	0	0	0	0
Intersection	At Route 619/757		7	2	0	0	0	0
Segment	Route 619/757	Route 635W	3	0	1	2	9	0
Intersection	At Route 635W		1	1	0	0	0	0
Segment	Route 635W	Route 755W	2	1	0	2	8	0
Intersection	At Route 755W		1	3	0	0	3	0
Segment	Route 755W	Route 653W	7	0	0	0	10	0
Intersection	At Route 653W		1	0	0	0	2	1
Segment	Route 653W	Route 746	2	3	0	0	3	0
Intersection	At Route 746		4	3	0	0	1	0
Segment	Route 746	Route 608	1	0	0	0	21	4
Intersection	At Route 608		3	3	0	0	1	0
Segment	Route 608	Route 801E	8	4	1	0	20	0
Intersection	At Route 801E		0	3	0	0	0	0
Segment	Route 801E	Route 807	0	0	0	0	3	0
Intersection	At Route 807		0	0	0	0	1	1
Segment	Route 807	Route 122	0	0	0	1	7	2
Intersection	At Route 122		0	5	0	0	0	0
		Totals	41	31	2	5	92	8

Exhibit 9  
**Accident Summary by Light Conditions and Severity**

Location Type	From	To	Light Conditions			Severity		
			Day-Light	Dark	Dawn/Dusk	Property Damage Only	Injury	Fatality
Intersection	At Route 886		4	3	0	3	4	0
Segment	Route 886	Route 619/757	0	0	0	0	0	0
Intersection	At Route 619/757		6	3	0	4	5	0
Segment	Route 619/757	Route 635W	5	10	0	12	3	0
Intersection	At Route 635W		1	1	0	0	2	0
Segment	Route 635W	Route 755W	10	3	0	9	4	0
Intersection	At Route 755W		4	3	0	3	4	0
Segment	Route 755W	Route 653W	7	7	3	10	6	1
Intersection	At Route 653W		3	1	0	2	2	0
Segment	Route 653W	Route 746	5	2	1	4	3	1
Intersection	At Route 746		5	2	1	4	4	0
Segment	Route 746	Route 608	10	13	3	21	5	0
Intersection	At Route 608		5	2	0	1	6	0
Segment	Route 608	Route 801E	20	11	2	20	13	0

Exhibit 9  
**Accident Summary by Light Conditions and Severity**

Location Type	From	To	Light Conditions			Severity		
			Day-Light	Dark	Dawn/Dusk	Property Damage Only	Injury	Fatality
Intersection	At Route 801E		0	3	0	2	1	0
Segment	Route 801E	Route 807	2	1	0	2	1	0
Intersection	At Route 807		2	0	0	0	2	0
Segment	Route 807	Route 122	3	7	0	4	6	0
Intersection	At Route 122		3	1	1	2	3	0
		<b>Totals</b>	<b>95</b>	<b>73</b>	<b>11</b>	<b>103</b>	<b>74</b>	<b>2</b>

Exhibit 10  
**Accident Rates**

Location Type	From	To	Accidents per Million Vehicles*	Equivalent Property Damage Only Accidents per Million Vehicles *
Intersection	At Route 886		44.35	95.03
Segment	Route 886	Route 619/757	0.00	0.00
Intersection	At Route 619/757		45.17	95.36
Segment	Route 619/757	Route 635W	81.97	114.76
Intersection	At Route 635W		14.37	43.10
Segment	Route 635W	Route 755W	56.30	90.95
Intersection	At Route 755W		55.66	119.28
Segment	Route 755W	Route 653W	145.36	342.01
Intersection	At Route 653W		37.70	75.41
Segment	Route 653W	Route 746	109.56	342.38
Intersection	At Route 746		84.94	169.88
Segment	Route 746	Route 608	212.62	294.39
Intersection	At Route 608		73.12	198.46
Segment	Route 608	Route 801E	153.36	274.19
Intersection	At Route 801E		35.78	59.64
Segment	Route 801E	Route 807	44.19	73.64
Intersection	At Route 807		47.13	141.39
Segment	Route 807	Route 122	148.42	326.51
Intersection	At Route 122		53.68	118.09

\* -- For segments, rate is per 100 million vehicle miles traveled (MVMT). For intersections, rate is per 100 million entering vehicles (MEV).

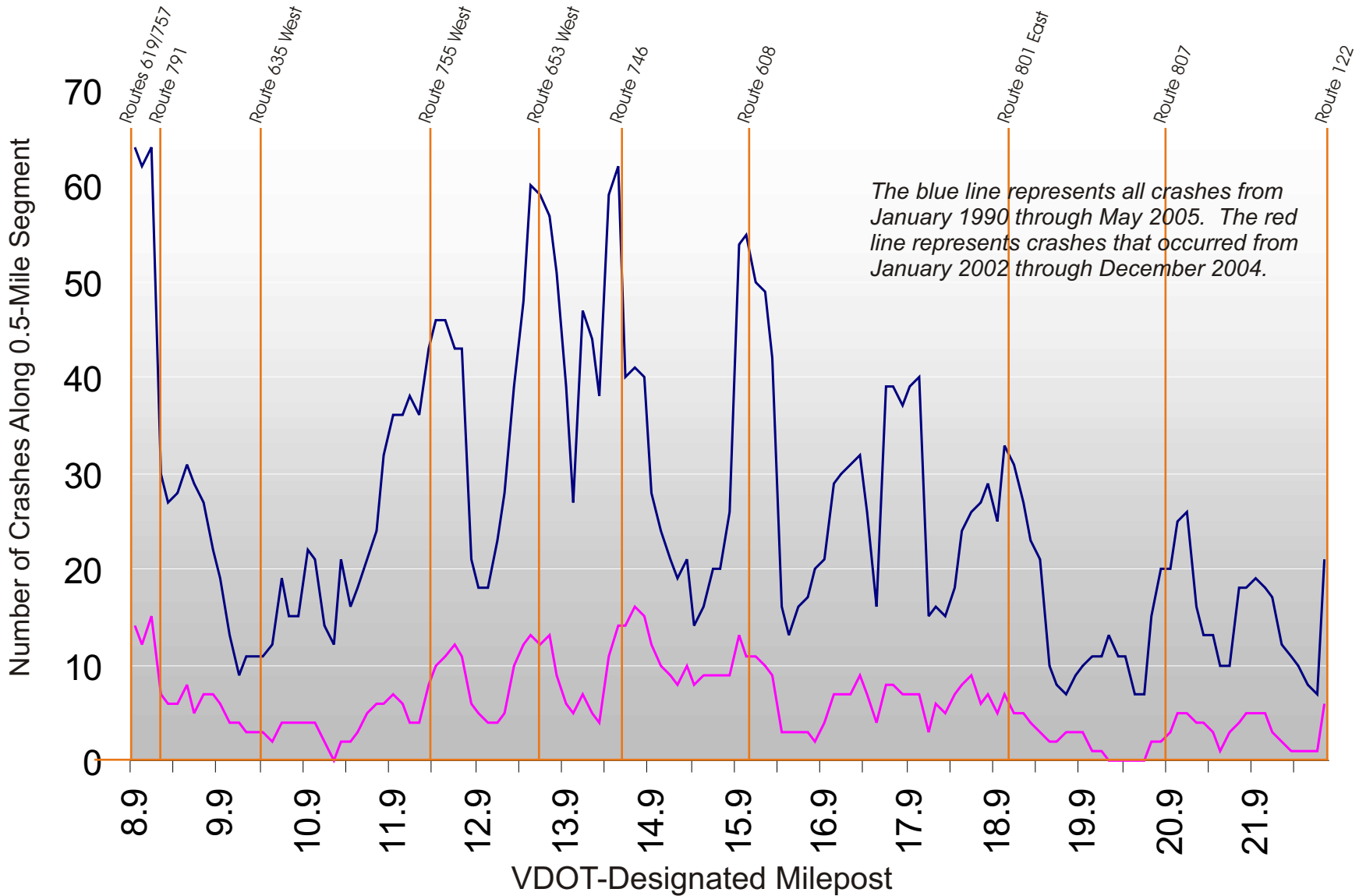




Exhibit 11

# Locations of Crashes

Bedford County Route 24 Corridor Management Study



Note: The points on this graph show the total number of motor vehicle crashes along a 0.5 mile segment of Route 24 centered on a particular milepost. These values are shown every 0.1 mile. Crashes, therefore, are shown in multiple segments.

## 1.4 Roadway Operations Analyses

Traffic operations in the study corridor were analyzed using the concept of levels of service. The analysis grades traffic operations as a level of service rating from A to F, with A representing excellent traffic flow with minimal delays and F representing failure in traffic operations and very long delays. For most areas in the state, including the section of Route 24 examined in this study, VDOT rates levels of service A, B, or C as acceptable and levels of service D, E, or F as unacceptable. The level of service analysis using grades A through F was used for all the intersections in the study corridor.

As shown in Exhibit 12, all of the roadway segments analyzed operate at level of service A or B for existing conditions with the exception of Route 24 west of Route 746, which operates at level D. The intersections at Morgans Mill Road (Route 755) and Flint Hill Road/Stony Fork Road (Route 801) operate at an unacceptable level of service F and D as shown in Exhibit 13.

Exhibit 12  
**Summary of Segment Level of Service (Existing Conditions)**

Segment	24-Hour Traffic	AM Peak Hour Level of Service	PM Peak Hour Level of Service
Route 24 west of Route 619 (Jordantown Road)	15,028	B	B
Route 24 west of Route 746	8,486	D	D
Route 24 west of Route 122	2,523	B	B
Route 757 south of Route 24	4,373	B	B
Route 746 (Dickerson Mill Road) north of Route 24	1,205	A	A
Route 801 (Stony Fork Road) south of Route 24	2,153	B	A
Route 608 (Emmaus Church Road) south of Route 24	1,435	A	A
Route 122 north of Route 24	4,763	B	B

Exhibit 13  
**Summary of Intersection Level of Service (Existing Conditions)**

Intersection of Route 24 with:	AM Peak	PM Peak
Route 619/757 (Jordantown Road/Goodview Road)	B	B
Route 755 West (Morgans Mill Road)	F	C
Route 801 (Flint Hill Road/Stony Fork Road)	F	D
Route 635 (Lovers Lane)	A	A

## 1.5 Public Participation and Input

The traffic engineering analysis described in this chapter provides an objective and quantitative assessment of transportation operations and safety in the study corridor. Some transportation concerns do not become apparent through engineering analyses, however, and are best identified by speaking with those who live, work, and/or travel the corridor. To collect this important input, public meetings were held in the study corridor on February 23, 2006 and March 21, 2006. Approximately 105 people attended the public meetings, several others provided comments either by e-mail or telephone. The discussions and comments are summarized below.

Questions were asked by meeting attendees on the study process, as well as some of the preliminary analysis. Safety was, in general, cited as the primary concern in the study corridor. Concerns related to crossovers, intersection alignments, overgrown vegetation, bus stops, and traffic speeding. The following provides a generalized summary of these comments received at the public meetings:

- The intersection of Route 24 and Route 608 (Emmaus Church Road) is a problem area; it lacks defined entrances to the commercial property in the southwest quadrant of this intersection. There is also a need to cut back overhead vegetation to improve visibility at this intersection.
- Route 24 near and at the intersection with Route 616 is also a problem area.
- The alignment of Route 635 East is a major problem as westbound motorists make high speed turns at this location (the right turn is almost like going straight because of the angle of the intersection).
- Traffic speeds up to use the passing zone near the Chamblissburg Baptist Church, resulting in very high-speed traffic and unsafe situations.
- There is a need for increased speed enforcement on Route 24.
- Consideration should be given to further reducing the speed limit in some areas, and increase enforcement of these reduced speed limits.
- There is a need to cut back brush to increase visibility at Mead Valley Road (Route 749 North).
- There will be a need to improve sections of existing Route 24 even if a roadway on new alignment is constructed.
- The shoulder widening that VDOT has done on Route 24 in some areas seems to have increased the safety of Route 24.
- The gravel material used to improve the shoulder of Nemmo Road (Route 755) continually washes downhill to Route 24. This can be a safety problem.
- Traffic growth in the corridor has been substantial over the years and shows a constant level of increase year by year. There was a concern that the traffic forecasts indicated in the meeting displays are low – consideration should be given to using higher growth factors.
- There is a need for a southbound right turn lane at Route 619 (would have significant impacts on the convenience store in the northwest quadrant of this intersection).

- There was a concern cited about the increasing number of school bus stops on Route 24. The lack of safe areas to walk was cited as one reason that so many individual bus stops are needed.

All of these comments were considered in developing and/or revising the recommendations described in Chapter 3 of this report.

## Chapter 2 – Year 2030 Traffic Forecasts and Operations

The transportation recommendations developed for this study are intended to accommodate both existing travel demands and demands to the year 2030. Traffic forecasts for 2030 and analysis of 2030 traffic operations were used to identify future needs and to ensure that the proposed transportation recommendations would adequately and safely accommodate future demand.

### 2.1 2030 Traffic Forecasts

Year 2030 traffic forecasts for this study are based on historic traffic trends along with the traffic expected to be generated by several planned development projects in the corridor. To calculate expected growth in traffic between 2005 and 2030, historic traffic counts collected by VDOT were tabulated along with the 2005 traffic counts performed for this study. Based on historic trends, the following annual growth rates were used to forecast traffic to the year 2030:

- 2.5 percent for the western portion of the study corridor between Route 886 and Route 635
- 2.0 percent for the middle portion of the study corridor between Route 635 and Route 801
- 1.5 percent for the eastern portion of the study corridor between Route 801 and Route 122

As is often typical for studies of this type, the growth rates were not compounded but rather multiplied. By not compounding, the growth rate is effectively a constant volume (rather than a constant percentage) per year.

Expected traffic volumes and resulting levels of service for roadway segments on Route 24 are shown in Exhibit 14. Traffic volumes on Route 24 are expected to be between 3,500 and 24,000 vehicles per day in the year 2030.

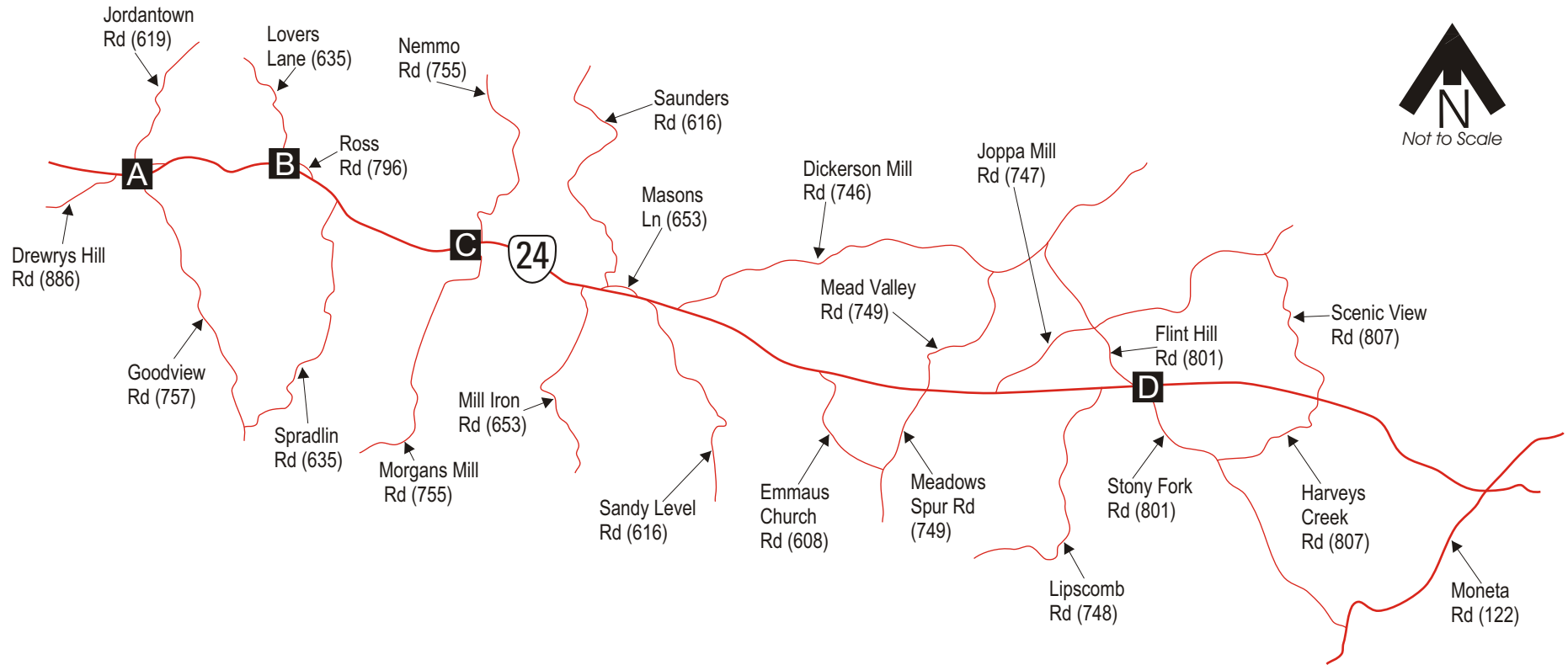
Exhibit 14  
**Summary of Segment Volumes and Level of Service (Year 2030)**

Segment	24-Hour Traffic	AM Peak Hour Level of Service	PM Peak Hour Level of Service
Route 24 west of Route 619 (Jordantown Road)	24,045	C	C
Route 24 west of Route 746	12,559	E	D
Route 24 west of Route 122	3,431	B	B
Route 757 south of Route 24	6,997	C	C
Route 746 (Dickerson Mill Road) north of Route 24	1,639	A	A
Route 801 (Stony Fork Road) south of Route 24	2,928	B	B
Route 608 (Emmaus Church Road) south of Route 24	1,952	A	A
Route 122 north of Route 24	6,478	C	C

Peak hour intersection turning movement volumes for the year 2030 are shown in Exhibits 15 and 16.



Exhibit 15  
**2030 AM Peak Hour Turning Movements**  
 Bedford County Route 24 Corridor Management Study



16

**A** Route 24 at Route 619/757

			↖	21
362	31	15	←	814
↙	↓	↘	↘	61
	111	↖	↖	↑
	194	→	303	26
	113	↘		30

**B** Route 24 at Route 635

			↖	5
109		23	←	1064
↙		↘		
	21	↖		
	337	→		

**C** Route 24 at Route 755 West

			←	648
			↘	48
			↖	
	243	→	117	58
	13	↘		

**D** Route 24 at Route 801 East

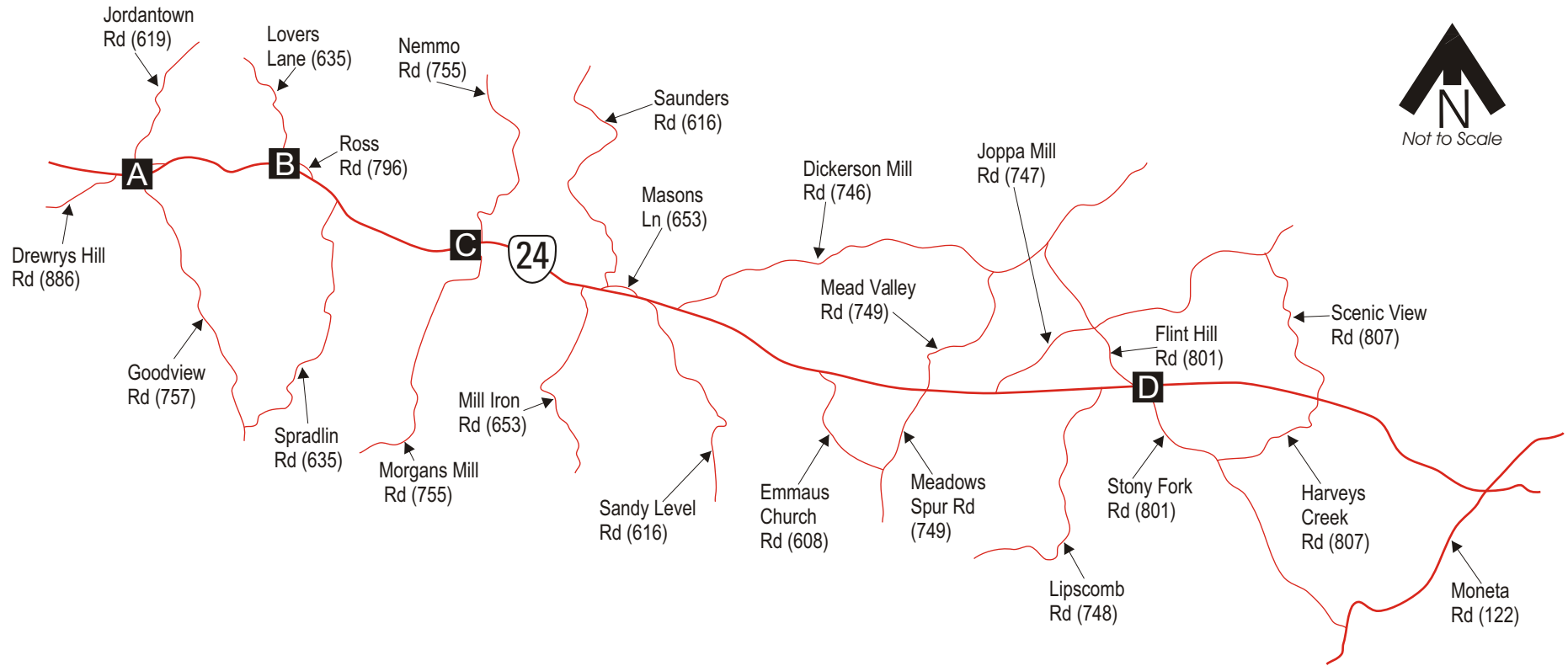
			←	271
			↘	4
			↖	
	176	→	181	17
	110	↘		



# Exhibit 16

## 2030 PM Peak Hour Turning Movements

### Bedford County Route 24 Corridor Management Study



17

**A** Route 24 at Route 619/757

			↖	8	
116	29	22	←	245	
↙	↓	↘	↘	22	
	350	↗	↖	↑	↗
	778	→	98	36	46
	330	↘			

**B** Route 24 at Route 635

			↖	7
56		4	←	337
↙		↘		
	70	↗		
	890	→		

**C** Route 24 at Route 755 West

			←	255
			↘	53
			↖	
	634	→	24	55
	105	↘		

**D** Route 24 at Route 801 East

			←	159
			↘	1
			↖	
	239	→	108	3
	209	↘		

## 2.2 Year 2030 No-Build Traffic Operations

The No-Build scenario refers to the situation that would occur if no major improvements, only routine maintenance, were made in the study corridor between now and 2030. With increased travel demands and no major improvements, traffic operations in the Route 24 corridor would deteriorate. As shown in Exhibit 14, the two-lane portions of Route 24 in the western part of the study corridor would operate at inadequate levels of service by the year 2030 (levels of service D and E). One significant effect of this increased traffic and congestion is substantial delays for motorists turning onto Route 24 from side streets. While inadequate level of service does not necessarily indicate that a traffic signal is warranted (a separate traffic signal warrant analysis is required for signal installation), major delays are indicative of both the potential for signalization and of decreased safety as motorists sometimes take greater risks when frustrated with delays. Exhibit 17 shows the results of the intersection level of service analysis for 2030. As this table, shows, two of the four intersections analyzed are expected to operate at unacceptable levels of service by 2030. The highest levels of delay are expected at the Route 24 intersections with Morgans Mill Road (Route 755 West) and Flint Hill Road/Stony Fork Road (Route 801).

Exhibit 17  
**Intersection Peak Hour Level of Service (2030)**

Intersection of Route 24 with:	2030	
	AM Peak	PM Peak
Route 619/757 (Jordantown Road/Goodview Road)	C	B
Route 755 West (Morgans Mill Road)	F	E
Route 801 (Flint Hill Road/Stony Fork Road)	F	F
Route 635 (Lovers Lane)	B	B

## 2.3 Corridor Transportation Issues

As described in Chapter 1, there are a number of existing transportation concerns in the study corridor. These concerns will be exacerbated by the year 2030 as traffic volumes increase, and pressures for additional strip-type development occurs. Exhibit 18 summarizes some of the transportation issues and concerns raised both in this study's analysis and from the public input. Improvements to address these concerns are described in the next chapter.



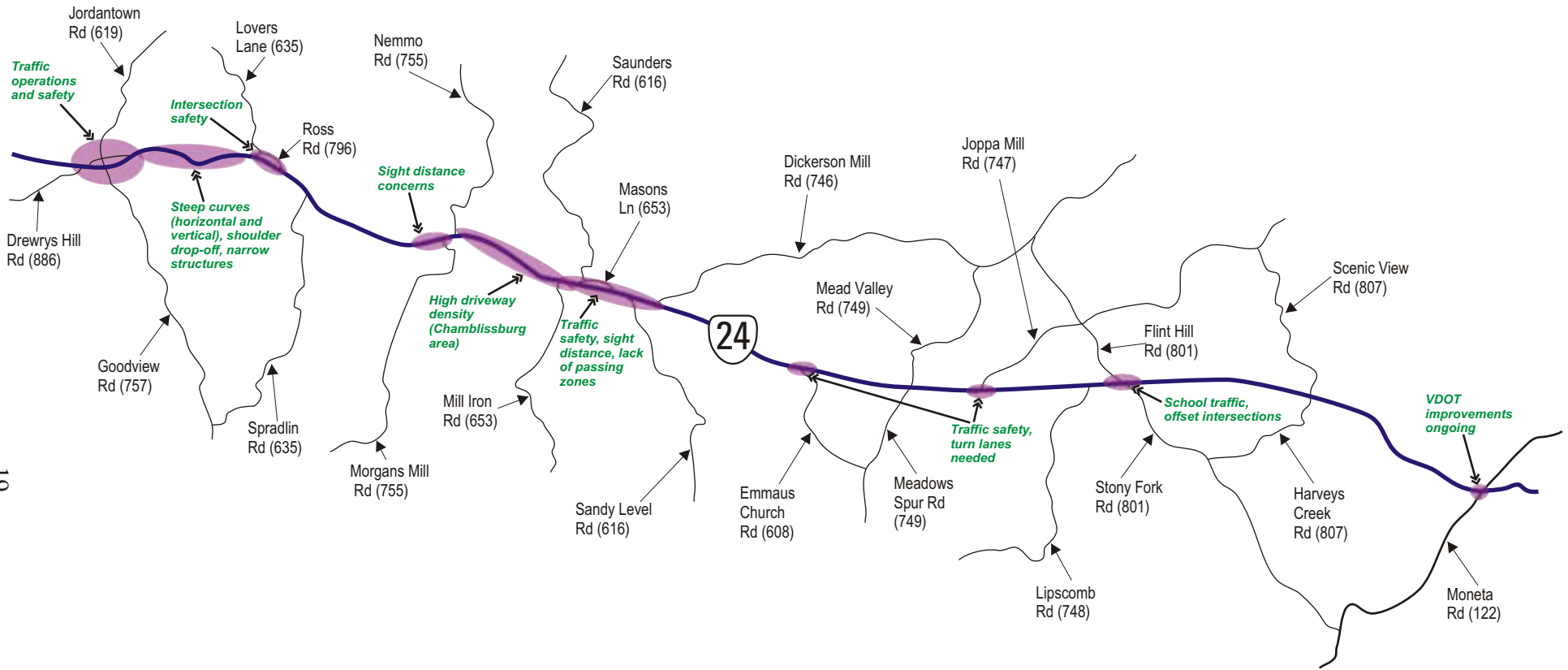



Exhibit 18  
**Summary of Transportation Concerns**  
 Bedford County Route 24 Corridor Management Study

## Chapter 3 – Study Recommendations

As described in previous chapters, this study has identified both existing and future transportation problems in the Route 24 corridor. These concerns were confirmed and reiterated by those who attended the public meetings that were held in the corridor. Meeting participants also emphasized the need for proactive transportation planning in the corridor to address existing needs and to plan for future improvements. Effective transportation planning in this corridor will provide Bedford County, VDOT, and local land-owners with a blueprint for a safe and efficient Route 24. For land-owners, this study and its implementation will allow them to make improvements to their properties that will maximize the benefits that both they and the County obtain from their land.

This study recommends a combination of roadway upgrades and planning initiatives. Based on projected traffic volumes by the year 2030, widening Route 24 to four lanes with a median is recommended for most of the study corridor. This four-laning is recommended to incorporate access management principles that will preserve the long-term functionality such a major transportation investment. Access management principles seek to limit the number of driveways and provide for good spacing of major intersections as well as safe and effective driveway access designs.

Another key feature of the study recommendations is the establishment of key access points that are spaced relatively evenly through the corridor. These proposed key access points support a hierarchy of access in the study corridor, which is supportive of both good land use and transportation planning. The proposed key access points are illustrated in Exhibit 19, and are listed below:

- Jordantown Road/Goodview Road (Routes 619/757)
- Spradlin Road (Route 635)
- Morgans Mill Road/Nemmo Road (Route 755)
- Dickerson Mill Road (Route 746)
- Emmaus Church Road (Route 608)
- Joppa Mill Road (Route 747)
- Stony Fork Road/Flint Hill Road (Route 801)
- Scenic View Road/Harveys Creek Road (Route 807)
- Moneta Road (Route 122)

To the extent possible, access to Route 24 to and from adjacent properties should seek to take place at the identified key points. This is particularly important as the intensity of land uses (along with the resulting traffic generation) increases. For example, while Bedford County zoning and comprehensive planning foresees much of this corridor as agricultural and other low-density uses, it is important that the limited amount of commercial properties in the corridor be focused on these key access nodes.

Exhibit 19  
**Proposed Major Access Nodes On Route 24**



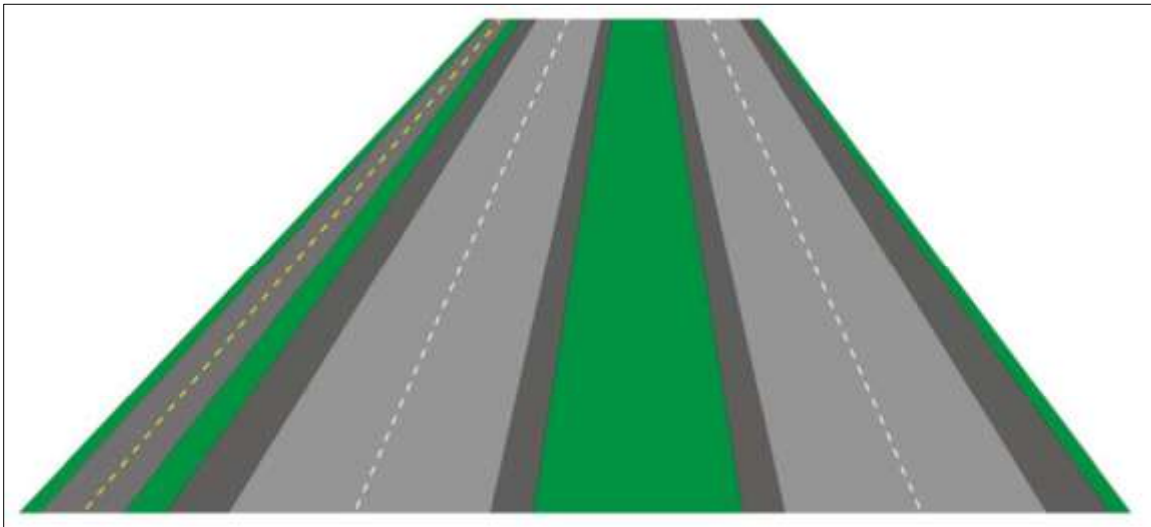
This study incorporates short-, mid-, and long-term recommendations. Short-term improvements are recommended to be implemented within the next 5 years. These improvements include relatively low-cost and low-impact improvements as well as planning actions that Bedford County should take within the same five-year timeframe. Mid-term improvements are those that would be implemented within the 5 to 10 year timeframe. These include projects that require some lead time in terms of location and environmental studies, as well as more capital-intensive projects that require some time to accrue funding for construction. Long-term projects are those that would be implemented over a timeframe of 10 years or more. Many long-term recommendations relate to improvements that are contingent on property uses changing. In other words, these recommendations are intended to guide decisions that would be necessary should a property convert to more intensive uses. Improvements such as parallel access roads or shifting entrances should then be part of the re-development. This guidance for property owners and county planning staff will assist in enhancing and promoting the overall safety and functionality of Route 24 well into the future.

As indicated above, Route 24 is proposed to be widened through much of the study corridor. The proposed cross-section for the widened Route 24 is shown in Exhibit 20. As shown in this cross-section, it is recommended that consideration be given to a pedestrian and bicycle facility that runs parallel to Route 24. For the remainder of Route 24 at the eastern end of the study corridor, this study recommends the preservation of rights-of-way through setback requirements: this would allow for widening to four lanes that may be necessary beyond this study's horizon.

The median shown in Exhibit 20 is an important component of the improved Route 24 as it serves to implement a key component of the improvement: access management. Access management is the concept of managing and controlling access in order to preserve the transportation function and safety of a roadway, and medians provide a important mechanism for limiting and managing access. Limiting of access by managing the number of driveways and medians promotes safety because it reduces the number of

conflict points and reduces the variation in vehicle speeds. Studies have consistently shown that the number of driveways per mile on a roadway is a key indicator of accident frequency. Traffic entering and exiting at driveways, particularly vehicles making left turns, also reduces the smooth flow of traffic. Limiting access will also, therefore, promote long-term efficient and safe traffic flow in the corridor. Pedestrian and bicycle safety is also substantially degraded as the number of entrance points onto a road increases. Finally, limiting access also serves to reduce or eliminate the strip development that extends along a roadway rather than focusing on a limited number of activity nodes.

Exhibit 20  
**Proposed Route 24 Typical Cross-Section**



*Note: The proposed cross-section incorporates a right-of-way approximately 100 feet wide (note that the actual width would depend on topography and other engineering considerations). Inclusion of a pedestrian and bicycle facility as shown on the left side of the cross-section diagram above would increase right-of-way requirements by 12 to 15 feet.*

In addition to designing improvements to Route 24 to include carefully designed medians, access management is recommended to be implemented in the Route 24 corridor using the tools of an overlay zoning ordinance as well as a number of physical local circulation improvements. The overlay zoning ordinance would provide incentives for shared access, as well as requirements for driveway location. Further details on these recommendations for implementing access management are included below.

In the sections below, study recommendations are coded by number for each of the timeframes (i.e., Recommendation S1 is the first short-term recommendations). The improvements for all three timeframes are also depicted in Exhibits 22 through 33 using these same improvement codes. Exhibits 22 through 33 also show planning corridor widths for the proposed improvements. These planning corridors are approximately 750 feet wide for roadway to be constructed on new alignment, and 300 feet wide for widening along the existing alignment. The final rights-of-way for the proposed four-lane roadway will be considerably smaller than this (generally no more than 100 to 150

feet); the final location of the roadway within the planning corridor will be determined based on detailed engineering analyses that are beyond the scope of this planning study.

### **3.1 Short-Term Recommendations**

The implementation of access management in the Route 24 corridor will require that a planning and regulatory framework be established. Short-term (0 to 5 years) recommendations address this requirement, and incorporate a number of intersection and roadway safety improvements that are relatively low-cost.

- S1: Adopt changes to the Bedford County Comprehensive Plan to provide the foundation for corridor preservation, corridor overlay zoning, and access management in the Route 24 Corridor. Incorporate references to this Route 24 Corridor Management Plan.
- S2: Begin to implement the access management and local circulation plan by incorporating additional elements into the Corridor Overlay District element of the Bedford County Zoning Ordinance. The Corridor Overlay District should extend 1,000 feet on each side of the centerline of Route 24. This will provide Bedford County with the mechanism to control the number of access points onto Route 24. The overlay zoning ordinance should:
  1. Incorporate minimum frontage requirements commensurate with this state primary highway. This study recommends a minimum parcel frontage of 500 feet for an access point and 800 feet of additional frontage for each additional access point (these requirements were developed based on desirable spacing to accommodate stopping sight distance).
  2. Require driveways be located at least 150 feet from the intersections of Route 24 with secondary roads, particularly those roadways identified on page 21 as key access points.
  3. Provide incentives for shared entrances, inter-parcel access, and/or access via existing or proposed secondary roads, as well as new parallel roads.
  4. Promote the design of driveways that come in directly across, rather than offset, from existing driveways on the opposite side of Route 24.
  5. Support the construction of the roadway improvements recommended in this study, particularly those that seek to remove intersection offsets (an example in the study corridor of this type of offset occurs at Route 755 – Morgans Mill and Nemmo Roads).

Implementation of access management in the Route 24 Corridor would also include several changes in procedures. These are:

1. New agreements for access onto Route 24 should incorporate language stating that such access is temporary until such time that alternative access via localized internal or parallel roads, or a secondary road, is developed. Bedford County will need to coordinate with VDOT to apply these guidelines. Where agreements already exist between VDOT and landowners, both Bedford County and VDOT

should seek to minimize the impacts that any new access points would have on traffic flow and safety.

2. The goals of the updated Comprehensive Plan, access management, and localized circulation should be integrated into the subdivision, site plan, and negotiation process with landowners and developers.
- S3: Build new connecting road between Route 24 and Ross Road; close existing entrances on east and west ends of Ross Road.
  - S4: Improve sight distance to west by removing brush and other minor improvements.
  - S5: Improve existing intersection at Dickerson Mill Road (Route 746); add turn lanes on all approaches.
  - S6: Construct new intersection for Emmaus Church Road (Route 608) east of existing intersection; close existing intersection.
  - S7: Shift entrance to Staunton River High School to West, to align with Lipscomb Road (Route 748), assess need for traffic signal (cost estimate includes installation of traffic signal).
  - S8: Assess potential for long-term roadway relocation to shift intersection of Route 24 and Route 122.

### **3.2 Mid-Term Recommendations**

Mid-term improvements are recommended to be implemented in a 5 to 10 year timeframe.

- M1: Improve intersection of Route 24 and Jordantown/Goodview Roads with addition of right and left turn lanes on the northbound and eastbound approaches, a left turn lane on the southbound approach and the extension of the left turn lane on the westbound approach.
- M2: Construct new 4-lane divided roadway from Route 24 east of Route 619 to Route 24 east of Route 635.
- M3: Widen Route 24 to four lanes divided (on the existing alignment) from east of Route 635 to the east of Nemmo Road (Route 755).
- M4: Align Morgans Mill Road (Route 755 South) with Nemmo Road (Route 755 North) by constructing new roadway and closing existing Morgans Mill Road intersection.

- M5: Align Sandy Level Road (Route 616) with Masons Lane (Route 653) by constructing new roadway and closing existing intersections.
- M6: Improve existing intersection at Joppa Mill Road (Route 747); add turn lanes on all approaches.
- M7: Align Stony Fork Road (Route 801 South) with Flint Hill Road (Route 801 North) by constructing new roadway and closing existing Route 801 south intersection.
- M8: Improve existing intersection at Moneta Road (Route 122). Construct right and left turn lanes and raise grade on Route 122 (Phase III of VDOT improvements).

### **3.3 Long-Term Recommendations**

Long-term improvements are anticipated to be constructed within a 10 to 20 year timeframe.

- L1: Construct new 4-lane divided highway from east of Nemmo Road (Route 755) to 0.7 miles east of Dickerson Mill Road (Route 746).
- L2: Realign Dickerson Mill Road to provide for good connection to new Route 24 (as described in Improvement L1).
- L3: Widen Route 24 to four-lanes divided from 0.7 miles east of Dickerson Mill Road (Route 747) to Stony Fork Road (Route 801 South).
- L4: Corridor planning/preservation for long-term widening of Route 24 from Stony Fork Road (Route 801 South) to Moneta Road (Route 122).
- L5: Shift and realign intersection of Route 24 with Harveys Creek Road and Scenic View Road (Route 807) to improve long-term safety

### **3.4 Estimated Costs**

Cost estimates were developed for the physical improvements described in the three previous sections using standard unit costs provided by VDOT. The resulting cost estimates were then reviewed with County and VDOT staff. These costs are in year 2006 dollars. It is important to recognize that the costs are planning-level estimates only and are subject to adjustment following more detailed engineering analysis. Unforeseen environmental impacts can also have a substantial effect on project costs.

The estimated costs for each improvement are shown in Exhibit 21. The totals for each timeframe are shown below:

Short-term: \$0.62 million  
 Mid-term: \$20.91 million  
 Long-term: \$32.14 million

Exhibit 21  
**Estimated Costs for Physical Improvements**

Code	Description	Estimated Project Length (feet)	Total Estimated Cost
S3	Build new connecting road between Route 24 and Ross Road; close existing entrances on east and west ends of Ross Road.	0.08	\$77,000
S4	Improve sight distance to west by removing brush and other minor improvements	NA	\$10,000
S5	Improve existing intersection at Dickerson Mill Road (Route 746); add turn lanes on all approaches	NA	\$213,000
S6	Construct new intersection for Emmaus Church Road (Route 608) east of existing intersection; close existing intersection	0.09	\$100,000
S7	Shift entrance to Staunton River High School to West, to align with Lipscomb Road (Route 748), assess need for traffic signal (cost estimate includes installation of traffic signal)	0.03	\$220,000
M1	Improve intersection of Route 24 and Jordantown/Goodview Roads with addition of right and left turn lanes on the northbound and eastbound approaches, a left turn lane on the southbound approach and the extension of the left turn lane on the westbound approach	NA	\$870,000
M2	Construct new 4-lane divided roadway from Route 24 east of Route 619 to Route 24 east of Route 635	2.09	\$13,016,000
M3	Widen Route 24 to four lanes divided (on the existing alignment) from east of Route 635 to the east of Nemmo Road (Route 755)	1.5	\$6,253,000
M4	Align Morgans Mill Road (Route 755 South) with Nemmo Road (Route 755 North) by constructing new roadway and closing existing Morgans Mill Road intersection	0.19	\$183,000

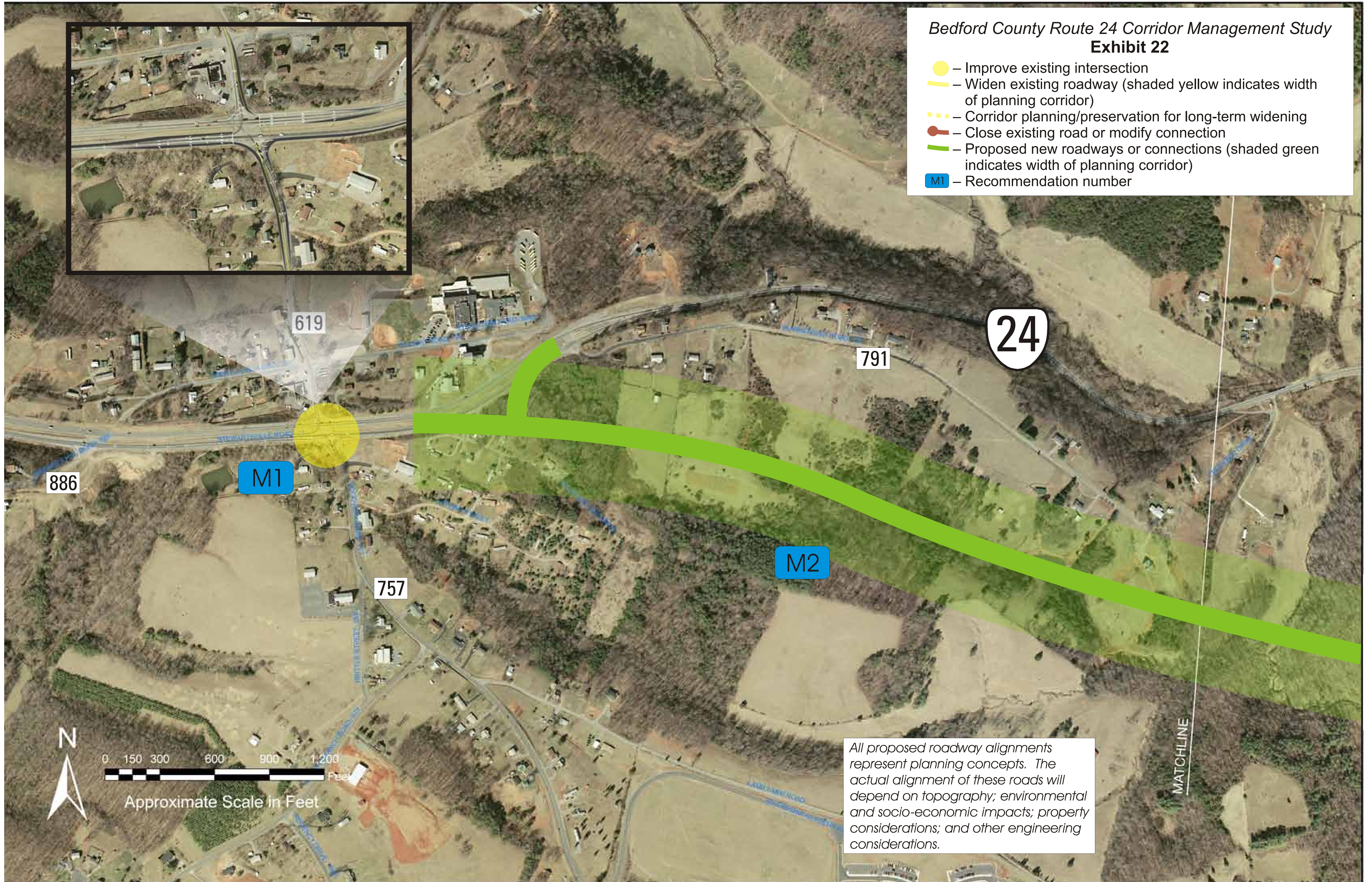


Exhibit 21  
**Estimated Costs for Physical Improvements**

Code	Description	Estimated Project Length (feet)	Total Estimated Cost
M5	Align Sandy Level Road (Route 616) with Masons Lane (Route 653) by constructing new roadway and closing existing intersections	0.13	\$158,000
M6	Improve existing intersection at Joppa Mill Road (Route 747); add turn lanes on all approaches	NA	\$213,000
M7	Align Stony Fork Road (Route 801 South) with Flint Hill Road (Route 801 North) by constructing new roadway and closing existing Route 801 south intersection	0.23	\$217,000
M8	Improve existing intersection at Moneta Road (Route 122). Construct right and left turn lanes and raise grade on Route 122 (Phase III of VDOT improvements).	NA	Costs determined by VDOT
L1	Construct new 4-lane divided highway from east of Nemmo Road (Route 755) to 0.7 miles east of Dickerson Mill Road (Route 746)	2.66	\$15,677,000
L2	Realign Dickerson Mill Road to provide for good connection to new Route 24 (as described in Improvement L1)	0.24	\$200,000
L3	Widen Route 24 to four-lanes divided from 0.7 miles east of Dickerson Mill Road (Route 747) to Stony Fork Road (Route 801 South)	3.85	\$16,050,000
L4	Corridor planning/preservation for long-term widening of Route 24 from Stony Fork Road (Route 801 South) to Moneta Road (Route 122)	NA	\$0
L5	Shift and realign intersection of Route 24 with Harveys Creek Road and Scenic View Road (Route 807) to improve long-term safety	0.2	\$217,000

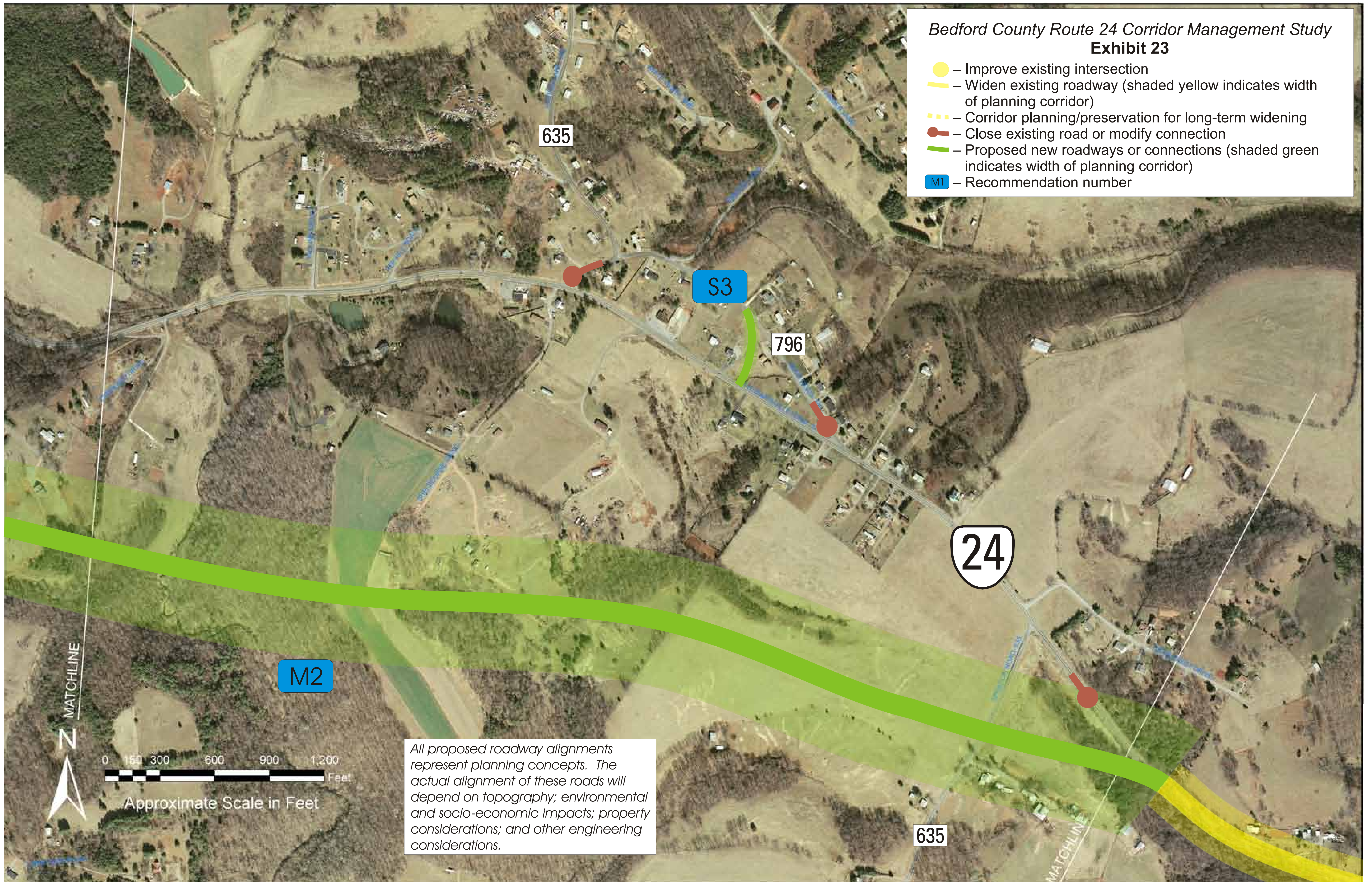
Bedford County Route 24 Corridor Management Study  
Exhibit 22

- – Improve existing intersection
- – Widen existing roadway (shaded yellow indicates width of planning corridor)
- – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



Bedford County Route 24 Corridor Management Study  
Exhibit 23

- – Improve existing intersection
- (shaded yellow) – Widen existing roadway (shaded yellow indicates width of planning corridor)
- (dotted yellow) – Corridor planning/preservation for long-term widening
- (red) – Close existing road or modify connection
- (shaded green) – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number

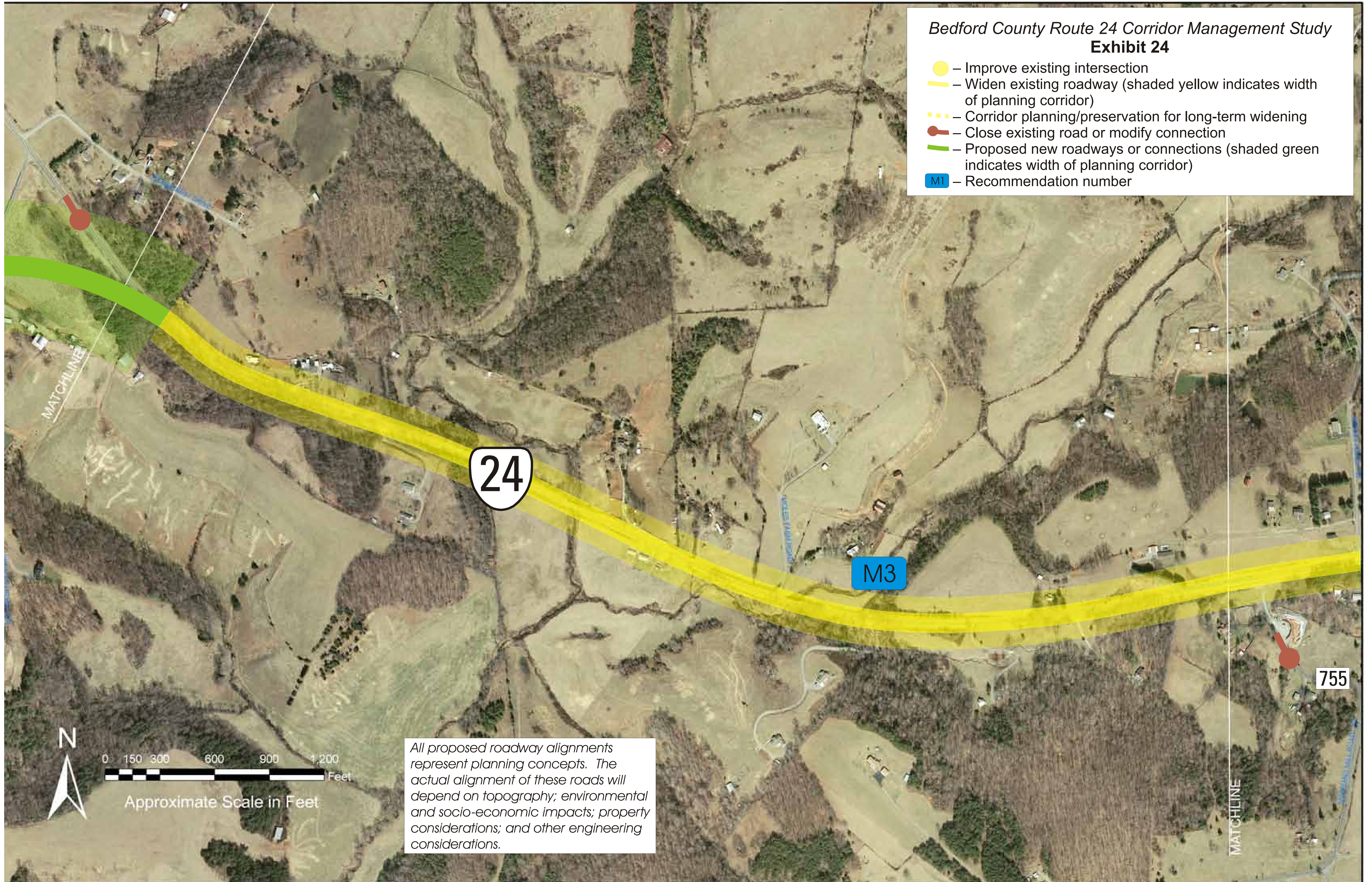


All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.



Bedford County Route 24 Corridor Management Study  
Exhibit 24

- – Improve existing intersection
- – Widen existing roadway (shaded yellow indicates width of planning corridor)
- – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.



MATCHLINE







MATCHLINE

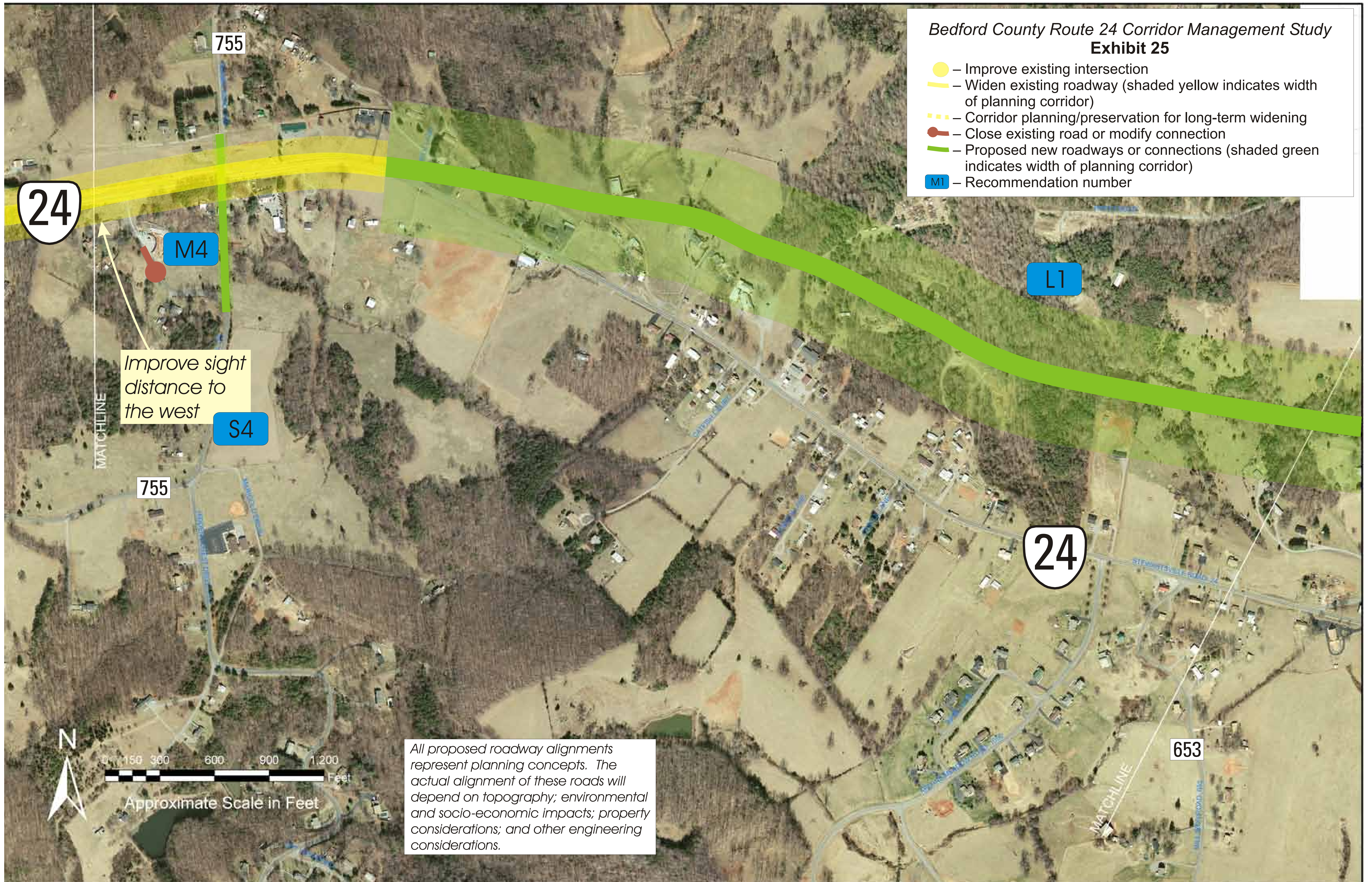
755

M3

24

Bedford County Route 24 Corridor Management Study  
**Exhibit 25**

-  – Improve existing intersection
-  – Widen existing roadway (shaded yellow indicates width of planning corridor)
-  – Corridor planning/preservation for long-term widening
-  – Close existing road or modify connection
-  – Proposed new roadways or connections (shaded green indicates width of planning corridor)
-  – Recommendation number









Improve sight distance to the west

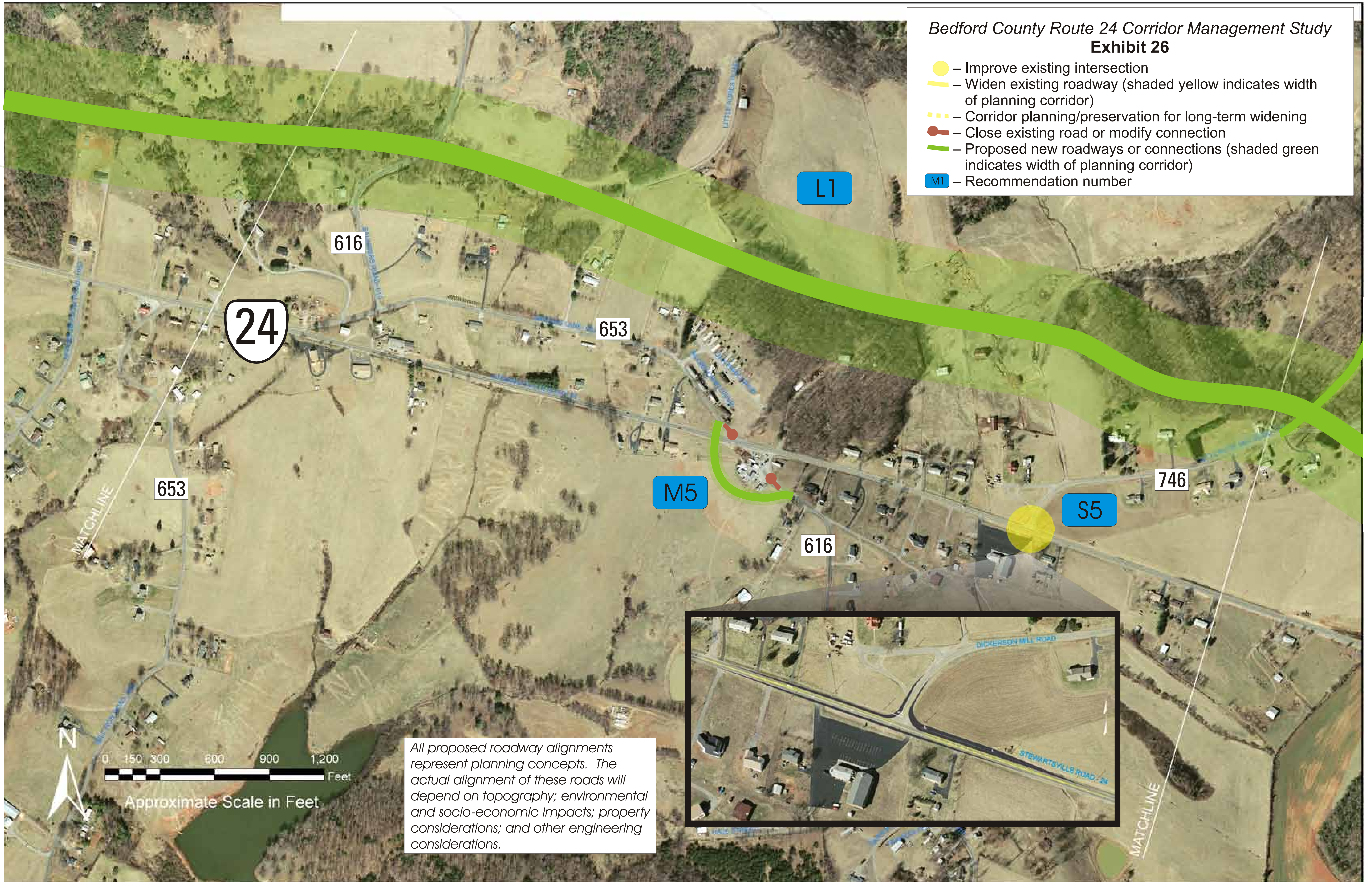
All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.

Approximate Scale in Feet



Bedford County Route 24 Corridor Management Study  
**Exhibit 26**

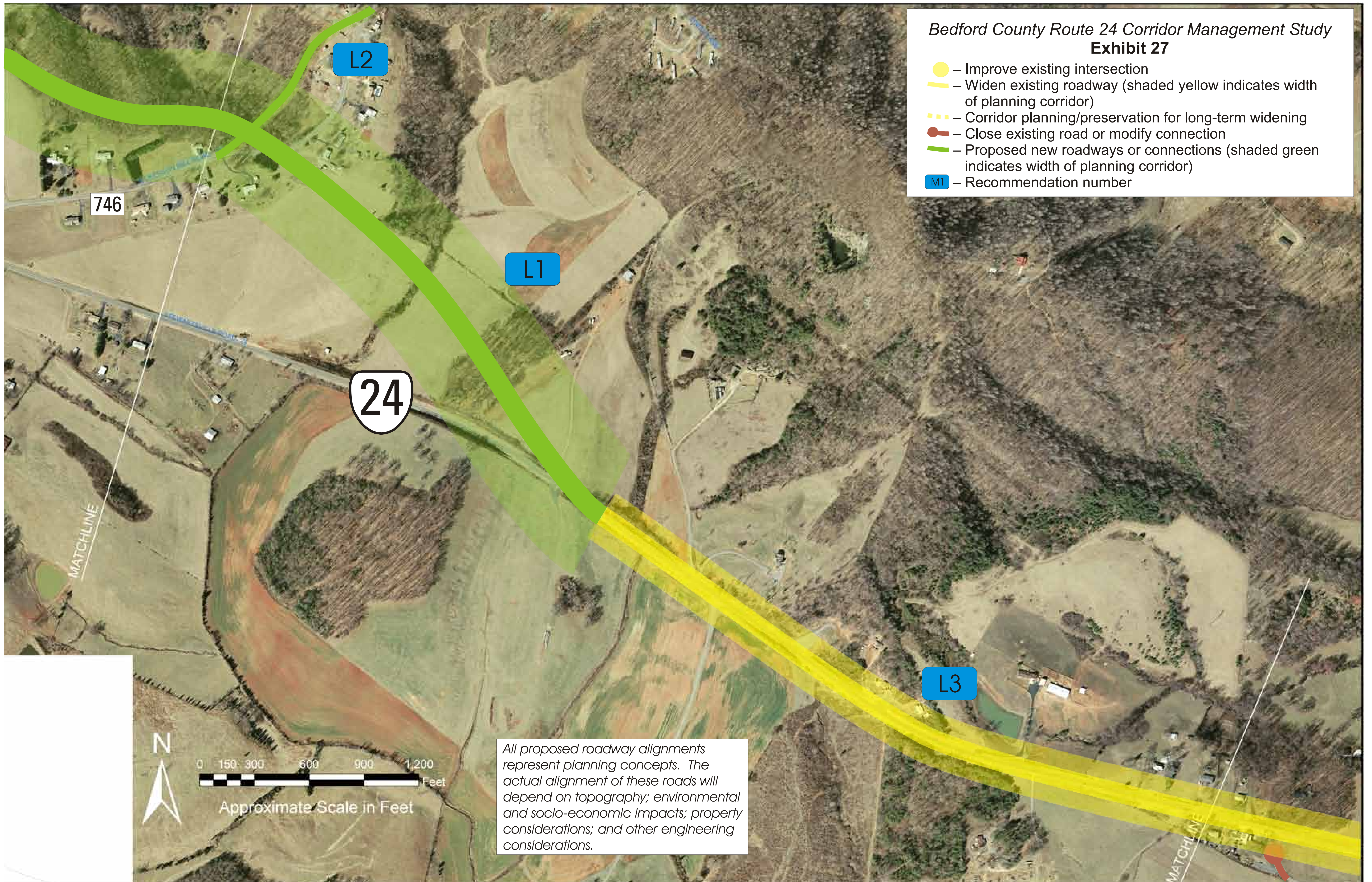
-  – Improve existing intersection
-  – Widen existing roadway (shaded yellow indicates width of planning corridor)
-  – Corridor planning/preservation for long-term widening
-  – Close existing road or modify connection
-  – Proposed new roadways or connections (shaded green indicates width of planning corridor)
-  – Recommendation number



All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.

Bedford County Route 24 Corridor Management Study  
Exhibit 27

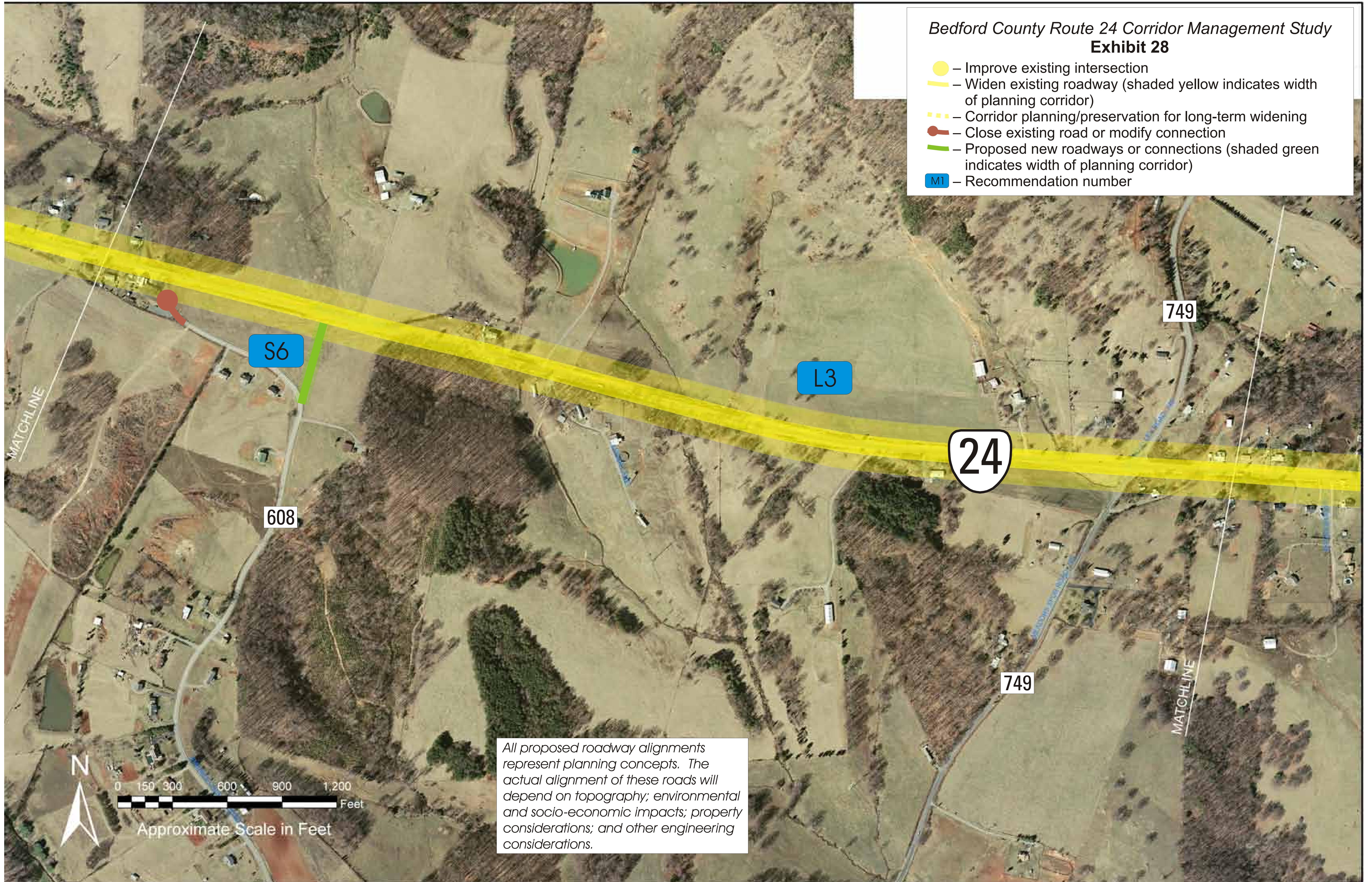
- – Improve existing intersection
- – Widen existing roadway (shaded yellow indicates width of planning corridor)
- – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.







Bedford County Route 24 Corridor Management Study  
Exhibit 28

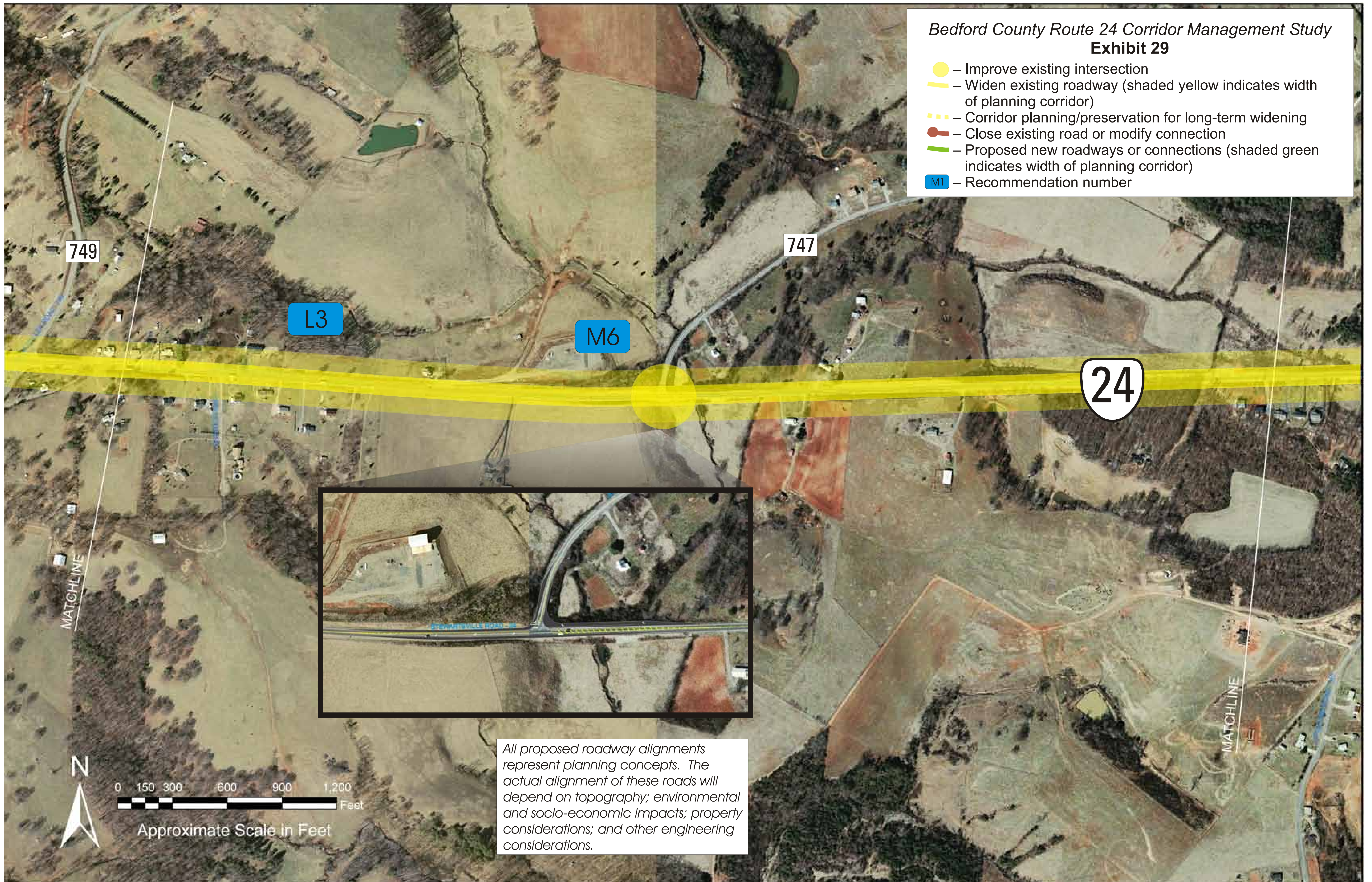
- – Improve existing intersection
- ▬ – Widen existing roadway (shaded yellow indicates width of planning corridor)
- ▬ – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- ▬ – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



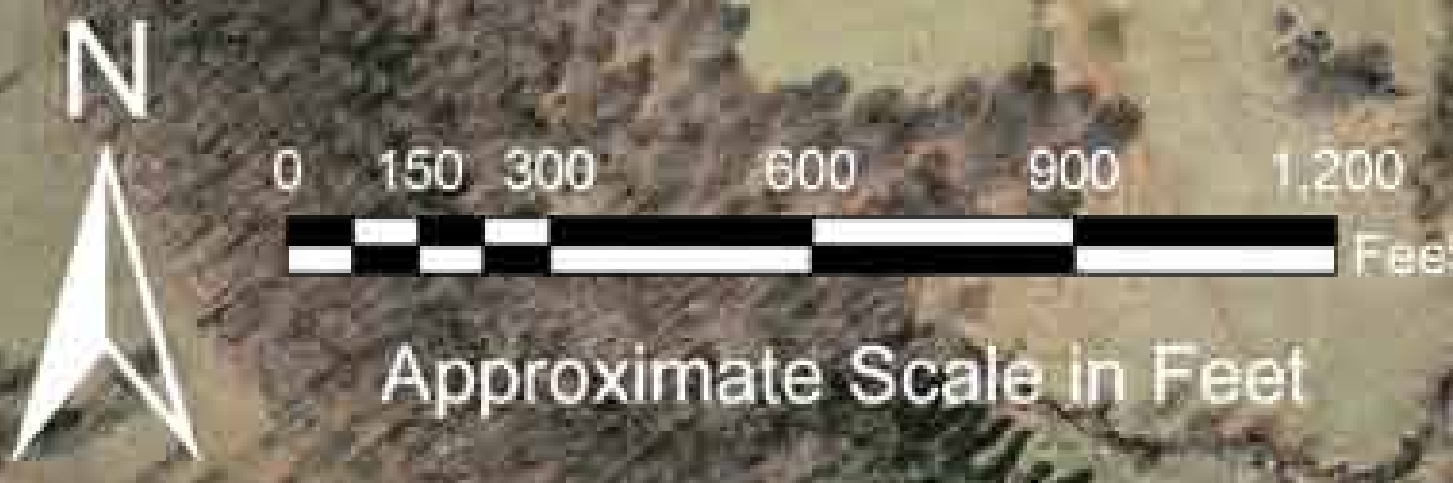


Bedford County Route 24 Corridor Management Study  
**Exhibit 29**

-  – Improve existing intersection
-  – Widen existing roadway (shaded yellow indicates width of planning corridor)
-  – Corridor planning/preservation for long-term widening
-  – Close existing road or modify connection
-  – Proposed new roadways or connections (shaded green indicates width of planning corridor)
-  – Recommendation number



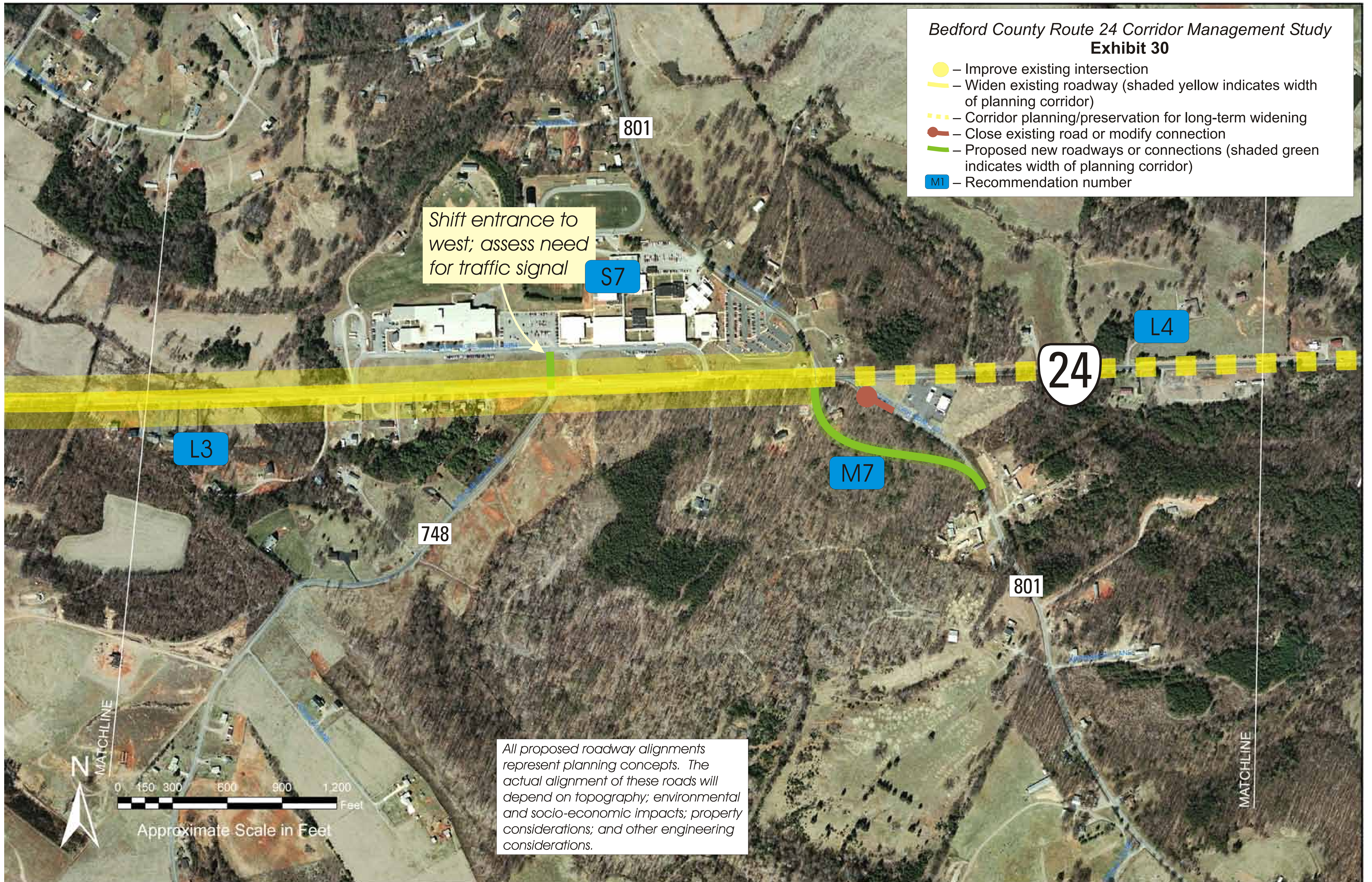
All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.



Bedford County Route 24 Corridor Management Study

Exhibit 30

- – Improve existing intersection
- – Widen existing roadway (shaded yellow indicates width of planning corridor)
- – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



Shift entrance to west; assess need for traffic signal

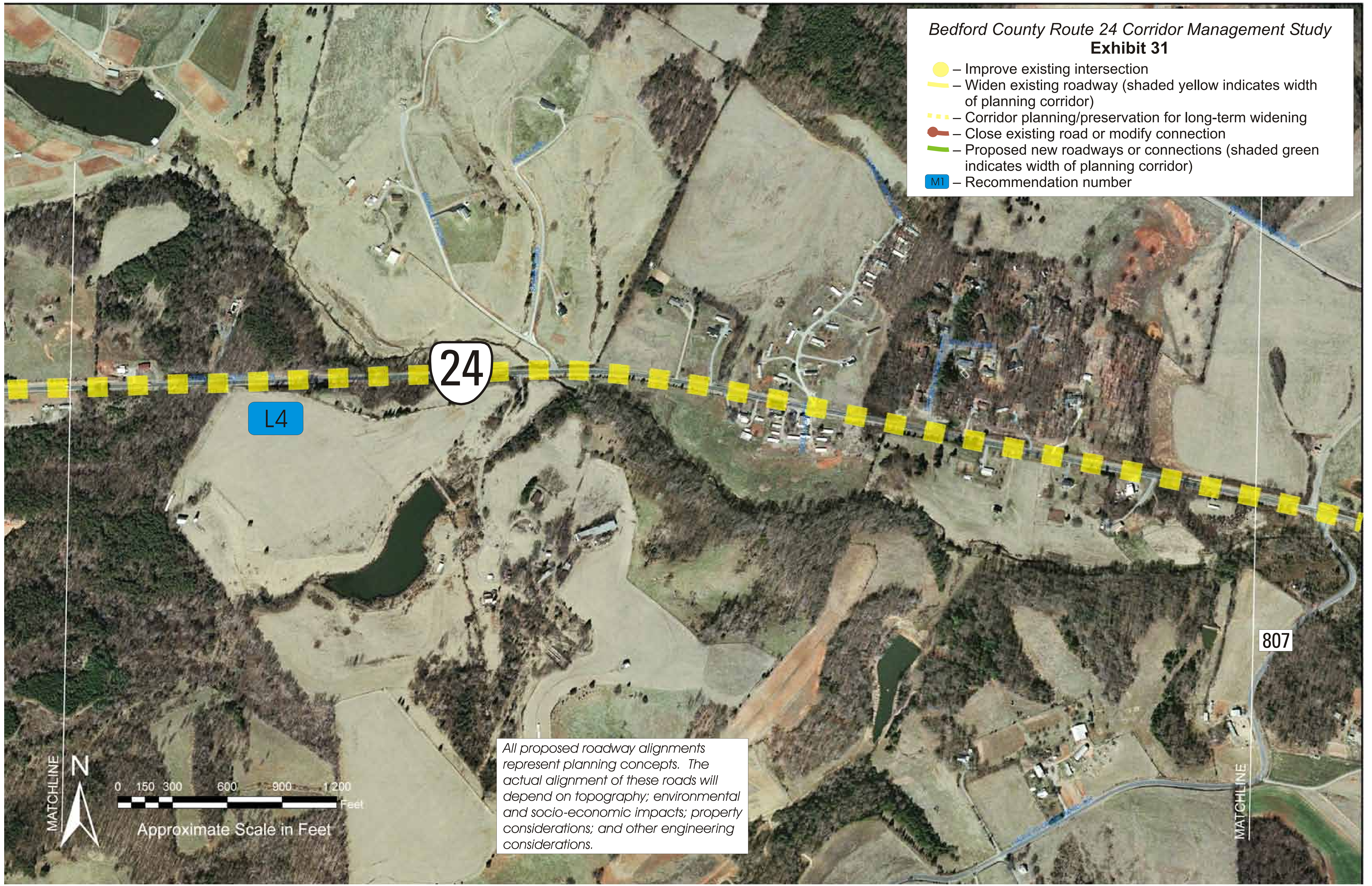
All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.

0 150 300 600 900 1,200 Feet

Approximate Scale in Feet

Bedford County Route 24 Corridor Management Study  
Exhibit 31

- – Improve existing intersection
- – Widen existing roadway (shaded yellow indicates width of planning corridor)
- ▨ – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



L4

24

807

MATCHLINE

MATCHLINE

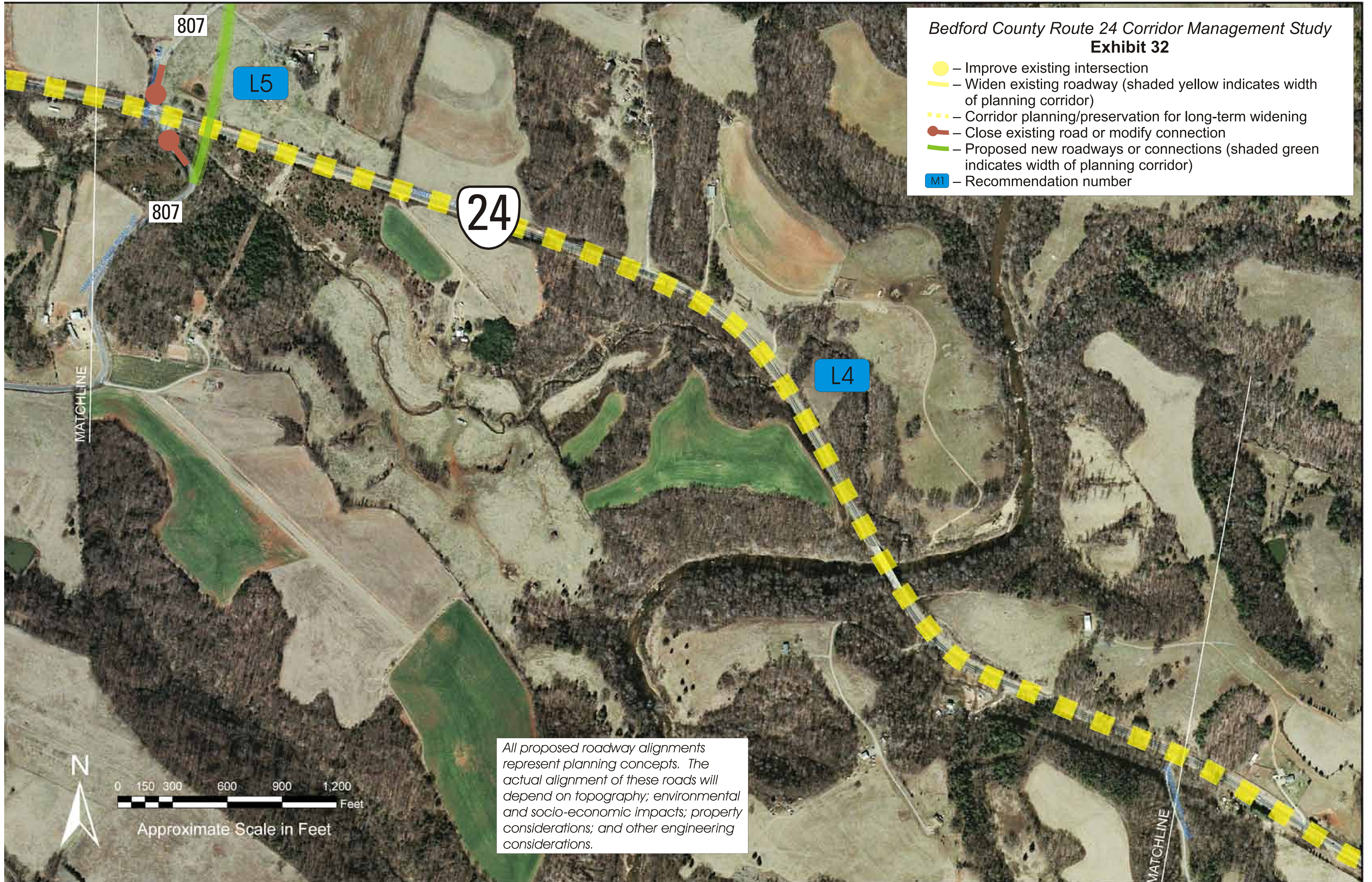
0 150 300 600 900 1200 Feet

Approximate Scale in Feet

All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.

Bedford County Route 24 Corridor Management Study  
Exhibit 32

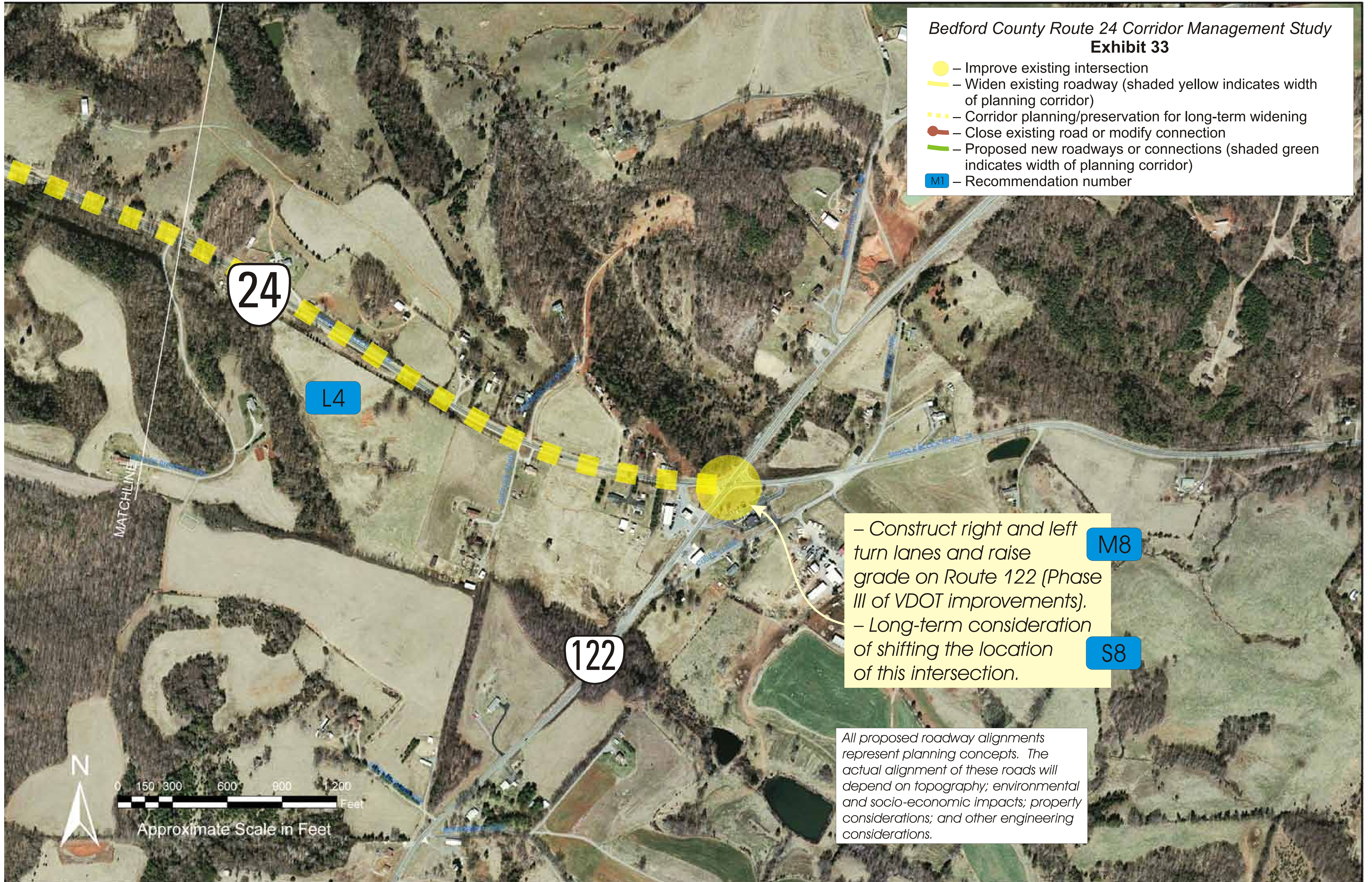
- – Improve existing intersection
- ▬ – Widen existing roadway (shaded yellow indicates width of planning corridor)
- ▬ – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- ▬ – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.

Bedford County Route 24 Corridor Management Study  
Exhibit 33

- – Improve existing intersection
- ▬ – Widen existing roadway (shaded yellow indicates width of planning corridor)
- ▬▬▬ – Corridor planning/preservation for long-term widening
- – Close existing road or modify connection
- ▬▬ – Proposed new roadways or connections (shaded green indicates width of planning corridor)
- M1 – Recommendation number



– Construct right and left turn lanes and raise grade on Route 122 (Phase III of VDOT improvements).  
– Long-term consideration of shifting the location of this intersection.

All proposed roadway alignments represent planning concepts. The actual alignment of these roads will depend on topography; environmental and socio-economic impacts; property considerations; and other engineering considerations.

0 150 300 600 900 1200 Feet  
Approximate Scale in Feet