# I-95 Corridor Study
## Including Route 802, Route 54, and Route 30 Interchanges

**Hanover County / Town of Ashland**
**Virginia Department of Transportation**
**Transportation and Mobility Planning Division**
**Reference No. TPD 02-02**

# *FINAL REPORT*

# *EXECUTIVE SUMMARY*

Hanover County is one of the fastest growing counties in Virginia, with industrial, commercial, and residential land uses growing along the Interstate 95 (I-95) corridor from the I-95/I-295 interchange to the Caroline County line. The Town of Ashland, the only incorporated town in Hanover County, is experiencing similar development pressures, especially adjacent to the I-95 corridor. To meet the travel demands of the anticipated growth, capacity improvements are needed for the I-95 mainline and its interchanges at Route 802 (Lewistown Road/Exit 89), Route 54 (Ashland/Exit 92), and Route 30 (Kings Dominion theme park/Exit 98). To preserve right-of-way for these capacity improvements, a master plan is needed for the corridor that VDOT, Hanover County, and Ashland can use for their planning purposes.

The I-95 Corridor Study is a planning-level study that has been directed by the VDOT's Transportation and Mobility Planning Division (TMPD) and coordinated closely with a Technical Advisory Committee (TAC) representing a number of stakeholders of the study. The goal of this study has been to develop practical and feasible concept solutions needed to address operational and safety concerns, as well as future capacity requirements, for the I-95 mainline and the three existing interchanges in the study area. Led by Kimley-Horn and Associates, Inc., the study team has analyzed current and future year traffic volumes, investigated operational and geometric deficiencies, and developed interim and long-term solutions for meeting the travel demands of 2025.

The report documents the data collection and analysis efforts, and it presents findings and recommendations that have been coordinated with representatives from VDOT, Hanover County, the Town of Ashland, the Richmond Regional Planning District Commission, and the Federal Highway Administration. The findings and results of this study were presented in public meetings to the Hanover County Board of Supervisors and the Ashland Town Council for review and comment prior to the completion of the Final Report. The recommendations in this report are a consensus-based set of preferred concepts that provide a master plan for the next steps in the planning process.

### *BACKGROUND*

As a major north-south route through Virginia, I-95 serves many counties, cities, and towns. In Hanover County and the Town of Ashland, this regional corridor and its interchanges serve as routes to and from local destinations, including retail, industrial, recreational, tourist, and residential areas. This study was driven by the need to balance local, regional, and interstate travel demands with existing and projected development along the corridor.

From a regional perspective, the study area boundary was generally defined as I-295 on the south, the Caroline County line on the north, U.S. Route 301 on the east, and U.S. Route 1 on the west. From a conceptual planning perspective, the study area is defined as the 13.5-mile I-95 corridor including the interchanges of I-95/Route 802, I-95/Route 54, and I-95/ Route 30, bounded to the east and west by the limits of interchange improvements.

### *DATA COLLECTION*

Collection of documentation and existing data for this study began in July 2002 and included current planning reports and related documents, as-built plans, crash data, the existing regional transportation model, and existing traffic counts. Collection of new traffic data began in August 2002 and included tube counts, turning movement counts, photography, and videotaping. The data collection task also included development of base mapping for the study area through digital aerial photography.

### *ANALYSIS AND FINDINGS*

The analysis included a review of the documentation and data and looked at the current land use and potential economic growth along the corridor. Traffic data, crash data, and geometric deficiencies were then analyzed and findings were obtained. These results led to the development of recommended solutions for specific mainline and interchange capacity improvements.

**Existing Corridor**: In Hanover County and Ashland, a 4-lane section of I-95 was built in the late 1950's and early 1960's as a north-south route, parallel to the aging U.S. Route 1. The three study area interchanges were also built during this time frame. Over the decades, this section of I-95 has been widened and maintained as local, regional, and interstate traffic has grown. The interchanges have also been maintained, but retained their original configurations, with the exception of the I-95/Route 30 interchange, which was modified to accommodate access to and from the Kings Dominion theme park.

**Traffic Volumes**: Average annual daily traffic (AADT), AM peak, and PM peak volumes for each of the major roadway segments within the I-95 corridor were derived for current year (2002) and future year (2025) conditions. The TAC approved the derivation process and concurred with the volumes, which were used in analyzing existing conditions, future no-build conditions, and the preferred concepts of mainline and interchange capacity improvements. Future traffic growth assumes that the current pattern of trip making continues, influenced by local (study area), regional, and state increases in population and employment. The projections of traffic for 2025 relied on the regional model (developed in 1998), current trends in development, and updated assumptions on future growth and transportation networks.

**Crash Analysis**: The study team researched the vehicle crash history of the study area, obtaining data maintained by VDOT. A traffic safety and crash analysis for 3 years of data (January 1, 1999 through December 31, 2001) was conducted for I-95, Route 802, Route 54, and Route 30. The majority of crashes on I-95 occurred at or adjacent to the study area interchanges. In the 3-year study period, 731 crashes, or 79% of all crashes in the study area, occurred on I-95. These crashes were primarily rear-end and sideswipe collisions attributable to ramp-related vehicle movements. On the arterial streets, rear-end crashes and angle collisions were relatively common.

**Operations Analysis**: With the derivation of traffic volumes for each of the roadway segments within the study area, and the quantification of geometric characteristics through the base mapping developed for this study, detailed analysis of traffic operations was possible. This analysis included the use of Highway Capacity Software (HCS), the Highway Capacity Manual (HCM), and CORSIM and SYNCHRO analysis packages.

**Year 2002 Existing Conditions**: In general, the I-95 mainline today operates at Level of Service (LOS) C or better. Current year (2002) AADT volumes for non-holiday periods range from approximately 90,000 to more than 110,000 vehicles per day. A significant characteristic of this corridor is that the mainline is saturated with traffic for 12 to 14 hours each day. During peak travel periods or holidays, or when incidents occur, traffic operations can rapidly worsen and can often be described as slow-and-roll or stop-and-go.

**Year 2025 No-Build Conditions**: "No-build" conditions for the purposes of this corridor study imply that no mainline widening or major interchange improvements will take place prior to 2025. Only those improvements listed in the Comprehensive Plans of Hanover County and the Town of Ashland, as well as those listed in the *constrained* 2023 Richmond Area Long-Range Transportation Plan (LRTP), were considered for the no-build network. The analysis of Year 2025 no-build conditions included the application of the Year 2025 Projected (study) traffic volumes on a network of roadways that realizes very few capacity improvements in the next 20 years. As expected, given a 6-lane section on I-95 in 2025, future year traffic volumes applied to the no-build network resulted in LOS D through F.

***Year 2025 Master Plan Conditions**:* "Master plan" conditions for this study are those that result from the recommended master plan of improvements. The analysis of Year 2025 master plan conditions, including the application of Year 2025 projected traffic, resulted in LOS D or better for the I-95 mainline and the interchange ramps.

**Summary of Findings**: Findings from this study have emerged from the review of data and documentation, field observations, an understanding of the projected land use, and the analysis of future traffic conditions. These following findings were supported by feedback from stakeholders and the members of the study's TAC:

- The I-95 corridor today is approaching capacity, and level of service is greatly affected by incidents. Mainline truck traffic percentage is high at 15% to 20%.
- A majority of the traffic is interstate and inter-regional, passing through Hanover County and the Town of Ashland.
- U.S. Routes 1 and 301 serve as diversion routes to I-95 when backups occur due to high traffic volumes or incidents.
- Crashes in the study area are generally volume related, and crash rates are higher than state averages.
- Geometric deficiencies are minimal, except for vertical and horizontal clearances at some of the bridges in the corridor.
- Traffic in the study area is expected to grow significantly by 2025, due to increases in inter-regional travel through the study area, and due to development growth.
- The no-build scenario will not provide the capacity needed to meet projected increases in traffic on I-95 and the interchanges.
- Year 2025 traffic volumes entering and exiting the interstate indicate the need to add capacity to all 3 existing interchanges.
- Year 2025 traffic volumes on the mainline and the high truck percentage indicate the need to widen the mainline from 6 to 10 lanes.

***PROPOSED SOLUTIONS***

Based on these findings, this I-95 Corridor Study has produced a set of Preferred Concepts that could be considered a master plan of solutions for the study area. These proposed solutions are comprised of a set of capacity improvements that will require more detailed study, local advocacy for funding, and programming into the VDOT Six-Year Improvement Program. Note that this study reflects a fiscally unconstrained vision and therefore has not been limited by air quality, environmental, or financial planning constraints in developing concept solutions to meet the corridor needs in 2025.

In close coordination with the TAC, the study team developed 17 "Preliminary Concepts" for the interchanges. These solutions were reviewed by the TAC, and the number was pared down to 2 to 3 "Alternative Concepts" per interchange, which were analyzed further. Upon subsequent TAC review, a "Preferred Concept" was chosen for each interchange. In addition, the study team also addressed the mainline needs and developed typical sections to supplement the interchange concepts.

A full range of options was considered for each interchange, including variations on the cloverleaf design, the addition of flyover ramps, and single point urban interchange (SPUI) designs. The options that were chosen for further study by the TAC were determined to be more functional, given the projected land use and traffic movements, and practical, given the amount of right-of-way required (currently developed or undeveloped), perceived cost, and anticipated construction and phasing issues.

**I-95/Route 802 (Lewistown Road) Interchange (Exit 89)**: The Preferred Concept for the I-95/Route 802 interchange is a full cloverleaf design, replacing the existing diamond and including collector-distributor (CD) roads on both sides of the I-95 mainline. The mainline through the interchange, and north and south of the interchange, is a 10-lane section with a median barrier to separate traffic, given that little right-of-way would be available for a grass median. The existing 2-lane bridge on Route 802 over I-95 would be replaced with a bridge accommodating the wider arterial roadway (4 lanes with 16-ft median) and the loop ramps.

**I-95/Route 54 (England Street) Interchange (Exit 92)**: The Preferred Concept for the I-95/Route 54 interchange is a partial cloverleaf design, with a flyover ramp and CD roads on both sides of the I-95 mainline. The ramp in the NE quadrant remains, while a ramp in the SE quadrant is added. The ramps on the west side of I-95 remain in their current location, thus preserving the developed land (existing retail areas) on the west side of the interchange. The current left-turn movement from westbound Route 54 to southbound I-95 (left turn on Route 54) is replaced by the fly-over ramp. The mainline through the interchange, and north and south of the interchange, is a 10-lane section, with a median barrier to separate traffic. The existing bridges on Route 54 over I-95 would be replaced with one or two bridges accommodating the wider arterial roadway (6 lanes with median) and the loop ramps to and from the east side of I-95.

**I-95/Route 30 (Kings Dominion Boulevard) Interchange**: The Preferred Concept for the I-95/Route 30 interchange is a modified cloverleaf design that improves on the existing configuration to meet future travel demand. The concept adds CD roads to both sides of the I-95 mainline. The existing loops in the SW and NW quadrants are lengthened, and loops in the SE and NE quadrants are added. The ramps on the west side of I-95 are pushed further to the west, making use of a parcel of land that has limited development potential due to poor access (bordered by the interstate and railroads). Ramps on the east side of I-95 are

widened and lengthened. The ramp from I-95 NB separates traffic destined for Kings Dominion (KD) before reaching Route 30. A new on-ramp from KD is added, with a bridge over the off-ramp, allowing traffic from KD to access I-95 without mixing with traffic on Route 30.

The mainline through the interchange and north and south of the interchange is widened to a 10-lane section, with median barrier at the interchange, transitioning to/from the existing wider median with grass and trees. The existing bridges on Route 30 over I-95 and over the southbound ramp to KD would be replaced with a bridge accommodating the wider arterial roadway (6 lanes with median) and the loop ramps. The existing bridge into KD would be replaced.

**I-95 Mainline**: During the development of interchange concepts, the study team and the TAC also developed concepts for widening the mainline from 6 to 10 lanes to meet future travel demands. The concept includes 12-foot lanes and 12-foot inside and outside shoulders. The current right-of-way available along this corridor within the study area varies in width. In some areas (especially in Ashland and south toward I-295), a narrower 250-foot section with a concrete median barrier would be needed. In areas with a wider right-of-way, widening to 10 lanes could occur to the inside or outside of the current 6-lane section, depending on design and aesthetic considerations.

**Operational Analysis and Conclusions**: For the analysis of the Preferred Concepts, the 2025 projected traffic volumes were applied to the 2025 master plan network of the conceptual improvements. This network included the implementation of projects in the Comprehensive Plans of Hanover County and the Town of Ashland, combined with the Preferred Concepts discussed above. It can be concluded from the results of the analysis that the Preferred Concepts meet the needs of projected travel demand in 2025. The Preferred Concepts also are a significant improvement over the No-Build conditions.

***RECOMMENDATIONS***

The overall recommendation of this study is for the stakeholders of the I-95 corridor in the study area to consider the Preferred Concepts described in this report in their ongoing planning processes, and in preserving right-of-way for future capacity improvements. The Preferred Concepts as a whole should be considered as a master plan of projects to be developed and programmed.

**Possible Interim Projects***:* Each of the interchange concepts described in this study could be implemented in phases as a series of interim projects. In addition, short-term projects could be implemented in the next 3-5 years to enhance the capacity of the existing interchanges and the I-95 mainline, including:

- Install traffic signals at appropriate intersections within the interchanges
- Widen and lengthen interchange ramps to accommodate additional traffic and to provide greater acceleration/deceleration distance
- Provide turn lanes on the arterial roadway within the interchanges
- Implement ITS applications such as ramp metering, highway advisory radio, variable message signs (portable or permanent), and CCTV cameras
- Add/upgrade wayfinding signage along interstate for destinations such as Kings Dominion, Virginia Beach, and other tourist spots

- Reconfigure Kings Dominion parking gates to minimize backups on I-95 by moving gates to the east to provide more storage for arriving cars; consider upgraded, efficient “mega-gate” to handle all incoming vehicles, eliminating the gate just each of the flyover bridge
- During incidents, lift commercial restrictions that require trucks required to use right 2 lanes only

Possible projects for the mid-term (5-10 years) include:

- Replace bridges to fix clearance deficiencies (ideally constructing the bridge needed for the ultimate interchange configuration)
- Construct partial cloverleaf interchanges of one, two, and/or three loops as part of the ultimate configurations
- Construct CD roads on I-95 as part of the ultimate configurations

**Planning Costs**: The cost of implementing the Preferred Concepts (in 2003 dollars) is likely to range between $233 million and $292 million. This range is based on a rough-order-of-magnitude (ROM) cost projections consisting of planning-level estimates only. The estimate is intended for use by VDOT, project stakeholders, and local officials to use in follow-on planning for improvement projects within the I-95 corridor study area.

## Summary and Next Steps

The I-95 Corridor Study has been a 12-month planning effort under the direction of VDOT TMPD and in coordination with a Technical Advisory Committee representing the stake-holders of this study. The study area has included 13.5 miles of I-95 in Hanover County and Ashland, Virginia, including interchanges with Route 802, Route 54, and Route 30.

The Final Report is envisioned to be a planning tool to identify anticipated right-of-way requirements within the study area, to address access issues near the interchanges, and to develop specific projects that can be executed through the traditional planning processes of the stakeholders, including the Comprehensive Plans of Hanover County and the Town of Ashland, the Richmond Area 2026 Long-Range Transportation Plan (LRTP), and the VDOT Six-Year Improvement Program.

The next steps in the planning process for improving the I-95 corridor and its existing interchanges involves community and local government leaders advocating for the improvements through the transportation planning processes of VDOT, Hanover County, the Town of Ashland, and the Richmond Regional MPO. No specific projects related to the mainline or the interchanges are identified in the current VDOT Six-Year Improvement Program. If funding is available in the future and projects within the master plan are programmed, the next logical step will be to conduct preliminary engineering and to study environmental impacts of the improvements in a more detailed location study.