

Transportation Systems Matter

Jonah Fogel

In coming years, demand will increase for roadway, rail system, port, and airport improvements. If current growth patterns continue, these improvements will be more likely to occur in those less populated counties which border metropolitan localities. In 2000, 37 of Virginia's 57 non-metropolitan counties (99 total counties) bordered metropolitan areas (Miller, 2003). The expected development will, in turn, influence the distribution, capacity, and convenience of transportation infrastructure already burdened by today's users.

To achieve a high quality of life for all Virginians, close coordination between transportation planning, land use planning, and economic development at all levels of government needs to occur. Careful analysis and transportation planning in fringe and rural areas is needed to produce coordinated plans. However, rural areas have the least capacity to plan for such improvements, relative to presently urbanized areas due to staffing and funding issues.

This article summarizes the state of Virginia's transportation infrastructure and expected future demand. Infrastructure demand is explored by examining socioeconomic trends, public policies, and expected levels of use. Special consideration is given to rapidly urbanizing rural and suburban areas. Finally, planning practices are discussed that are likely to accommodate transportation, land use, and economic development needs.

The State of Virginia's Transportation Infrastructure

Virginia is located within a day's drive of 50 percent of the nation's population. Virginia's transportation system presently consists of over 70,000 miles of highway, 67 airports, 4 port terminals, 40 public transportation systems, and over 3,100 miles of railroad track (VDOT, 2003).

Roads

Virginia's roads are classified into four major categories: interstate, primary, secondary, and urban. Interstate and primary roads provide connections between other states, cities, and towns, and are state maintained. In addition, all secondary roads, which represent local connector and county roads, are state maintained except those in Arlington and Henrico counties. These municipalities maintain their own secondary roads. Urban streets within cities and towns are jointly maintained by local and state funds.

Virginia Department of Transportation (VDOT) publishes report cards that summarize the condition of Virginia's roadways.¹ In 2006, 11.5 percent of the state's interstate and 15.4 percent of primary pavement needed repair (Figure 1). Also in 2006, 49 percent of secondary pavement were in need of work as were 39 percent of all bridges maintained by VDOT in need of repair or rehabilitation (VDOT, 2006).

The percentage of roads in need of repair is likely to increase as the wear on existing infrastructure increases. Over the last 20 years, vehicle miles traveled (VMT), a measure used to estimate the use of roadways, increased 79 percent, transit ridership increased 58 percent, the number of registered vehicles has increased 53 percent, and the number of licensed drivers has increased 34 percent (VDOT, 2003). In the same time period maintenance costs have increased substantially. For every dollar now spent on highway construction today, about \$1.85 is spent on maintenance. In addition, state transportation revenues have lost 40 percent of their buying power. The state motor fuel tax rate has remained unchanged for more than 20 years despite rising inflation.

¹ Virginia Department of Transportation

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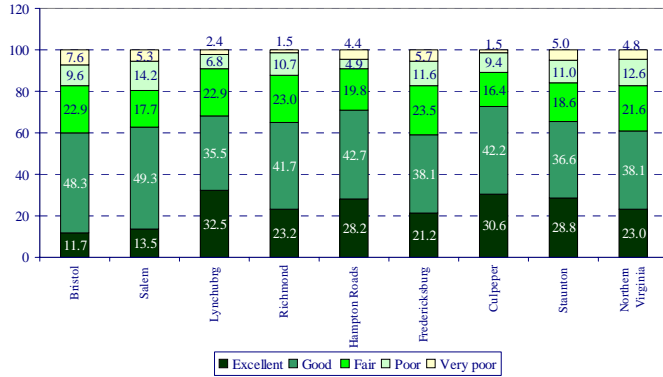


Figure 1: Road Conditions by VDOT District (Source: Virginia Department of Transportation, 2006)

New legislation (HB 3202) passed in February 2007 provides for \$3 billion in state bond funding to help offset increasing operation and maintenance costs (Kaine, 2007). Increased funds notwithstanding, leveraging non-state funds has become a necessity in the maintenance and improvement of Virginia’s roadways. A currently adopted multimodal transportation plan, VATrans2025, is designed to maximize the impact of available funding by reducing roadway demand.

Public Transit

The Virginia Department of Rail and Public Transportation (VDRPT) is responsible for rail, public transportation, and ridesharing. The department works with two passenger railroad companies, 40 public transportation operators, and 15 ridesharing programs (VDOT, 2006). These transit systems operate a variety of vehicles, depending on their service area and population. They include trains, buses with fixed route services, and demand-responsive services such as vanpools.

Use of public transportation (3.6 percent state average) varies widely by locale. For instance, about 16 percent of Alexandria residents ride public transportation. In contrast, only 1.3 percent of Caroline County residents use public transportation (Miller, 2003). Many public transit systems in rural Virginia are “demand-response” systems that pick up citizens on request. These transit systems are often designed to cater to elderly and disabled citizens but often do not have weekend or evening service. Many rural areas lack transit

service altogether. Demand-response systems are relatively inexpensive to operate relative to other public transportation services, at \$45.12 per hour in service, but are the most expensive form of public transit for passengers at \$2.90 per mile (VDOT, 2003).

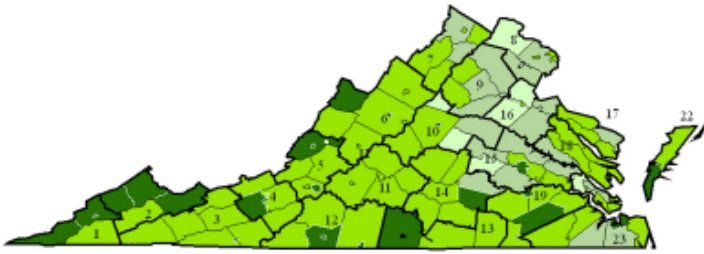
Most public transit vehicles are past their recommended replacement age. VDOT notes that vans require replacement every four years. In 2001, 48 percent of rural vans and 66 percent of small urban vans are beyond their recommended replacement age of four years (VDOT, 2003).

In contrast to rural public transit, urban areas such as northern Virginia have access to passenger rail service. One well-subsidized system, the Virginia Railway Express (VRE) system, is expensive to operate (\$410.51 per hour of service) but very cheap to ride, \$0.29 per passenger-mile (VDOT, 2003). The high cost of operation, in part, stems from an aging fleet of locomotives and associated infrastructure. In turn, ridership of these trains has decreased because of a lack of amenities and in-route delays. To alleviate ridership losses, the transportation funding package approved by Virginia lawmakers this year will provide VRE with an additional \$25 million a year for capital improvements and operating expenses, which were \$42 million for the 2006 fiscal year (Miroff, 2007). Greater public and private investment in regional light rail services could improve performance and extend service areas, thereby increasing ridership.

Transportation Demand

Four areas have been identified that affect transportation demand: socioeconomic changes, public policy, freight trends, and personal transportation preferences (Miller, 2003). Generally, socioeconomic factors are the strongest influence on demand. An understanding of population and economic growth can provide an indication of future travel related needs. The population of the state is expected to rise by more than two million people between now and 2025. More than three-quarters of this increase will occur in four of Virginia’s most urban planning districts (Figure 2). However, areas characterized as rural or suburban will also see significant increases. For example, the districts from northern Virginia south through Richmond are estimated to have from 40 to over 80 percent increase in population.

Approximately 25 percent of Virginians presently live in rural parts of the state. Compared to non-rural settings, rural communities have low density, fewer public transportation options, and poorer road conditions. However, development conditions in many areas are rapidly changing. Some counties currently considered rural or suburban, such as Greene, Fluvanna, and Powhatan counties, are projected to see population density increases on the order of 50 percent by 2025. Population densities may make new transportation services more feasible. But population growth does not



Source: US Census and VCE

Figure 2: Projected percent change in population for counties/cities, 2000 to 2030. Numbers indicate Planning District Commissions, which are districts indicated by black boundary lines.

guarantee the development of transportation services (Miller, 2003).

Population increases are, in part, generated by economic development, primarily in the service sector and wholesale/retail trades: 59 percent and 48 percent, respectively. Urban economic development will continue to outpace rural development. However, personal incomes are expected to rise overall, and the income disparity between poorer and richer Planning District Commissions (PDC) will shrink (Miller, 2003). With an increase in the service sector across a broad geographic area, an increase in freight and passenger traffic is expected, with goods and people traveling further distances and more often.

Tonnage of each mode of freight in Virginia is expected to grow significantly from 1998 to 2020: truck tonnage by 81 percent, rail tonnage 41 percent, and air tonnage by about 300 percent. In addition, VMT is projected to grow by 68 percent between 2000 and 2025 (Miller, 2003). The VMT rate is on the rise because of longer commuting distances; more trips per household; more cars per household; and fewer people per household, which results in more cars on the road. These trends suggest that traffic congestion will be a major concern well into the future. Alleviating congestion has become a major challenge facing economic vitality and quality of life issues in Virginia.

In contrast, people without reliable transportation, especially those in rural areas, face hardships in traveling to and from work, appointments, and childcare. About 200,000 Virginia households do not have a vehicle. The fact that many of these households are in rural counties with fewer transportation options indicates a need for alternative transportation services (VDOT, 2003). In addition, nearly two-thirds of the elderly population lives in rural and suburban areas, where specialized transit services are limited or nonexistent, and where traditional transit services are not well developed.

As the population ages, a growing proportion will live with a disability. Individuals over 65 years old have a 42 percent chance of having a disability, versus 17.5 percent for

people between 21 and 65. A major challenge for people with disabilities is achieving full participation in community life, particularly employment. The availability and reliability of transportation is critical in this regard (VDOT, 2003).

Increasing development, an aging rural population, a lack of transportation choices, and a need for accessible mass transit could inspire increased attention to rural transportation planning. Furthermore, 70 percent of the state-maintained roads are in rural areas. Because rural localities generate limited tax revenues, and because public policy has leaned toward a more local cost-share structure, it will be increasingly important for rural areas to plan for future demands if they are to avoid excessive construction and maintenance costs associated with inefficient transportation design.

To meet the increasing demand for transportation infrastructure, recently passed legislation is providing guidance by 1) developing coordinated state transportation plans, 2) establishing funds for projects prioritized in the planning process, and 3) providing growth management legislation. The legislation, House Bill 771, has led to the development of a statewide, multimodal, long-range transportation plan known as VTrans2025. Four state transportation modal agencies were involved in the development of the plan: Department of Aviation (DOAV), Port Authority (VPA), VDRPT, and VDOT.

As part of this planning process, the condition of existing infrastructure and future infrastructure demands were assessed. The investigators found that to meet increasing transportation demands in the face of funding shortfalls, more planning coordination between local and state governments and between transportation modes is necessary. Fully coordinating transportation between bike and trailways, roads, railways, and airports at a regional scale is necessary to relieve congestion on roadways and reduce future construction and maintenance costs. To accomplish the promise of the VTrans2025 plan requires technology, public policy, and urban design and planning be brought together during local and regional planning efforts. Each has a role to play.

Meeting the Demand

Several factors can influence how the present transportation related challenges and demands are met. Public policy, regional and urban planning, and technology can relieve some pressures on the transportation system. Public policies can be used to increase transportation revenue and alter urban development patterns. Urban planning is being used to increase access to multiple forms of transportation, thereby reducing roadway demand. Technology is being implemented to reduce congestion and facilitate coordination for a highly functioning, multimodal transit system across the state.

Technology

Technology can be implemented to increase efficiency of operations and use of existing infrastructure. Efficiencies can be achieved by coordinating users' needs with service providers. Examples include providing drivers with real-time information of road and traffic conditions or trip customization technology. Another way that might create more efficiency is to reduce VMT through telecommuting. However, disagreement arises about whether increasing telecommuting relieves congestion or increases it by allowing residents to live farther out away from urban centers thus creating sprawl and the need to drive to town for shopping and services (Miller, 2003).

Public Policy

Recent legislation authorized several new rules to guide urban and regional growth patterns that in turn may have implications for future transportation demands.² The goal of this legislation is to increase population density and limit sprawl-type development. Among other benefits, raising density may make new transportation services more feasible. However, population growth does not guarantee their development (Miller, 2003). Increased density also facilitates the protection of farm and forestland by concentrating residential development rather than excessively subdividing prime farm and forest lands.

Two pieces of legislation effective July 1, 2007 directly control density: urban development areas (UDAs) and road impact fees. UDAs are mandatory in 57 localities as outlined in House Bill 3202, a major transportation bill, enacted in April 2007. Urban development areas provide a boundary around an urban center large enough to accommodate 10 to 20 years of expected population growth. UDAs must allow minimum residential densities of four dwelling units per gross acre and commercial densities of 0.4 square foot floor area per gross acre. Combined with incentives such as exemptions from fees or expedited subdivision plan approval, UDAs can promote development in support of transportation and economic development goals (McCormack, 2007).

Second, road impact fees are now authorized in 49 counties (McCormack, 2007). A road impact fee is assessed on new development to offset the cost of transportation improvements that are necessary due to that development. The fees serve as a disincentive to locate development where road capacity is insufficient to accommodate more traffic.

² For a summary of 2007 legislation that directly addresses land use and transportation demand see *Virginia's Quiet Revolution in Land Use Control* found at <http://www.vaco.org/sitefiles/pdfs/newsletter/july15newsletter.pdf>.

Additionally, municipalities can choose to waive road impact fees inside UDAs to further add incentive for dense development.

Other incentives to promote density include purchase of development rights and transfer of development rights programs. For more information on development rights programs, the Virginia Forest Landowner Education program at Virginia Tech offers the Forest and Farmland Conservation Strategies short course.³

Urban Design and Regional Planning

The stated goal of a statewide, multimodal transportation plan is to "create a more integrated, convenient, and efficient transportation system for all of the Commonwealth's travelers." (VDOT, 2003) A primary factor in realizing this goal is establishing an interconnected network of transportation modes to provide multiple choices for people and goods to move from origin to destination. An efficient, integrated network requires that decisions about where to place major facilities such as airports and commercial centers be made at the regional level.

To achieve the desired integration, intermodal planning and regional cooperation by local governments are needed. However, local governments, municipal planning organizations, PDCs, and transportation agencies do not have strong incentives to cooperate with one another on transportation, land use, and economic development issues. Issues regarding tax revenue sharing between local governments within a region and jurisdictional coordination between local land use planning and state level transportation planning need to be resolved (LGC, 2007). Regional transportation plans are likely to alleviate local transportation demands and might decrease overall management and construction costs at the state level.

The ultimate success of a multimodal transportation network lies in how it is perceived by regular users. Creating "livable" places is the role of urban design. Good design, in part, provides convenient alternatives to car travel and access to work, shopping, and recreational activities, thereby integrating seamlessly with the transportation network. These values are embodied in the design principles of new urbanism.

New urbanism brings together the ideas of compact development, a multimodal transportation system, and architecturally appropriate forms to protect the characteristics of local places (*newurbanism.org*). Often, new urbanist design is not permitted under existing zoning and ordinances. To overcome this hurdle, codes related to residential density, mixed use (residential/commercial), parking, and street design will need revision. Many resources currently exist to support

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transforming traditional codes to “smart growth” and new urbanist standards.

Conclusion

Demand for transportation infrastructure, driven by population increases and poor urban planning practices, are increasing the costs of infrastructure maintenance and construction of new capacity. The responsibility to provide the state with a functional and sustainable transportation system will fall largely to rapidly urbanizing areas around existing metropolitan areas. Simultaneously, the funding and professional expertise necessary to provide for these improvements are very limited. Only by working at a regional scale, across local jurisdictions, can enough resources and expertise be assembled to implement the VATrans2025 plan.

A robust multimodal transportation network, as envisioned in the VATrans2025 plan, will help relieve congested roadways, increase opportunities for healthy lifestyles, and protect natural resources. By combining changes to public policy, regional planning, urban design, and technological innovations, Virginia’s communities will likely be able to meet the coming transportation demands. Many challenges regarding funding and cultural histories await our local governments in this planning process.

References

Kaine, Timothy M. Governor Kaine Submits Amendments to Transportation Bill (HB 3202). Press Release March 26, 2007. Found at <http://www.governor.virginia.gov/MediaRelations/NewsReleases/viewRelease.cfm?id=365>.

- McCormack, Ted, Virginia’s Quiet Revolution in Land Use Control. In “County Connections”, Newsletter of the Virginia Association of Counties, June, 15, 2007.
- Miller, John S., Technical Assistance Report: Expected Changes in Transportation Demand in Virginia by 2025. Virginia Transportation Research Council. Charlottesville, Virginia. VTRC 03-TAR5. June, 2003.
- Miroff, Nick VRE’s Ridership Decline Continues. Washington Post Saturday, May 5, 2007; Page B01. Found at <http://www.washingtonpost.com/wpdyn/content/article/2007/05/04/AR2007050401977.html>.
- NewUrbanism.org, 1998. New Urbanism. Found at www.newurbanism.org.
- Smart Growth Online. Found at <http://www.smartgrowth.org/library/ldrlist.asp>
- Virginia Department of Transportation (VDOT). Virginia’s Statewide Multimodal Long-Range Transportation Plan Phase 2 Report to the General Assembly. Richmond: Virginia, 2003.
- Virginia Department of Transportation (VDOT). Virginia’s Transportation Performance Report 2006. available online at <http://www.vtrans.org/>.
- Virginia’s Region 2000 Local Government Council (LGC), Central Virginia Regional Action Plan for Coordinated Land Use and Transportation Planning. May 25, 2007. Found at [http://www.centralvirginiafuture.com/Documents/Final percent20Draft percent20Report.pdf](http://www.centralvirginiafuture.com/Documents/Final%20Draft%20Report.pdf).

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